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**THE STATE OF LABOUR IN THE DIAMOND
INDUSTRY IN INDIA
WITH SPECIAL REFERENCE TO GUJARAT
STATE**

THESIS SUBMITTED
TO
SAURASHTRA UNIVERSITY
FOR THE AWARD OF THE DEGREE
OF

DOCTOR OF PHILOSOPHY

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**DEPARTMENT OF COMMERCE AND BUSINESS
ADMINISTRATION
SAURASHTRA UNIVERSITY – RAJKOT**

JANUARY – 2007

This Research is Dedicated

to my loved

Grand Parents

Lt. Smt. Ratanben B. Kanani

Lt. Shri Bhimjibhai H. Kanani

Gautam Kanani
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...CERTIFICATE...

This is to certify that Mr. GAUTAM P. KANANI has carried out the research work and submitted the thesis entitled "THE STATE OF LABOUR IN THE DIAMOND INDUSTRY IN INDIA: WITH SPECIAL REFERENCE TO GUJARAT STATE" for the degree of DOCTOR OF PHILOSOPHY in the subject of commerce under my guidance and supervision. To the best of my knowledge, this is his original contribution and the work contained in this thesis has not been previously submitted to any other university for any degree.

Place: Rajkot

Date: __ / __ / ____

(Dr. A. K. Chakrawal)
Guide

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Place: Rajkot

Gautam P. Kanani

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CHAPTER-1

INTRODUCTION



CHAPTER -1

INTRODUCTION

Introduction:

Diamonds are fascinating, both in their ability to catch the light, and in their ability to fetch high prices. However, what is as fascinating as the diamond itself and the prices it fetches, is the way in which the diamond industry works.

The international trade in diamonds and gemstones has for decades provided vast profits for the companies which mine, process and market these precious stones. Yet the workers who cut and polish precious stones often receive poor wages, and tens of thousands of children work full time in the industry, denied the opportunity to go to school and to play. The steady increase in the demand for diamonds and gems since the 1960's has, along with the secretive and unregulated nature of the processing industry, drawn a steadily growing number of children into the industry.¹

The industry has three main stages.

¹ www.ilo.com

- i. mining,
- ii. cutting and polishing of raw or "rough" diamonds; and,
- iii. trading and retailing

These processes can happen within countries - some diamonds are mined and processed in the same country, or as in the case of most diamonds, mined in one country and cut and polished in a second country.

While there are 19 countries where diamonds are mined, the major producers are Australia, Zaire, Botswana, Russia, South Africa, Angola and Namibia, and a number of lesser producers such as Sierra Leone and Zimbabwe. As competition intensifies in the diamond industry, the major diamond mining companies are actively seeking to mine deposits in places such as Canada and in the north of the Nordic countries.²

The 'big four' diamond cutting centers are Antwerp, (Belgium), New York, (US), Ramat Gan (Israel) and Mumbai (India), but there are additional smaller centers in Thailand, Sri Lanka, China and Russia. The 'big four' cutting centers are also the main diamond trading stations, with the addition of Hong Kong, which services buyers in Asia.

² www.gjepc.org

In general, the diamond trade has continued to generate increasing profits, with most markets stable or growing, although sales in Asia, particularly in Japan, are sluggish.

The majority of the world's diamonds are traded through the Central Selling Organization (CSO), the marketing arm of De Beers, based in London. De Beers is the biggest player in the world diamond trade controlling the sale of most of the world's diamonds. The CSO traces its origins to efforts by De Beers in the 1920's to organize and regulate the diamond trade, and it has since that time lived up to its name, virtually controlling the trade in diamonds.³

An important exception to this is the large Argyle Diamond mine in Western Australia, which withdrew from the CSO in mid-1996 to market its own product, consisting mainly of industrial diamonds, lower priced gem diamonds and some very expensive "pink" diamonds which fetch huge prices on international markets. Argyle is controlled by Rio Tinto Ltd through its 60% holding in the Argyle joint venture. Rio Tinto is the Australian arm of UK-based mining company Rio Tinto Ltd. The remaining 40% of the Argyle

³ Pathak, H. N., (1984) 'Diamond Trade and Industry in India: Diamond Cutting and Polishing Industry of Gujarat', I.I.M., Ahmedabad. P.No.-123

joint venture is owned by Ashton Mining Ltd, one of the world's major diamond mining companies. Argyle is the main supplier of rough diamonds to the Indian processing industry, and is thought to keep over half of the estimated 5,500 Indian processors busy.⁴

The Indian diamond trade has good cause to worry: over 40 percent of De Beers exports to India, accounting for nearly \$400 million, are composed of Argyle roughs and more than half of India's 5500 diamond manufacturers depend on this business for their livelihood. They fear that oversupply of diamonds in the market could kill their business and they are waiting for a positive signal from De Beers.⁵

That has not yet come and the Indian diamond trade, which cuts the highest amount of small diamonds in the world, is getting increasingly restive at De Beers' attitude. While senior officials of Argyle rushed to India earlier this month to reassure their key clients, De Beers has not done the same, preferring to wait till the next annual meeting with the Indian manufacturers scheduled in October. This is in contrast to a previous occasion last year when De Beers's officials rushed to India when it appeared that Indian traders were planning to visit Russia to establish direct links with sellers.

⁴ 'Diamond Galaxy International'(March-2000) , Gem and Jewellery Informatics', Publication, Surat.P.No.-23

⁵ www. idexonline.com

Argyle's attempts to soothe their Indian clients reflect the importance the company attaches to this country. Argyle roughs are difficult to cut and require a lot of skilled workmanship, something that is available in India in abundance. Trade sources say that if it was not for Indian cutters, these diamonds would be fit only for industrial use and a whole new market has cropped up over the past decade in small diamonds. If the Australian company plans to sell directly into India, it has to keep the trade here on the right side. Indeed, support from India could be a crucial factor in Argyle's future survival strategy.

Argyle broke off its contract with De Beers, to whom it sells 40 million carats a year, with effect from July 1 and declared its intentions to sell directly to clients. India figures prominently in the company's plans and its Bombay office has been overactive in recent weeks, holding meetings with clients to ensure that the relationship is not jeopardized. However, at the same time, there are rumors of Argyle diamonds flooding the market, presumably coming from the Central Selling Organization (CSO) and it is only a matter of time before prices crash. This, say traders, will be bad for the industry in the short and the long term, because Indian manufacturers are already sitting on huge amounts of inventory.

There was talk of an import ban, but in the end the trade bodies decided that the matter would be left to the individual manufacturers. But considering that many traders and manufacturers have been dealing clandestinely with Russian suppliers, there is little chance of a steady inflow of cheap Argyle diamonds slowing down. This could spell doom for the smaller traders who rely on thin margins.

The Indian diamond trade is also worried that the international diamond trade is in for a shake-up which could change the way the business is run. "First the Russians and now Argyle is the cartel crumbling?" traders have begun to ask and are waiting for answers.⁶

The bigger players and sight holders have long standing relationships with De Beers and the CSO and they have offices all over the world. But in recent years, Argyle has, through its own office in India, built strong contacts with Indian manufacturers, which it intends to consolidate. It has given tremendous support to small and medium sized manufacturers and helped them export. With the US and Japanese markets for small diamonds booming, both sides

⁶ Miranda Engelshoven (1999) 'Diamond and Patels : A Report on the Diamond Industry of Surat', J. P. Parry, Jan Breman, Karin Kapadia, The World of Indian Industrial Labour, Sage Publication, New Delhi. P.No.-92

need each other. De Beers too cannot afford to annoy its Indian clients but unless it takes urgent steps to restore the eroding confidence, it may find that it does not have too many supporters left.

The Diamond industry is one of the major industries of India. Its contribution is significant in the economy from employment and exports point of view. The Gujarat state and Surat city in particular has contributed a great deal in the development of diamond industry. The growth of diamond industry has helped the economy of India, Gujarat.⁷

The present exports of diamond industry are worth Rs. 40000 Crores and are likely to touch Rs. 45000 Crores within sometime. This shows the international importance of the industry.⁸ About 15 lacs workers are employed in this industry in Gujarat.⁹ These figures speak about its importance from employment point of view. Out of ten rough diamonds nine are polished in Gujarat. This shows the dominance of Gujarat over diamond industry. No wonder why Surat is known as 'Diamond City'. This

⁷ 'Diamond Galaxy International', (April-2004) Gem and Jewellery Informatics' Publication, Surat.P.No.-79

⁸ www.gjepc.org

⁹ Diamond Galaxy international (December-2005), Published by Gem and Jewellery Informatics' Publication. P. No. 81

industry is pollution free, noiseless and takes no subsidies from the government are some of the major points in favor of this industry.

The diamond industry of Gujarat is mainly unorganized. Hence most of the units in Gujarat are in the unorganized sector while very few are in the organized sector. The diamond industry in Surat is about 45 years old by now. But in the last few years its growth has been very impressive. Most of its workers and entrepreneurs are from Saurashtra region of the Gujarat state. Such migration has taken place because of lot of economic opportunities in this industry.

Since this is a major industry of Gujarat state and its growth has played a major role in the economy of Gujarat, I decided to take up research work on this industry. This thesis deals with state of labor of this industry: With special reference to Gujarat state. According to census of India 1971 near about 84 lack people were doing economical activities in Gujarat. In that ratio proportion of female was 15.76%, which was increased by 1% in 1981 and 2% in 2001 in 2001. In 2001 the numbers of male workers are decreased and numbers of female are increased. This ratio is different in different types of areas. Most of the female workers are getting employment from unorganized sectors. Near about 86% people in Gujarat are

getting employments through unorganized sector. It is sure that unorganized sector is keen for providing employment to unemployed people. The number of employment will be increased in unorganized sector in near future & Diamond industry will be an important employer.

Lack of capital, inexperienced and untrained workers are basic constrains of the diamond industry, but it provides more employment on per capita investment. Diamond industry provides more employment with least capital and less education. Diamond business provides more employment to be the illiterate and less literate people.

Diamond business is providing not only direct employment, but also indirect employment. Indirect employers are exporter, workers in mines, workers related to diamond studded jewellery, workers related to diamond cutting and polishing industry etc.

The working hours of diamond processing centers are flexible and vary from one unit to another. Usually, the total working hours ranges from 7 to 10 hours, starting from 7.00 a.m. till 11.00 p.m. The workers are paid on monthly basis, but their wages calculated on a piece meal wages rate. The piece rate varies for each diamond at different stages; it also depends on the shape and quality of diamond.

During the training period workers are either paid no remuneration or are paid very less amount as a gift or loan. Children are not paid for polishing diamonds right for the moment they are inducted. During the initial one or two months they are given jobs like cleaning the units running errands etc. Once a child wins his employers faith, he is engaged in the diamond polishing jobs. The wages paid to the workers in the diamond industry is found more lucrative compare to many other industries.

Diamond cutting and polishing is hazardous, where the hazard includes painful burns from the sparks generated while cutting, polishing and shaping the diamonds, hands head injury, stresses to the head and arm, loud noise, heat crowded spaces and working under glare of spot light over the work table contribute to a very stressful work environments.

The researcher proposes to investigate the state of labor in Diamond industries in India: with special reference to Gujarat. This study gives details concerning social and economical characteristics as well as demographic particulars of the workers getting employment through diamond cutting and polishing industries in Gujarat state.

Aims and Objectives of the Study

1. The foremost objective of the study is to real economical and social condition of the workers of the diamond industry.
2. To know the working condition of the workers who are working in different types of work related to diamond industry.
3. Most of the people believe that Patel Community constitutes larger area of this business. This study try to find weather Patel are the legend of this business and other community people are entering in this business or not.
4. To know the literacy level of diamond workers in this business.
5. The researcher wants to reveal the rewards level of diamond workers in diamond industry.

6. Training is vitally important in diamond industry. This study tries to find out types of training, period of training and location of training in diamond industry.

Significance of the Study

1. Contribution to the Society

Diamond business is a business of import and export. Diamond industrialist and merchant are importing in rough diamonds and exporting cut and polishing diamonds. So it is the main foreign exchange earner business for Indian economy. The study will contribute to the knowledge of such income to the society.

Most of the people are getting employment through this business and serving their family. The study will contribute towards the knowledge of actual contribution to the society.

2. Contribution to the Knowledge

Most of the diamond business is in unorganized sector. This study tries to give some important guideline to

the people who are interested to enter in diamond industry. Workers who are engaged in this business are not familiar with the primary condition of the work. This study will try to bring this condition in to the knowledge. Whether social and economical condition of workers is good or not. The study tries to gather such knowledge to make familiar to workers about their working method.

Research Methodology

1. Types of the study

The proposed study is of investigating nature. The study will be done by analytical research method. Moreover the study will use the facts and information collected by the researcher and analyzed that information to make critical evaluation.

This study is much concern with proper facts, findings, analyses and evaluation related to the economical and social condition of diamond workers in Gujarat state.

2. Scope of the study

The proposed study covers the workers of diamond industry in Gujarat state.

The study will analyze the social and economical condition of diamond workers in diamond industry in India: which special reference to Gujarat State.

Major Hypothesis to be tested:

The Hypotheses for the present study are as follows.

1. There is no significant difference among the education qualification of the diamond labour.
2. There is no significant difference among earning of the diamond labour.
3. There is no significant difference in money saving quantum by the diamond labour.
4. There is no significant difference in the working hours of the diamond labour.
5. There is no significant difference in the length of the Diwali Holiday of the diamond labour.
6. There is no significant difference in the residential status of the diamond labour.
7. There is no significant difference in the experience of the diamond labour.
8. There is no significant difference in the individual problems of the diamond labour.
9. There is no significant difference in the wages of the diamond labour.

10. There is no significant difference in the debt condition of the diamond labour.
11. There is no significant difference among the caste of the diamond labour.
12. There is no significant difference in the migration Problems Faced by diamond labour.

Data Collection

The data related to this study will be collected by two methods are as under:

1. Primary data

Primary data will be collected through direct interview, personal visits, observations and questionnaire.

2. Secondary data

Secondary data related to this study will be collected by periodicals, journals, magazines, news papers and by other published data. The collected data will be analyzed through appropriate statistical techniques.

Limitation of the Study

- This study is limited to workers economical and social conditions only.
- This study is not much related to financial performance of the industry.
- Data collection of non registered units and the number of people getting employment through this type of units will not be accurate.

Chapter Plan

Chapter No. :-1

Introduction

Chapter No. : - 2

Review of the Literature

Chapter No. : - 3

Diamond industry

1. World
2. India
3. Gujarat

Chapter No. : - 4

State (Condition) of Labor in Diamond industry

Chapter No. : - 5

Findings and Suggestions

CHAPTER-2

REVIEW OF LITERATURE



CHAPTER -2

REVIEW OF LITERATURE

In this Chapter, Researcher has tried to be aware about the researches made in relation to this topic and also described suggestions in opinion with the researcher.

BUSINESS OF SHAPING DIAMONDS:-

**R. C. Shukl & K. M.
Desai,
V.N.S.G.Uni., 1968.**

R.C. Shukl and K.M. Desai have studied the diamond industry on economic and social base. They have studied about the Indian condition in compare to the world, possibility of decentralization of the business, problems of the business, world production, import and export. They have collected the needed data by preparing questionnaires. They have directly and indirectly connected to the workers, exporters and importers. They have also contacted to those who have visited India for the business purpose from abroad.

**IMPACT OF THE DIAMOND INDUSTRY ON THE
SOCIAL LIFE:-**

**Kalathil Methyu,
Delhi Uni. 1973.**

Methyu has done this study by visiting the diamond workers who were living in the five villages nearer to the Navsari District of the Gujarat. He has used England's qualitative analytical method rather than America's analytical method to retain the quality of his study. According to him, population density in Surat and Navsari is much more. In his study he has specified that diamond workers are expecting more out of his income without any types of future planning. In his study he finds most of the workers of the small aged to whom we can say child workers are entered in this business due to their weak economic condition. They have also left out their study for more earning. Methyu also finds some how behavioral and social weaknesses among them. As per his study the condition of the working place was very bad, it seems that workers who are living with the health less worker have possibility to become ill also. He finds that workers were working very hard to earn more money. They are not aware about the labour law. They are not getting the facilities like provident funds, insurance, allowances etc.

According to researcher industry is as same as society. Thus, he finds modernization in this society. He says that this society needs more researches.

**“DIAMOND CUTTING AND POLISHING UNITS”, A
BRIEF REPORT ON SAMPLE SURVEY.**

Mahendra G. Maheta & T. S. Raman

In this brief report they have covered 21 units of diamond industry. They have prepared their report with 590 samples of different workers out of 21 units. They want to give the important result of 9 units in this report. They says that workers average age was 22 years, average experience was 4 to 5 years, average monthly income was 322 Rs. only 7% workers were getting their income between 500 Rs. to 1000 Rs., 52% workers are living 2 km. far from factory, 23% workers are living 8 to 10 km. far from their working place. They have not only studied about the workers but also the profitability of the industry, requirement of finance, types of production etc. As per this study 52 % female diamond workers are of Navasari city. 9 % are of south Gujarat's other districts. Where as 39% is migrated. Out of them 26% are of Gujarat and near areas and 13% are out of Gujarat like Maharastra, Rajasthan, Orissa, Bengal etc. This shows that most of the diamond workers are of nears areas.

There is a relation between education and profession. If the education is high, there is higher profession with higher income. Totally 39% female have completed their education up to primary level, 5% are illiterate, 28% are higher secondary educated and 2% are graduate. There isn't any necessarily of education in this business, even illiterate can also do this business by training, although 95% females are found educated which is very interesting point to know.

Work experience is a very vital factor in any types of business. Out of total studied male 50% have one year to three years experience, 19% have less than 14 years work experience, 17% have 3 to 6 years and 14% have 6 to 10 years work experience. It shows that females are entered in this business before five years. Training is the most important factor in this business. To analyze this factor most of the diamond workers have taken training for 1 to 3 months, 98% have taken training from the owners and 2% have from their relatives, 77% female are found regularly absent. According to them, they were taking leaves because of guests at their houses, due to illness, child's examination, household work etc.

Wage is the main factor to joint in this business. Female diamond workers average income is Rs. 1516. It

shows that it is higher than minimum monthly income. These females who are working in the organized sectors have their month average income is Rs. 1540 and females who are working in the unorganized sectors have their monthly average income is found Rs 1420. There isn't any wage difference is found between the organized and unorganized diamond sectors. Wage is paid mostly on piece wage system. In the initial period workers can get Rs 500 to Rs 700 per month and experienced female diamond workers are earning more than Rs 1500 per month. For the diamond business, it is said that it is the business of unorganized sector. So workers are not getting non financial facilities like provide and fund, medical allowances, housing allowances etc. 34% female diamond workers of organized sectors are getting the benefits like above whereas 66% female diamond workers are not getting extra benefits more than their wages.

An important aspect of the study is to know the saving patterns in the female diamond workers. 73% female diamond workers are not saving their because of their economical condition they have to expense all their earning to fulfill their primary requirements. 27% females are found who were saving their income. Their average monthly saving ratio is Rs 444.11. Out of total studied female 95% have not insured their life and only 5% are found having insurance. 71% female diamond workers have not incurred debt where

as 29% have debt to their family and the average debt is Rs 18724.33.

In male dominated country most of the female are engaged with household. If the income is less than expenses females are not allowed to do work out of total studied female 30% has expenses more than their income. Whereas 70% have not much expenses as per their income.

Only males are the legendary of this business however 30% females are found to be keen interested to start her own diamond factory in future. To take work from the workers and to make trading is the main affecting factors of this business. This work is very hard for female thus they are not able to become the owner of this business. If we discuss about the wage rate it is very high in this business out of total studied female 14% are doing their work for 14 hours to 17 hours 53% female are doing 11 to 13 hours and 33% are doing 7 to 10 hours. Most the female workers are doing more work per day.

Due to the non organized sectors, unionism is not succeeding in this business. Not a single studied female is found a member of any labor union. The main problems of studied females are lack of provident fund facility, leave of illness and delivery, lack of labor union, housing

allowances, lack of qualitative diamond, medical allowances etc..

Work, Wage and Life Style of the Child Labors: (A Study of Child Labor in the Diamond Industry of Surat City) (June -1998)

**Varasani Dilip C., M. Phil Thesis,
Economic Department,
V.N.S.G. Uni., Surat.**

In the study, he has selected 28 unorganized diamond units and 100 child labors of those units. The study is made on gender, training, types of work, monthly income, working hours, reasons of leaving education, part of employment, present profession, saving pattern, having debt to their family etc.

As per his study 2 to 3 % diamond workers are child labors. At that time near about 10,000 child labors were working into the diamond business. Their average age is 13.5 years. Before 14 years is called a child. Studied Child labors are entered into this business at 11 years of age and after 14 year they become a perfect worker. This business is the business of precious stone and gem. In this study Varasani has found 98% boy child labors and 2%

girls. There is a less ratio of girl child labor is found during the study.

As per the hypothesis of sociology and economics, higher class people not entered into lower class business. But during the study, researcher found that 65% child labor of open category and 35% are of backward classes. He hasn't found any child labor from S.C. and S.T. category. It shows that the above hypothesis is not proved here. An analysis on the basis of types of family says that 18% child labors are living in a Joint family. They have average number of family members is 7.16. He found 82% diamond workers from Nuclear family having average number of family member is 4.93. Where as 100 child labors have average numbers of their family members is 5.34. Here family size is not found much larger. Day by day Nuclear family system is looking to be growing and Joint family system is decreasing.

Education and profession of their elders have direct relation with their income. What ever the level of education is lower their profession is lower and income is also lower. Out of total studied child labor 32% child labors fathers and 825 child labors mothers were illiterate. Educated parents have also not completed their primary education. It shows that the education of child labors parents is found very lower. Where as in profession 56%

child labors father were engaged in farming and 72% child labors mother were engaged in household. An average monthly income of child labors father was Rs 1853.93 and their working mothers average monthly income was Rs 470.68 and of 100 child labors fathers' average monthly income was Rs 823. It shows that child labors have great portion in their family income. Out of total studied child labor 58 % were single Earner and rest 425 were double earner. Their dependency ratio is 1:1.4.

To get an entry into the diamond business, education is not an important aspect. Even illiterate can also do this business by training. In this business education is not important so Childs have left their education and entered in to this business. As per child labors education level 96% child labors were educated and only 4% were illiterate 58% child labors have completed their primary education where as 37% have none completed their primary education.

Training is the most important factor in any type of business. 79% child labor has got training for 2 to 3 months. 17% have one and half months, 1% has 3.5 months, 1% has 5 months. Varasani has studied the reason of child labors for joining this business. In response to this questions, 84% child labor were entered in to this business due to their weak economical condition, 16% have due to

others call, higher earning and they were not interested in education, 89% child labor were working in large size factory, 10% were in middle size factory and 1% were in small size factory. Their absent average in to their work is found 1.30%. It shows that there is a less ratio of absence among the child labors.

He has not found any relation between the education and income in to the child labor. Rate of wages is high but working hours are also more. Child labors are doing work 9.95 hours per day it means that owners are getting more work from the child labors.

This study shows that for the deep knowledge, more and more researches should be made in this business. Diamond business is going to become the shoulder's of Indian Economy. We should not waste our human capital like child labor. Government, owners and institutes have to be aware about this problem. They have to make the policies in relevance to prevention of the child labors.

[Carried Out For the Instance of Ministry of Labor Government of India]

By B.B. Patel has done this Study on the Basic of Child Labor of the Diamond Industry.

He has given the definition of child labor on the basic of the child labors act 23rd December 1968, “Any child doing economical work under the age of 14 years is called child labor”

In the first part of his study, he has analyzed the art of the child labor and described the ratio of child labors in the organized and unorganized diamond industry. More over he has analyzed the working condition of the child labors.

In the second part of his study, he has described the growth of Gujarat diamond industry, ratio of investment, employment and earning from export and import to the country and contribution of diamond workers. His positive point is that in this business unemployed can get easy entry with less and without education. This business is providing employments to illiterate also.

The main object of his study is to found child labors and to check the working condition of the child labor. He has collected his required material with connect of 21 diamond units of Surat city and a units of Navasari city. According to him out of total diamond workers 15% are child labor and he found different ratio of child labor in to different cities. There is 6% lower ratio of child labor is found in Navasari city when ever Surat city has higher ratio of child labor is found. Surat has more population density then Navasari. There is a high ratio of **“Ghanties”** (Diamond Cutting Machinery) and worker in the diamond industry. He says that he hasn't found any extra rest room in the factory and health checking facilities also not found.

Miranda Engelshoven, Diamonds and Patels: A Report on the Diamond Industry of Surat

J.P. Parry, Jan Breman, Karin Kapadia, the worked of Indian Industrial Labor, New Delhi: sees Pub-1999.

According to Miranda Engelshoven Surat city of the India is speedily developing city and going to become the central point of the business in India. It is world famous to make cut and polished diamonds from 5 cent weight. This work is running a special region named Varachha Road of

the Surat city. Today near about 1, 50, 000 diamond workers are engaged with this business. Most of the diamond workers are Saurashtra's Patel. They are the owner of the factory, diamond traders and local retailers. They have their participations is Mumbai, Hong Kong, New York, London and Antwerp based diamond industry.

During the march 1996 to march 1997 he has visited Surat and stayed here for that period for about the study of urban environment and changes in to the cast structure. For about this study he has made his choice on Saurashtra Patel who was much migrated. If he has not checked the relation of this cast with this business; he would not be able to complete his study. When the Saurashtra Patel are giving the shape to the diamond the shape is giving them life style and food, shelter and clothes also.

This report is divided in to two parts. In the first part of the study he has given concentration on, the effect of diamond business on Surat city and working condition of diamond workers where as in the second part of the study he has made his choice on lack of strike, some other protective measures and some other problems.

He has received some basic information about the diamond industry before he visited India. He has filled by

receding books that to work in this business is very hard. Most of the diamond workers are passing their 24 hours of a day in to factory. They sleep at the factory during the night. He says that factories are found higher hot, bad and dim-light. Workers were seated on the floor in this industry. He hasn't found toilet facilities in some of the factory. He found weak industrial environment. Most of the diamond workers of this business are found unmarried and young.

According to Irafan engineer's article, "Migrate workers in Surat". Owners are doing rude behavior with the workers. Their average working day is between 12 to 16 hours workers. Earning is Rs 1500 to Rs 2000 averagely per month. Worker sometime steals the diamond and owners catch the thief on the basic of superstition. Double full diamond workers are beated. First of all owners tied him with the pillar by iron ring and start to beat him. Engineers have described diamond owners very orthodox and spiritual. These workers and owners are living in one region named Varachha. They have wide identity with officers. Kathiyawadi are famous as quarrelsome people.

Population of Surat is increased after independence. In 1971, Population increased up to 1/3 million and in 1991 it increased half million. Growth in the population of the Surat city is depends on progress of its two main business sector textile and diamond. Saurashtra

Patels are living in housing societies, Apartments and tenements on Varachha road. Most of the diamond factories are situated near the Sardar chock of the Varachha road. Research has connected Saurashtra Patel unions, and arranged some meetings with them. He has visited the small streets also where diamond factories were running. There were less ventilated rooms, suffocation due to arrangement of many **Ghanties** in a small room, worker were doing their work sitting on the floor and there clothes were hanged on the walls. Then he has visited a big factory where he found proper work place. Workers were working on **patali**. When he was asking any questions to workers at that time owners, all managers came to listen then he has tried to get appointment to contact them at their residential place.

Diamond factories were started in 1950 in Surat and Navasari. In the initial period of this business the trading side of this business was in the hands of Palanpur Jain Vanik. In India this business has started the fruits of success with growth due to the low wage rate. It is said that the owners who have started their factories among 1970 to 1980 become instantly richer. That was the golden period for Surat in diamond industry but the main problem during this golden period. They have to face was scarcity of skilled labor. There was higher demand of polished diamonds. Saurashtra people enter into this business during this period. First of all Saurastrian Patel come into Surat in

1962 and started this business. They were come from the Gariyadhar of Bhavanagar district and different villages of Amareli district of Gujarat state. They all were farmers. They were come to Surat due to draught and uncertain rain at their native. First of all they joint the factories of Saidpura, Mahidharpura, and in the middle part of the old city. At that time most of the diamond owners were Surties and most of the diamond workers are of near areas of the Surat city.

According to one Saurastrian Patel in 1963, when they came to Surat and started his work in diamond industry, at that time they (surati) were not behaving well with them. Surties were called him like 'Those Kathiyawadi', 'That **Hiraghasu**', when they were passing from their streets; they were throwing small stone at them. They called them villagers (**Gamadiya**). They haven't good clothes and they were unknown about city. At that time Varachha region was not existed. They were living in the Muslim areas like Saidpura, Rampura, and Mahidharpura. Muslims were helping them. They have done very hard work in the initial period. There were living alone at that time. When their income is started to increase, their family also shifted to Surat.

They were working 18 and more hours per day. Suraties were not working like this. Factory owners have started to give advance payments to diamonds workers to

attract more and more workers in this field. They were giving them Rs 400 to Rs 500 and due to the competition they have stated to give them Baki (debt) also up to Rs 25000. This Baki system becomes violent during 1970 to 1980. Today 'Baki' system is not available at anywhere in the industry. Workers can change their job when they want.

Single diamond workers are living in to the factory and those who are living with a family are living at Ghanshyam Nagar, Khodiyar Nagar, Matavadi and Trikam Nagar and rich owner are living on the society of Varachha road like Sadhana Society, Saurashtra Society, Hansh Society, Hirabag, Gurunagar, and L.H. Road. Saurastrian Patels are short minded. They do not allowed unmarried diamond workers to give rental house. They have fear of their young girls and they are not trusted on workers and even their daughters.

In the small size factories 20 to 25 workers are working. Where as in big size factories 300 to 400 workers are experienced and are talents of work, they can earn Rs. 3000 to 3500 per month. **Boler** (very expert) worker can earn Rs. 7000 to Rs. 8000 per month. But workers who are working in small size factories have irregularity of rough, so they could work only Rs. 1500 to Rs. 2000 per month. Most of the diamond workers are male but earlier female have also joint this business near about 15 to 25 years. There is

a lack of unionism between diamond workers. Researcher hasn't found any worker who was a member of any labor union.

Before independence Saurashtra Patels were working in to the farms of **Darbar** and **Kathi, Rajaput** as a labor work at their native. **Darabar** community was the owner of the agriculture at that time. Due to the draught in 1960 to 1970 **Darabars** and Patels have migrated to Surat. Among them most of the Patels were of Bhavanagar district and Amareli district of Gujarat state. Now a day they are earning much from the diamond industry. They are sending some parts of their earning at their native. Due to the success of Patels in diamond business, many other **Leuva** and **Kadava** Patels have also migrated from Saurashtra and Surat's Varachha road become famous as 'mini Saurashtra'. Diamond owner have established societies, schools, hospitals etc. as their social responsibility of professionalisation.

In the Patel community some of the educated **Leuva** Patel's young have established 'Saurashtra Patel **Samaj**'. A main objective of this institute was to provide educational facilities, to maintain unity, etc. To success in this direction, its members have collected donation and arranged 'Group marriage' occasion. In 1984 and evidence happened on Varachha road, in this event Darbari people

have killed 12 Kanabi Patel in the main chock named Mangadh chock of the Varachha road but police have not arrested them. Thus near about 1 lacs Kanabi Patel get to gather in the Sardar chock of the Varachha road and gave a report to collector. They have complained to arrest them many times but at last they hired 10 buses and went to Gandhinagar and more buses went to Saurashtra. Then offer 15 days to the officers to arrest those otherwise they were went on a strike, and at last killers were arrested. Saurashtra Patel won against Saurastrian **Darbar**. It shows that Patel's unity become more strengthens.

After the Mangadh chock's event, Saurashtra Patel's have started near about 150 unions and started to help their cast people. In this ways then have made growth of their cast.

As per Saurashtra Patel's opinion it is happened due to diamond business. Richer diamond industrialists have helped more to their cast. Some said that diamond industrialists have made this cast famous in all over India. Due to hard working and business knowledge, they become owners of the factories in a short period of time.

Diamond Cutting and Polishing Industry of Gujarat II, Diamond Trade and Industry in India

**H.N. Pathak (Professor of Economics),
Indian Institute of Mgt.,
Ahmedabad (1984)**

According to H.N. Pathak diamond Industry in an unorganized industry thus he has to fixed numbers of unit as per others opinion. The main goal of his study is to be aware about the activities of cutting and polishing in diamond industry and employment position in the diamond industry. He has given 16 points in his result as below.

1. Year of Establishment

Most of the diamond units were started during 1976 to 1980 in Gujarat stat where as in many districts it was started during 1961 to 1965. In the initial five years the growth of the diamond industry was very slow. It was started in Surat and nearer areas in 1960. It is started to grow after 1978.

2. Types of Work

Most of the studied units were of double cut. Only 10% units were of single cut. Most of the single cut works of done

in Ahmedabad. Single cut units were producing less diamond pieces than double cut. In local market there was less diamond of single cut. Most of the diamond units of Surat were of double cut out of total studied diamond units 95.4% were of double cut and 4.6% were of single cut.

3. Types of Ownership

Out of the total studied units 18% were partnership units, 2% were private and 80% were individual and personnel units. Where in Surat he has not found any information of 9 units out of 369 units.

4. Investment Ratio

From the total studied units, he has found 1/3 diamond units with the investment of less than Rs. 10,000. Where units have which investment more than Rs. 10,000 were varied in to all over Gujarat. An average investment per worker was Rs. 12,923. Total average investment was Rs. 45,669.

5. Proportion of Machinery

An average proportion of machinery per unit was 6 machinery. Where as average number of lathe was 4 and average number of electric motor was also 4. In Surat's

studied units have total 2268 **Ghaneties**. An average was 6 per units out of total 369 units of Surat city only.

6. Ratio of Workers

An average of worker per units in Gujarat was 20 workers out of them 3 were doing **Ghat** work, shape work and top work. In Surat's 369 units 7223 diamond workers were getting employment. Out of them 905 workers have got training and 10% have been on the training 65% workers were young in Gujarat and ratio of child labor in Gujarat was found 1%. All the diamond workers were found male.

7. Source of Rough Diamonds

Commission agents are the main source of getting rough diamonds. Exporting units have more **Ghanties** and workers so they purchase rough by their own way. He has found only are unit which purchased rough from the Hindustan diamond company (H.D.C.). Where as other four units were purchasing rough from these units. The main local centre to get rough is Surat. Rough is distributed in to the various districts of the Gujarat state.

8. Working Time

Most of the diamond units of Gujarat state are working 8 to 10 months per year. 20% units are working 10 to 12 months and 4% to 5% diamond units are working 4 to 8 months. Not a single unit is working less than 4 months in a year.

9. Profitability

He has taken the units of Gujarat Palanpur district and Surat district. On profitability analyses profitability is decided on the basis of rate of wages and on advance payment. Big factories are getting higher profitability than smaller units where as small size units' profitability is found lower.

10. Rate of Wages

Rate of wages in diamond industry to cut and polished diamond is found Rs. 5.70 to 10.50 per piece of diamond. There is 10 paisa difference is found among the other studied units. On the other side, there isn't any much different in the wage of **Ghat** work, Bottom work, top work and shape work. Single cut units have less wages rate in compare to double cut diamond units.

11. Inter Location Comparisons

For the inter location comparison 1% diamond units were selected from Bhavanagar has big size units in compare to Botad region. There more investment is found in Bhavanagar units in compare to Botad diamond units. Bhavanagar nit owner are paying higher wage and advance to workers in compare to Botad's diamond owners.

12. Advance Payment (Baki) to Workers

Advance payment system of workers is checked in to the Surat and Bardoli. This Baki was paid from Rs.16,000 to 78,000 unit owners of the Bardoli regions have invested Rs.22,000 averagely where as in Surat an average investment of Baki per unit was Rs. 16,027.

13. Average Expenses

Average expenses include monthly rent, wages, raw material, electricity and other miscellaneous expenses. An average wage expense was Rs. 8000 other expenses were Rs. 240 to 570. Total average expense of the unit was Rs. 9662. To know the average expense he has selected diamond units from Surat, Palanpur and Bardoli. Average

monthly electricity bill was Rs. 642 of Surat region units. An average monthly house rent expense was Rs. 350.

14. Monthly Production

To know the monthly production of the diamond units he has selected the diamond units from Ahmedabad, Surat and Palanpur. Ahmedabad diamond units are producing more monthly production. Those units are preparing average 1640 diamond per month. An average monthly production of these four units was 1465 diamond pieces. The production capacity of single *ghanti* per month is to prepare 200 to 400 pieces per month.

15. System of Payment

Most of the transaction are made on cash in this business payment on cash is now a days common method in diamond industry.

16. Other Problems

There were 54% diamond units were facing the problems of workers absent habit, 26% were facing the scarcity of availability of rough diamonds. Out of the total

studied units 427 units were facing the problems of electricity and 23% units having high investment problems.

'Hira Udhyog Par Mojani' (A study on diamond industry)

Gujarat State Export Corporation, Gujarat State, 1974.

In this study G.S.E.C. has selected 204 diamond units from Surat, 113 units from Valasad, 8 units of Bhavanagar, 51 units of Banaskatha, 24 units of Mahesana and 18 units of Kheda. Heave diamond units are checked on the bases of its ages. It shows that 2/3 number of diamond units in Gujarat were started in 1971 to 1973 Where as 35% units were started in 1965 to 1970. Thus, this business is growing earlier.

On the basic of production 26% diamond units were single cut units and 67% were double cut ever on the type of unit, pattern of investment, unionism among them etc. are analyzed.

An Economical and Social Condition of Diamond Worker (A Study on Surat City)

**Pratimaben Atulkumar Vyas,
Economics Department,
V.N.S.G.Uni., Surat.**

As per her study Patel community is found to be the legendary of the diamond industry. Diamond business is known as the business of lower level but rather than Patel community the people of Brahmin, Vaniya, and Rajaput etc. have also Joint this business to get an employment.

Most of the diamond workers are found young, 60% of the diamond workers are of between the age of 16 to 25 years and 80% female diamond workers are found between the ages of less than 20 years. As per her study out of the total studied diamond workers 30% diamond worker found child workers.

Diamond business is a business of unorganized sectors so it is not providing non financial benefits to its workers. Traditionally joint family system is providing social safety in the under develop economy. She has identified more female workers in joint family rather than male

diamond workers. Out of total studied diamond workers 845 diamond workers are living in joint family

As far as the marital status is concern. She finds 74% unmarried diamond workers in favor of this point. She is giving her opinions that most of the diamond workers are young so they found to be unmarried.

As per the study 6% diamond workers have migrated from the Saurashtra region and others were migrated from north Gujarat, Jalganv, Dhuliya etc.

The reasons of their migration were found that they have migrated due to their weak economical condition, uncertainty of rain, draught etc. Female diamond workers have migrated due to their marriage and weak economical condition of their family.

On the basic education, an education level is found lower among diamond workers. They have completed their study up to primary. 3 female diamond workers were found totally illiterate. In comparison of male diamond workers education level to female diamond worker education level, females are found more educated. 70% female workers have completed their primary education.

She has tried to know the education level of their family. She hasn't found any relation between the education of their family members and him.

Training is a very important feature in the diamond industry. Diamond workers are getting 2 to 5 months training in this business. Female diamond workers can easily completed their training with in a short period of time in compare to male diamond workers. Only 3% diamond workers have taken training from the Indian diamond Institute .(I.D.I.), 70% diamond workers have taken training without payment, 22% diamond workers have got stipends during the training period.

An object of her study was to know the earning of the diamond workers from this business. Out of total studied diamond workers 70% were earning Rs. 1000 to 2500 per month. In compare to this 40% female diamond workers were earning less Rs. 1000 than male diamond workers.

Most of the diamond workers who were engaged with the work of diamond cutting, Ghat work and fancy work were earring more from their work. In other types of work male's earning was found more than female diamond workers. Most of the diamond workers of her study were

working 8 to 10 hours per day. She has found lower ratios of overtime payment and night shift.

As per study 35% diamond workers have their own houses and those diamond workers who were living in to the rental house were paying Rs.323 rent averagely per month.

Most of the diamond workers were expensing Rs.100 to 200 per month on pocket expenses. In compare to male 40% female diamond worker were expensing Rs. 100 and less on pocket expensing. There are expensing their pocket expenses on tea, coffee, cold drink, on watching film etc. 54% female diamond workers were expensing on purchasing cosmetic items where as most of the male diamond workers were doing expenses on Tobacco, Bidy, Cigar, Clothes, and Perfumes.

She has tried to know the saving pattern of the diamond workers. As per her analyses 50% diamond workers were not saving their earning. Female diamond workers were giving their whole earnings to their family leader.

Diwali holidays have more importance in the diamond industry. 60% diamond labors are visiting their

native. They are taking 21 to 30 days leave. Females are taking more leaves in compare to male diamond workers.

As far as the problems of the diamond workers are concern 80% diamond workers were feeling suffocation and less ventilation at the work place, 60% diamond workers are demanding extra room for male and female diamond worker, 46% workers were not getting pure air and 90% were feeling the problems of toilet. There are 80% male and 50% female are found with the problem of eye's number.

**A Soci-Economic Condition of Diamond Workers:
With Special Reference to Navasari City.**

**Patel Kishor C.,
Economics Department,
V.N.S.G.Uni., Surat 2002.**

Kishor C. Patel has studied the diamond workers of Navasari district of the Gujarat state. According to him the working condition of diamond workers is resulted as under.

According to his study, there are less ratio of child labor is found, he has found only female diamond worker under the age of 14 years.

He has found Baudh, Jain, Muslim and Hindu diamond workers in his study and as far as the cast is concerned he found Nariyan, Mahal, Khandayat, Modhavanik, Machhi etc.. of lower cast.

As per his study 69% diamond workers are found to live in a joint family and 31% diamond workers are found who are living in a Nuclear family.

He found that the education of their parents is very lower and their occupation is also found lower. 41% of their families have income less than 3000 Rs. and 40% is found having more than 3000 Rs. and below 6000 Rs. income of their family and most of the diamond workers are getting extra wages from their other source of income. 40% of the diamond workers have farming and so they can get extra income from the agriculture sector.

On the basic of migration 79% diamond workers are found migrated in the Navasari region living in rental houses and paying Rs. 264.58 Rs. rent per month.

Education of the diamond workers is also found low. 40% diamond workers have studied up to primary level and 55% are found higher educated where as 5% are found illiterate.

As per his study education and cast has not direct co-relation between them due to the government's education policy, most of the diamond workers have concentrate on study but due to their weak economical condition, they have to joint this business. 80% diamond workers have completed their study in Gujarati medium and 9% have studied in Marathi and rest other diamond workers are migrated from the other states of India, so they have studied in their mother tongue. Most of the diamond workers have left their study due to their weak economical condition and in female workers most of the workers have to leave their education due to their marriage with diamond workers who were working in Navasari.

He has tried to know about the reason of entry in this business and come on the point that most of the diamond workers have joint this business due to their weak economical condition at their native.

In this business diamond workers are doing different types of diamond works but all the workers are found trained means training is the vital factor in this

business. As per his study 80% diamond workers are working 8 to 10 hours per day and 4% are working 11 to 12 hours per day. Out of the total sampled diamond workers 26% diamond workers are earning 1500 Rs. to 2000 Rs. per month. He has not found any types of relationship between education and their income. According to his study most of the diamond workers are getting Diwali presents. 4/5 diamond workers are found who have got the benefits of Diwali presents. Out of the total diamond workers 1/5 of the diamond worker are incurring 200 to 300 pocket expenses and most of the diamond worker are doing their pocket expenses on tea, coffee, cold-drink, chewing of tobacco, break fast etc.

As per his study 39% diamond workers are not habituate to save their earning and 71% are habituate to save their earning 25% diamond worker are saving their earning in bank, 14% in post, 22% are sending their saving at their native regularly. On the basic of his study diamond worker are not saving their earnings in to the shaves and Jewelry sectors according to him they are unfamiliar about this types of investment.

As per his studied diamond workers 90% are not getting illness, delivery leave and provident fund. 68% diamond workers are feeling eyes problems. There is very minor problem of skin disease and when dangerous disease

is found 48% diamond workers are felling suffocation due to the arrangement of many **Ghanties** in a single room. 51% are feeling less ventilation problem.

As per his study diamond workers should be educated and if they are not educated, there should be an arrangement to provide them education; government has to start trading centers to provide them more and more training. Industrialist should have to provide them housing allowances etc. If these problems became less the productivity of the business will automatically increased more.

Hirane Pahel Padavano Udhyog (1986): A Study on Surat and Navasari Region

**K.M. Desai,
Economics Department,
V.N.S.G.Uni., Surat.**

K.M. Desai has completed his study on the manufacturers of the diamond industry by this study he has tried to know the working pattern of the diamond industry the study is made with the direct interview of 63 manufacturers of Surat region and 65 manufactures of Navasari region.

The diamond business was in the hand of the Palanpur Jain in the starting period and cutting work was made only by the **Leuva** Patel before 1965. Due to the boom of employment in this business day by day this business varied in to different community there are 54 diamond units are running into Navasari and Surat region. Out of the total studied units 58% units one of individual ownership, 81 % of the diamond owners have account to do their financial transactions. The factory rental expenses are found to be 3% only. Most of the diamond workers are producing cut and polished diamonds on the basis of piece work. This ratio was 96 %, only 4 % manufactures were found to be work on relation to the rough diamond and most of the diamond units are running on a work of single cut and double cut only. As per the analyses made between 19-4-1976 to 23-5-1976 manufactures were paying RS 7.50 to 8.00 to the diamond worker on a piece of diamond made by them They were earning 100 paisa profit per piece He has found those types of manufactures who were earning minimum 10 paisa and maximum Rs 4 per diamond out of the total studied diamond manufacturers 90 manufacturers were easily find rough diamond from rough diamond traders.

To prepare a perfect cut and polished diamond only one should have trust, skill, clarity, ability and working style to be stabilized against world competition. Business

strategy is must, although you must have the knowledge about government policy, high investment capacity, high risk, export-import policy knowledge, awareness of banking rules and regulations etc. Banks are providing 2\3 loan to do the business. While overseas company in Israel and Belgium is providing 80% loan to their manufacturers. Out of total sectioned loan 80% is received by exporters, Out of total export made from India 99.50% export is from Mumbai only. Out of the total facets work is 60 to 80% that is made only in south Gujarat in India. The investors who have only 5 to 10 lakhs investment are also doing export work. The main hurdles of them were government policy pattern of bank loan, lack of organized diamond market, lack of qualitative cut, polished diamonds and workers social problems

Diamond business is running on the basis of unorganized sector, so here benefits of factory act are not identified. He has found 1.02 % child labors in Surat and 1.26% child labors in Navasari. A diamond is passed from four types of process to become a perfect cut diamond. In this process 17%, 40%, 20%, 23%, respectively diamond workers are required. They have to take training first. As far as there work experience increase they become more experience about their work. An important factor of this business is that education is not considered to do work. An illiterate can also do this work very easily. According to his

study 49% diamond workers have completed their primary education and 17% diamond workers were found totally uneducated.

Diamond business has concentrate on why they left their school very early, is the main question found here the answer is that they want higher life style due to their weak economical condition due to their elders pressure to be earn etc. and manufacturers also giving them easy entry because they are not asking them any question related to their qualification.

During the education their Average monthly income was Rs 25 to Rs 300 per month. Production work is run 10 months only in a year. Thus this average is taken four ten months only. They are not getting any extra wages during Diwali Holiday, National holiday, cut of power supply, communal riots, due to lack of rough diamond etc. Researcher has found system of Baki also among their workers. Most of the diamond workers are expecting their Baki from owners.

He has study the productivity of the units also. As per his study, when diamond labor do their work regularly. Manufacturer can get 26 to 50 more pieces of cut diamonds per month. In this business manufactures has to invest Rs 1276 per diamond worker. Only material is

purchased of Rs 482. As per the study 90.69% capital is invested in partnership basis where as only 1.88% capital is on loan.

In the total studied diamond manufacture 40.56% are from the Saurashtra and they were from Leuva Patel community. Their ratio was found more in Surat rather than Navasari. Out of total studied diamond units 39.67% were running on partnership basis and 1.56% was running on the administration of manager. The higher manufactures were between the ages of 31 year to 40 year. So, we can say that most of the diamond manufactures were of young age. 29.69% diamond manufactures have not completed their primary education. Two diamond manufactures were found to be illiterate where as other have completed their primary education. Two diamond manufacturers have completed their primary education. As per the study of their economical condition, out of total 128 diamond manufactures 22 were found financially strength, 98 were found middle level, 8 were found to be with good financial position. 40.28% diamond workers were not able to grow their business due to their weak economical condition. Out of total studied 128 diamond manufactures, 39% were thought to do this business for getting more earning, 18% were entered into this business by others call, 14% were due to their less education, 10% were due to their

weak economical condition, 6% were due to their heritage business 27% were to other reasons joint this business.

To run this business manufactures should have good experience of cutting and polishing work of diamond. There were minor numbers of manufacturers who have higher experienced. They were 46.21% with 1 to 5 years experiences of managing the factory. Most of the manufacturers past business was found farming.

Small manufactures are investing Rs. 1000 to Rs. 25000 more per year where as middle class manufacturers are investing Rs. 5000 to Rs. 32000 more per year. 60.96% diamond manufactures wanted to improve their business and other were feeling the problems of availability of skilled lab our, financial scarcity, government policy, depression, availability of rough etc. 54.62% diamond manufacturers were saying that they have bright future in this sector and they found to be keen interested with this sector.

In the last chapter of his study, he has declared the problems, their evaluations and future aspects related to the diamond industry. The main problems of the diamond industry are related to the workers, finance, rough material, trading policies, government policies etc.

According to his advice manufacturers have to adopt the policy to provide training to the diamond workers by giving them stipend during the training period and they have to show morality to give entry to the diamond workers who have join their factory by leaving other factory. Banks should provide loan to improve the diamond business. Although many problems, this business has found a great and bright future.

Behind the Glitter, Down and Out Laboring Under Capitalism, Oxford University Press.

Bremen Jan & Das Aravind N. (1996)

According to Jan and Das, diamonds workers who are doing diamond cutting and polishing work into Surat are migrated. There were 100 units were running with 1000 diamond workers near about Surat region in 1950, where as in 1960 diamond units were 1000 and diamond workers were 20000. There was a draught among 1966 to 68 so most of the *kanabi* Patel of Bhavanagar have migrated to Surat. Due to their weak economical condition they entered into this business by left their study. These migrates have got employment on the condition that they have to paid wages up to fulfill their lodging only. After completion of three years, wage is paid to them on piece

wage system. It makes clear that in starting of this business workers have given most valuable contribution. That's why; we can say that workers are the base for the growth of the diamond industry.

In 1978-79 there were only 5700 diamond units and 41000 diamond workers were registered. It is to be believed that in 1982, 9000 diamond units and 57500 diamond workers were working in this sector. Averagely 5 to 7 diamond workers were working per units. It was the main season of establishment of more and more diamond cutting and polishing units in Surat. They have to invest very less finance to start a manufacturing unit. Out of total cost 86% was paid on wage and another reason of establishment of more and more diamond units was that they have good and faithfully relations with rough traders. Day by day entrepreneur workers become experienced and started their own factory. Only 2% diamond manufactures have started this business due to their heritage business.

According to the belief, in 1990, 9000 diamond workers were working in this sector. Surat city is famous as diamond city in all over India After same period Ahmedabad also entered into this business there were less ratio of women diamond workers into Surat diamond industry and this business of male in is an important matter this to be

noted that earlier this business is started from south India and at there women also entering to do this business.

The diamonds workers who are doing diamond cutting and polishing work are living alone in Surat city and they are unmarried. They haven't their family in Surat city but these workers are living into rental house in a group. As far as the question of the rent is arise, they are distributing rent among them in the same proportion. **Kanabi** Patels from Saurashtra and North Gujarat have joint this business by left their agricultural work. Their ratio is one half. Migrants who came to Surat were migrated from Saurashtra, Palanpur and Mahesana. More and diamond workers are entered into this business in 1970. At that time Navasari become the most competitive center of the diamond business in India. Competitors have started their factories at Surat, Navasari and nearer of south Gujarat.

The period of 1980 was the period of great depression into the diamond business, due to this depression diamond industrialists have lost their confidence of diamond manufactures due to the depression and competition, they have stopped to start new units, thus thousands of workers went to their native and at their they have joint their past work. Among then most of the diamond workers were **kanabi** Patel.

Backward community people and out states people were not putting trust on this business and they have thought to left this business. A report on diamond workers said that workers who left this business are not showing their desire to re joint this business because they felt that they have lost their faith against the manager who was taking work from them. They were not able to work in this business now because of the dissatisfaction and entrusts between workers and owner where as higher community people are living a good life style they are aware about their work very interesting what ever the cutting and polishing work is given to them.

Diamond workers are doing their work on their choice means they are libber to do their work whenever they want job change; they left the factory and joint another factory. Workers who are living into the Surat city gets up early in the morning and started their work at 7:00 a.m. until 8:00 p.m. continuously at noon, they have to given an hour recess for lunch. They are getting wages on piece wage system. If they get hard diamond in whole the day at that day they feel tired much. If they want it they want leave they have to take the permission of their owners in advance in some circumstances, they are not getting leave also some of the diamond worked leaves their work during the farming season and went to their native to help their family members is agriculture work some. Diamond workers have

to face misbehaviors of their owners, so they left that factory and joint another factory thus there is high ration of job changes in this business.

A description of diamond unit is that diamond workers are feeling suffocation due to the arrangement of many Ghanties in room, lack of satisfaction, lack of toilet facilities, lack of proper ventilation, where as owner chamber haven't this types problems, they have free space to be work, proper ventilation, and personal toilet. Owners are ever concentrating on them by their office window. Diamond workers have napkin on their shoulder to clean their faces etc.

Life Style, Income and Work of Female Diamond Workers: A Study of Female Diamond Workers of Navasari Region (1997)

**Patel Preeti B.,
Economics Department,
V.N.S.G.Uni., March, 1997**

Patel Preeti has done this study on random sampling method of statistics. she has taken 50 female of organized sectors and 50 female of unorganized sectors who were working in the diamond industry of Navasari Gujarat

The main important object of this study are education type of work monthly income reason of migration ratio of saving wage differentiations etc. Diamond business has 68 % female diamond workers whose age in between 15 years to 19 years The average age of female workers in 24.97 years female workers who are engaged in this business are of young age only a single diamond workers is found child labor Patels are the legendary of this business 44% female were Patel and 59% were came from open cast 17% were of backward cast and 24% were from S.T. and S.C. Higher class of people are also Jain this lower level business workers attitudes changed due to the modernization Industrialization out of total studied female 43% female are living in a join family and 33% are living in unclear family The average of their family member in 5.23 means they have middle class family.

There is a certain relation in found between their elders education and profession less education have lower profession and low income 50% females fathers have and completed primary education 47% females fathers have completed their education up to primary level where as 3% father of females workers have there studied up to graduation it shows that most of the females diamond workers father have lower education 44% female workers father were doing service 26% were doing there own business 20% went doing agricultural work 4% were

engaged in labor work and 9% were not doing any type any type of work most of the father of female diamond workers were doing lower business Their average family monthly income was Rs 3856 and per head income was Rs 737.8 female diamond workers who were working in organized sector having their average monthly family income was Rs 3478 There isn't shown much difference between both types of sector.

**SHAPING OF DIAMOND IN SURAT: AN INQUIRY
INTO SOME OF ITS PASSAS (FACETS) (1982)**

**S. P. Kashyap and R. S. Tiwari,
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Ahmedabad.**

Like entrepreneurs majority of the worker (70 percent) came from rural areas having there roots mainly in the farming. New entrants in the industry are primary aliens who joined the industry by discontinuing there education and or farming business. This is also reflected from the fact that the migrant household decline in important as the household size increases. Until a few years back workers were mainly from Surat and Palanpur have emerged in a big

way (accounting for approximately 70 per cent of the migrants as supplier of workforce.

Migrants do not have very strong financial ties with their place of origin and these too decline in importance as the household size increases. On the whole migrants receive more money than they remit.

The role of caste and kinship appears to be limited to providing initial entry into the industry. Migrants in fact show more proneness to change jobs compared to their resident counterparts even if initially half the job changes are of setting down variety and carry on financial advantage. Once setting down is over, workers change jobs primarily to improve their economic prospects. Financial gains appear to be function of work experience in the industry.

Despite the fact that the 'small' firms are the better pay-masters. The pattern of job changes is in favor of bigger sized units. Such a pattern is induced because the prospects of uninterrupted work or capacity to remain in business, despite slump in the industry stay facility in the unit, opportunities for an irruption in the better paid skills (pale polishing) amount of loans availed all seem to directly relate to the size of the firm.

Despite apparent high job mobility in the industry quite a few workers stick to the initial entry points. Keenness of firm to retain their skilled workers by loans and advance payment of wages and the fact that even the better paid jobs can grow only in relation to the overall majority of workers also have no intention of leaving the industry. This is because the wage levels (at least the money wages) have not been static in the industry and are considerably higher compared to the levels prevalent in other unregistered manufacturing in the region. Workers also generally Lack education and skills that could lead to inter-industry mobility. Possibility of owing the enterprise is also a major attraction.

It must be understand that the reward for labor are ultimately determined by the institutional arrangement of sharing gains in the industry. It has been possible to study the industry over-time we could have gained a proper prospective of changes in wage Level and its structure. As it is only a static picture can be analyzed which is also not without same unusual features. Given inter-firm mobility of workers to seek higher earnings keenness at the part of entrepreneurs to retain their workers shortage of skills and absence of sharp skill differentiation would lead one to think that workers earning to narrow in the industry This is not so Earning per worker vary from Rs 150 to more than Rs 500/- per month .Earning of workers to some extent rise

with experience though the gains from learning are not linear. Group average of workers by experience show that in the initial phase (up to 2 year) earning rise in the third year and subsequently it is a gradual process till a peak is attained. There are however wide variation in the earning within each group of workers by experience. Education and earnings are unrelated. Often a worker with no education earns more than a worker with 10 year of education.

Probing into the traits of 'high' and 'low' earners in the industry gives some explanation of earning differentials types of skills performed affect earnings "High earners" and "hard" workers" also show positive association. But these categories are also coterminous with experience. Often hard work is not very remunerative though it is true that on the average a 'high' earner compared to an average worker in the industry is more experienced a bit more hard working a bit more education and performance better paid jobs. Exception to this observed pattern, however are quite glaring Even with relatively a long association with the industry and high education some workers continue to earn much below the average in the industry Initial start in life also matters. Workers who initially entered the industry as child labor or discontinuing as agricultural labor on the average do not as well over time as the rest of the workers Superimposed over all these considerations seem to be the aptitude to work that is why some worker have high earning

despite little education and experience on the country for quite a few workers a considered edge in education and experience is of no avail clearly they do not 'belong' to the industry and are there because of Lack of alternate job opportunities.

How does the earning differential affect the Level of Living? To understand the level of living and pattern of consumption we take household as the basic units of observation and group households according to the size variable. In a marked contrast to the developing countries , where the size of the household age of the point and then a fall (inverted U shape) these attributes of diamond workers household show an almost continuous upward movement. It is seen that age of the head, household size, and household income rise. This is, however, not so for education, beyond the house- hold size of three there is an inverse relation ship between age and education of the head² of the household.

Household income generally rises with the size of household, but per worker income of household decreases beyond the household size 2. This happens because increase in the number of earners with the household size is perhaps accompanied with a higher proportion of young and inexperienced workers. Per capita or per adult equivalent Income also falls up to the household size 7 and then it

curls up. This means that for about 94 per cent of the household the increase in size is not fully compensated by the increase in income.

Expenditure pattern of the workforce shown that the per capita expenditure on pan, tobacco, smoking and other such items fall sharply beyond household size one, indicating that the family composition has an important say in shaping the consumption pattern. Per capita expenditure on items like fuel, rent and miscellaneous items etc., also falls along with the household size, possibly due to the economies of scale of consumption for these items.

Unlike most similarly placed urban consumers the per capita household expenditure as a percentage of total household expenditure as a percentage of total household budget on items like health education transport and clothing is meager varying between 0 to 4 percent. Consumption pattern of diamond workers in Surat thus shows a distinct rural orientation. Age profile of workers (most of them are below twenty-five years), their rural roots and the fact that most of them stay within the unit or near by accounts for some what modest expenditure on health, education and transport.

Irrespective of household size, however, share of per capita expenditure on food items dose not show much variation. It varies between 65% to 67% of the total

expenditure for most of the households. If theoretical assertion, that households with the same food share be regarded as equally well-off irrespective of their size, is true then at Least group averages of varying household sizes indicate similar welfare levels.

Similar welfare levels based on group averages, however, do not rule out the possibility of existence of poverty. Based on individual schedules about 10 per cent of the total households and 19 per cent of the workers' population are identified as poor. Poverty seems to have household size³; no household is identified as poor, but proportion of 'poor' household except for the household size of 6 members.

It must be stressed that poverty amongst the workers engaged in Diamond cutting and polishing industry in Surat is much less intense compared to their counterparts engaged in other manufacturing activities. For instance, out of the total workers in registered manufacturing industries in Ahmedabad, about two-fifth were having consumption levels such as to push them below the poverty line. Poverty amongst construction workers of Ahmedabad was still worse as 78 per cent of the workers deemed 'poor'.

It is significant to mention that poverty, as defined usually, does not appear to be a function of income only. Almost two fifth of household identified as 'poor' have incomes considerably above the poverty income nom and one-third of the households, though have incomes close to the poverty norm or below are not spending as much as they earn. It appears that taste factor, family composition are physiological factors play an important role in determining consumption and saving. Full understanding of the mechanism of consumption and saving and associated poverty would thorough study than that has been possible effort.

Existence of poverty among diamond works poverty false prevalent notions that the diamond industry constitutes an island of affluence in Surat. This is much more glaringly revealed if examine workers habitat. Three forth of the household are either slum or **chawl** tenant or live in old house. **Chawls** accommodate about 30 per cent of the single workers and half or more household up to size 5. Most of the large size households (more than 7 members) live in old houses. Less than one-fifth of the households own hoses, but it does often imply a decent dwelling. Distribution of per head room space by the household is very merge which falls sharply beyond household size 1 and fluctuates between 0.4 – 0.5 up to the household size6 and beyond this it deteriorates further. Most of the workers live

under subhuman conditions which might be affecting their productivity and earnings. It seems that the rapid growth of this industry in Surat has led to dismal housing. It is apparent that further growth of the industry would call for urgent search for alternate locations.

Manufacturers, Exporters, Workers and Growth of the Diamond Industry of the Surat Region (June-2004),

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Most of the workers are young. An average age of male workers is 29.40 years. While that of female workers is 23.41 years. Overall average age of workers is 26.32 years. Majority of workers are Hindus (96 %). It is worth noting that people from minority communities are hardly seen in this industry. 41% of workers are from the reserved category (37% ***Baxi-Panch*** and 4% S.C.). But it is a point to be noted that there is no S.T. worker. The South Gujarat region has

a sizeable population of S.T. But we hardly find S. T. workers in diamond industry. This is surprising.

The family background of diamond workers is poor. The income, education and occupation status of parents is low. This has certainly affected the status of diamond workers.

The position of workers engaged in the units of the organized sector is better than the workers of the unorganized sector. An average monthly income of organized sector workers is Rs. 4456. While that of unorganized sector's workers is Rs. 3288.

The hypothesis of 'specific' migration is not proved in this study because most of the workers have migrated from Saurashtra. But one point needs to be mentioned here that hardly people from other states are found in this industry. This is bit surprising because in the last few years Surat as experienced phenomenal migration from other states Viz.: Punjab, Rajasthan, U.P., Orissa, Maharastra and Bihar.

It is a good point to be noted that only 2% workers are illiterate. Some workers are graduates. But overall average of education of these workers is 8.17 standard. This can't be considered as satisfactory.

In the diamond industry the education level does not carry any weight. It is the experience that matters. Hence we find that there are many workers, entrepreneurs and exporters who have high income but do not have high education. The correlation between education and income is found to be negative and not significant.

The absenteeism of workers in this industry is very low. This is a satisfactory point.

It is worth noting that diamond workers of Surat city get more than minimum wages. This has worked as a pull factor for many young persons from Saurashtra region to join this industry of Surat city.

The diamond industry of Surat city is male dominated. The women workers in this industry of Surat city are about 5%. It is interesting to note that in the entire diamond industry of Surat city, there is not a single woman entrepreneur and a woman exporter. All these data clearly prove that this industry is highly male dominated.

In the last few years, the big entrepreneurs and exporters have earned a lot from this industry. Their prosperity is a testimony to this fact. But this glittering of the industry has not much touched the workers especially

engaged in the unorganized sector. Most of the workers do not get the benefits. Viz.:- P.F., Pension, Life insurance, Health insurance, Housing etc. So the industry is shining and the big entrepreneurs and exporters feel very good, but unfortunately it is not shining for the workers and so they do not feel good.

Most of the workers and entrepreneurs are from Saurashtra region while exporters are from Jain community. Hence Patel and Jain community at present are dominating this industry.

In the last few years the standard of living of diamond workers seems to have improved. This is proved by the things that are seen in their homes. The position of entrepreneurs and exporters is much better.

Many of the entrepreneurs started their career as diamond workers. This proves that it is the experience and training that matter in this industry.

This study has clearly proved that Surat city is most important as far as diamond industry is concerned. Especially from employment, income and exports point of view.

In the last few years there is more automation in this industry. And there is also more sophistication in the big diamond offices especially those which deal with exports.

During this research work, I have come to know that this industry has some problems which need urgent attention. If not solved, they can hamper the growth of diamond industry. And this will not be in the interest of Surat city, Gujarat and Indian economy. The workers must have the benefits like P.F., Pension, Life insurance, Health insurance, Housing etc. This will increase their productivity. In this regard, the government, owners and trade unions should make joint efforts to improve the conditions of workers. It is a fact that workers have got little out of the prosperity of diamond industry. The entrepreneurs especially the small, have some problems. They find it difficult to compete with big units, shortage of raw material, availability of credit at reasonable rate of interest, periodical recession. At present, most of export business is handled from Bombay, the exporters feel that if Surat is given proper infrastructure by the government then it will be beneficial to exporters, overall growth of diamond industry and there by economy of Surat, Gujarat and India. Their urgent needs are airport, international post office, 'A' Grade Hotels and Gems and Jewellery Park.

The diamond industry has still lot of potentialities to grow more. This industry needs to concentrate more on high value diamonds, more production and improvement in productivity of workers. I have got all the indications from this study that if proper attention is given by the government to improve the infrastructure facilities and all efforts are made by the owners, the government and workers to improve the productivity then this industry will be shining more.

CHAPTER-3

SECTION-1

DIAMOND HISTORY



SECTION-2

DIAMOND INDUSTRY

IN THE

WORLD, INDIA & GUJARAT

SECTION-1

HISTORY OF DIAMOND

This chapter is divided into two parts in which section-1 includes the history of diamond and section-2 covers the basic ideas about the diamond industry in the world, India and Gujarat.

❖ MEANING & ORIGINE

There is slight confusion surrounding the origin of the word “Diamond”. In tracing the Word’s history, I have come upon two origins, one of which probably referred to other minerals but now apply to what is known today as diamond.

The word itself, “Diamond”, comes from the old French, “diamante”. But diamond is derived from Latin and also from Greek. The Greeks had a word, “**adamas**”, which means “unconquerable”. However, **adamas** was the word for iron, or iron alloy, as far back as 800 B.C. apparently lacking a word to apply to other substances as hard, as or

harder than iron, adamas was used to apply to what probably was the diamond.¹⁰

❖ THE NATURE OF DIAMOND

Diamond- A word which awakens beauty, mystery, and romance, a gem revered for centuries and credited as both poison and miracle drug-is a natural paradox. It is at once the hardest substance known to man, yet it will shatter into bits and pieces if struck at the proper point.¹¹

Natural diamonds are unique because of their specific characteristics. Chemically it is carbon (the same material that makes up soot or graphite in a lead pencil.)According to one scale of measurement, 140 times harder than the sapphire and will cut corundum, which itself is used as cutting medium.¹²

A partial description of diamond is read as follows.

¹⁰ Isidore Lipschutz,(1979) 'The Romance of Diamonds' Formar President, Belgium Diamond Manufacturers Association, Page No. 25

¹¹ Edward Jay Epstein (1982) 'The Rise & Falls of Diamonds: the Shattering of a Brilliant Illusion'. P.No.:- 10

¹² Olga Levinson, (1983) 'Diamonds in the Desert', Tefelberg Publishers Ltd., Cap Town. P.No.:-33

A diamond is a crystallized carbon, usually transparent with occasional color variation, with a relative hardness of 10 (***Mohs'*** scale), a specific gravity of 3.52 and 2.42.¹³

When measuring diamonds, the term carat is used. This is measure of weight and it is a determining factor in assessing value. One metric is 1/2,268 of a pound, or 1/142 of an ounce, or 1/5 of a gram. Of the originally mined carets, less than one forth can be classified for sale as gems.¹⁴ These will possess varying degrees of color, most of them in only slight traces. However, when the diamond is subject to light, this color is displayed through refraction. This produces the stone's flash, or fire. Refraction is simply light which bends as it passes from the air through a particular substance. The diamond has the highest index of all gemstones in its ability to refract the light. The diamond's ability to reflect light to such a great degree is a result of its power to gather the light coming from all directions, then bending it into the center of the stone.

Diamond is thought to melt around 3700 degrees Centigrade. But it will change color at much lower degrees

¹³ S. Tolansky (1962) 'The History & Use of Diamond', University of London, London. P.No:- 245

¹⁴ Graham Hughes (1978) 'A Pictorial History: Gems & Jeweler', Phandon Ltd., Oxford. P.No.:- 43

of heat. Heat treatment at 500-900 degrees Centigrade for several hours turn most green irradiated diamonds to yellow or cinnamon brown, which is often considered a more attractive color of a diamond artificially, this fact must be transmitted during any sale agreement.¹⁵

These are some of physical properties of diamond. But there are other characteristics of this “gem among gem” which makes it unique among all the gemstones of the world.¹⁶

❖ **Biblical references**

Diamond is a strange and wonderful material. For over 5,000 years the small pieces of rock called diamonds have excited the wonder, interest and envy of man, from the richest prince downwards. Diamonds are unique little crystals, and being the hardest material known to man they are also of considerable significance both to the modern scientist and the modern technologist.

Diamond has aroused intense interest in the historian and the folk-lorist, the industrialist and the man

¹⁵ Miechal Weinstein, (1967) ‘The world of Jewel Stone’, New York. P.No.:- 50

¹⁶ A.N. Wilson (1660) ‘Diamonds from Birth to Eternity’, Gemological Institute of America, California. P.No.:- 284

of wealth, the scientist and the technologist, the speculator and the investor, the craftsman and the aesthete. Many diamonds are linked to a strange history, often a history of theft and murder, and it is certainly the costliest of all natural minerals (if we leave out those modern curiosities, the radioactive concentrates, which chemists extract with such cost and labour).

Yet diamond is but one special form of carbon, one of the most common of all materials. Occurring as it does on and in the earth's crust in millions and millions of tons, carbon is a major constituent of all trees and plants and their residues, such as coal. It is the basis of petroleum, and is widely distributed in combination in many rocks such as limestone, carbonates, and so on. (Carbon as such, free from combination with other atoms, can exist in three distinct varieties. The one is non-crystalline, i.e. amorphous carbon, such as wood charcoal; the other two varieties are crystalline. These are graphite and diamond. Graphite is fairly common, soft, and friable and solid; it is the 'black-lead' of our pencils, at times called plumbago. Diamond is rare, immensely hard, clear and shiny.¹⁷

¹⁷ S. Tolansky (1962) 'The History & Use of Diamond', University of London, London. P.No.:-43

Diamond has a long, extensive, and worthy literary history. The very name by which we know this crystal derives from the Greek *adamas*, which means 'the untamable'.¹⁸ It was called this at least before 300 B.C. in the belief that neither by fire nor by blows could the diamond be 'subdued', neither belief being in fact justified. We find ill translations of early records that the same material is described either by the name diamond, or by its synonym adamant, but latter has now become more of a poetic description.¹⁹

Our earliest records of diamond are Biblical. It is mentioned no less than six times, either as diamond or as adamant. The earliest references, dated perhaps about 1200 B.C., are in Exodus XXVIII, 18 and XXXIX. 11. Further mentions, dated perhaps 600 B.C., and occur in Jeremiah XVII. 1, Ezekiel III. 9 and XXVIII. 13, and finally, perhaps a hundred years later, there, is one mention in Zechariah VII.

¹⁸ A.N. Wilson (1660) 'Diamonds from Birth to Eternity', Gemological Institute of America, California. P.No.-:55

¹⁹ Curzio Cipriani and Alessandro Borelli (1984) 'Guide to Gems Precious Stones', Simon & Schuster Inc., Singapore. P.No.-:110

12. These Biblical references to diamond are all of curious interest for, they show that even at those very early times, the diamond was considered to be a valuable gem and was recognized as being an immensely hard stone.²⁰ We shall find that these two characteristics, namely rarity as a gem and great hardness, dominate the whole history of the diamond right up to the present day and are together amongst the key factors accounting for its use.²¹ Its recognition as an object of fiery beauty comes late in its history.

In Exodus, the diamond (**Hebrew=jahalom**) is twice mentioned as being, one of the twelve engraved precious stones in the breastplate of the High Priest. The old Hebrew High Priest wore on his breast a bag which contained the sacred lots, the **Urim** and **Thummim**. On this bag were mounted twelve precious stones which, are sardius, topaz, carbuncle, emerald, sapphire, & diamond, ligure, agate, amethyst, beryl, onyx and jasper. Each of these precious stones was engraved with an alphabetical letter, or a sign, to represent one of the twelve tribes of Israel. "And the stones shall be with the names of the

²⁰ A.N. Wilson (1660) 'Diamonds from Birth to Eternity', Gemological Institute of America, California. P.No.:-72

²¹ Edward Jay Epstein (1982) 'The Rise & Falls of Diamonds: the Shattering of a brilliant illusion'. P.No.:-128

children of Israel twelve, according to their names like the engravings of a signet." ²²

Now diamond is the hardest material known to man; how then could a letter or sign be engraved on a diamond? Indeed, on such grounds the voice of criticism has been raised and it has actually been argued that the learned translators who produced the Revised Version made a mistake in translating *jahalom* as diamond. The old Hebrew scholars, however, always translated *jahalom* as diamond and this translation persists today in both ancient and Modern Hebrew. Such a criticism is indeed a weak one. In any case, there are at least two fair arguments, either of which can meet this criticism. It is certain from what we know of the sources of ancient diamonds that most early diamonds came from India. We certainly have evidence now that the early Indian craftsmen were able to engrave diamond. There exist today dated diamonds engraved by Indians over 300 years ago, and it may be that this art has been known for very much longer. But equally probable is the possibility that a natural diamond was selected with markings on its surface resembling an ancient Hebrew letter.²³ Diamonds are often found with markings or ruts on

²² Curzio Cipriani and Alessandro Borelli (1984) 'Guide to Gems Precious Stones', Simon & Schuster Inc., Singapore. P.No.: -301

²³ Walter Schumann 'Gemstones of the World', Sterling Publishing Company Inc., New York. P.No.-220

their surfaces which can twist and turn to resemble very closely a typical ancient alphabetic character, and such a diamond could well have been selected for this special purpose.

The translators of Ezekiel make use of both the words diamond and adamant. It is noteworthy that Ezekiel is expertly familiar with all the precious materials of his time. In various places he names diamond, topaz, beryl, onyx, jasper, sapphire, emerald, carbuncle, agate, flint, coral, amber, crystal, ivory, ebony, silver, gold, iron, tin, lead and In ass, together with a variety of spices and other riches, but he is familiar with their properties too. In Chapter iii, v. 9, he writes, "as an adamant harder than flint have I made thy forehead". And, Zechariah, writing perhaps a hundred years later, uses the same concept when he says, 'Their hearts are as an adamant stone'.

The inference is clear. All three prophets are only too well aware that diamond (adamant) is an immensely hard stone. This hardness is indeed the key property which guides us to an understanding of the part played by diamond both in ancient history and, surprisingly enough, in modern technology, and it is noteworthy that this unique hardness was recognized at so early date, clearly it was then

quite unique, and 2,500 years of experience have still left it so.²⁴

❖ **Ancient Virtues Attributed to Diamond**

In the early Middle Ages the diamond was a rare, highly valued object, which was worn not as a decoration or as an object of beauty, but as a magical amulet. Indeed, since only natural unpolished stones were at first available and as these only occasionally have, an attractive shape (and this only as a rule when they are small), it was not the appearance but other properties which gave the diamond its special position. As a decorative gem it was not at first rated as highly as the ruby or the pearl. Its real magical importance was due to its great hardness. Because of this hardness, by the simple and familiar process of sympathetic magic, it was firmly believed that diamond could endow its wearer with corresponding hardihood and manhood. It was thus worn exclusively as an amulet, and only by men, for clearly the quality of hardihood and manliness is hardly likely to appeal to women! Diamonds were, therefore, often worn by knights and leaders on the battlefield. They were worn in a sword-hilt, on a helmet, on a dagger. Many a valuable gem must have been lost on the battlefield, and,

²⁴ S. Tolansky (1962) 'History and Use of Diamond'. University of London, London. Page No. 1 to 3

equally, many a gem was found as spoils when the fallen were stripped after a battle.²⁵

In the National Portrait Gallery in London is a portrait of Henry IV painted about A.D. 1400,'and on the monarch's sleeves are two enormous octahedral bluish stones, recognizably natural diamonds. They are, perhaps, the best put of an inch across. One might guess that each stone would be of formidable weight, but Of course the artist might have exaggerated the size deliberately, since no other decoration is worn on the sleeve.

The diamond was believed to have many miraculous powers.²⁶

'Diamonds' grow in India; some as big as a bean, some like a hazel nut. They are male and female and from the falling dew they multiply and bring forth small children. How nice it would be if this were true! Yet it is a not unreasonable description of the crystallization from solution of some crystals. Clearly someone had learnt how to grow crystals and confusion between growth of water-soluble crystals and diamond has emerged by hearsay.²⁷

²⁵ www.heerazhaverat.com

²⁶ www.diamondworld.com

²⁷ A.N. Wilson (1960), 'Diamond from Birth to Eternity', Gemological Institute of America, California. P. No.-123

A diamond has the curious power, of breaking out into a 'sweat' and becoming damp when brought near to poison. Obviously a very useful property indeed, especially for a prince who might be subject to the attentions of the poisoned. The diamond has the power of destroying magnetism, whether it is the magnetism of the loadstone or that of the mariner's compass. According to this belief the more perfect the diamond the more destructive it is to magnetism. This legend persisted unchallenged until it was proved false by the distinguished William Gilbert, physician to Queen Elizabeth 1. Gilbert, known to physics as the founder of the science of terrestrial magnetism, surrounded a loadstone with no less than seventy-five diamonds and gravely reported that they had not the slightest effect on its magnetic strength. It is worth noting that Gilbert had developed a very sensitive test for magnetic strength, He floated a light, magnetized noodle on water and used this as his detector of a magnetic field. It is a surprisingly sensitive device, as Gilbert well knew, and he rightly claimed with complete confidence to have destroyed the old fallacy about the effect of the diamond on magnetic bodies.

The magical virtues attributed to diamond were very well summarized by Leonardus in 1502, who asserted that it has the following properties. He says it repels poisons, it disperses fears, and it is a formidable defense against sorcery. When worn it quells quarrels. It is a reliable

cure for lunacy and a certain remedy against possession by devils. If worn on the left arm, it leads to the conquering of enemies and enables one to tame wild beasts. It is also a cure for nightmares. Above all, it makes its wearer courageous and bold in battle. With all these wonderful supposed virtues, it is no surprise that the diamond was of so great a value that only kings and princes could afford to possess it. Diamond was the, king of magical stones, fit for kings,²⁸

❖ **The Carat**

We shall consider at this point the measure by which diamonds have long been valued. In the middle Ages and the period of the Renaissance the jewel which was really extensively worn, naturally enough by ladies was not the diamond but the pearl. Pearls have been taken from the Persian Gulf since the days of the Macedonians, if not earlier, and from the time of the Ptolemy's pearl fishing has been actively conducted in the Red Sea. It is well known that certain freshwater mussels can produce excellent river pearls and this, too, has been a source of pearls since ancient times. The river pearls of Britain are even mentioned by Tacitus and by Pliny, and a breast-plate studded with British river pearls was dedicated by Julius

²⁸ S. Tolansky (1962) 'History and use of Diamond'. University of London, London. Page No. 1 to 3

Caesar to Venus ***Genetrix***. It is perhaps worthy of mention that in 1355 Scottish river pearls are referred to in a legal statute and that in the time of Charles 11 the Scottish river pearl trade was on a scale big enough to justify a parliamentary discussion. ²⁹

However, it was essentially the pearls of the Orient which really flooded Europe and they were certainly used in great profusion the great ladies at the courts. Pearl collars, pearl hair decoration and pearl girdles are seen very frequently in contemporary portraits. This use of pearls mounted to a climax at the time of Queen Elizabeth I. The well-known portraits of this Queen, now in the National portrait Gallery, London, show her to be wearing thousands of pearls. In one painting an enormous pearl rope of several turns contained perhaps a thousand pearls, and the whole grand dress is simply covered with this gem. The weight must have been considerable. ³⁰

Now it was from this extensive pearl trade of the Orient that the weight measure still used today for all gems, diamond included, arose originally. In early times, the smallest units of weight adopted in commerce were, generally, specified seeds. For example, the barley grain was

²⁹ Susannse Steinem Patch (1976) 'Blue Mystery Story of the Diamond', USA.P.No.-133

³⁰ Graham Hughes (1978) 'A Pictorial History: Gems & Jeweler', Phandon Ltd., Oxford.P.No.-211

the lowest weight unit in this country and there are still, by definition, 7,000 grains to the pound weight. Of course, such a weight is an average.³¹ The astute ancient pearl dealers of the Orient made the very striking discovery that the dry seeds of fruit of the locust-pod tree are remarkably uniform in weight. This tree is very widespread over the Mediterranean and in the whole near and Far East. The locust-pod tree produces a curved fruit, something resembling a flattened, hard banana in appearance, rather like a horn. The pearl traders noticed that no matter how old the tree and no matter which part of the pod the seeds came from, the weights of the dry seeds were remarkably uniform. This seed being readily available, it was adopted by the pearl dealers as the unit of weight for measuring pearls. The old Greek name for plant is Keration, from whence I derive the word carat. The carat was originally the weight of the seed of this locust-pod fruit.

That seeds have an amazing uniformity in weight can be demonstrated today with precision balances. The small differences found, say less than 1/1,000th part of an ounce, are too small to have been measurable by the simple balances available to the ancient traders. As far as they could measure, such seeds were absolutely identical, and

³¹ Diamond Smarat, Surat Diamond Association, Surat, 1991 Vol-1. P.No.-30

this fact is a remarkable tribute to the astuteness of the ancient pearl traders.

For many centuries the adopted working carat was a little different parts of Europe, but always more or less then same, i.e. something near to a fifth part of a gram, or $1/140^{\text{th}}$ part of an ounce. Strangely enough, although the carat has been in use in this country since Norman times at least, it was for long only an agreed measure of commerce and had no read legal standing at all. Even up to the middle of the nineteenth century the persistent differences in different trading centers were still appreciable. The weight in milligrams of the carat was 197 in Florence, 205 in Berlin, 206 in Vienna, 207 in madras. The values used actually ranged from 188 to 213 milligrams, a variation of some thirteen percent. This was too much to be tolerated for reliable international trading and after much discussion, finally in 1907; the International Committee on Weights and Measures in Paris proposed the adoption of what is now called the metric carat, which was to be exactly 200 milligrams, i.e. $1/5^{\text{th}}$ of a gram, or $1/142^{\text{nd}}$ of an ounce. The French Government sought international agreement but this very sensible proposal was resisted by many jewelers. However, pressure was exerted, and in 1915 the Board of Trade in this country at last legalized the metric carat. This was carried out more or less simultaneously in Britain, Holland, Belgium and the U.S.A., the four countries in

which the dealing in diamonds was mainly concentrated. Strangely enough, South Africa, a principal source of diamonds, only adopted the metric carat as late as 1923.³² It is now universally used for gemstones and this fact must be remembered when the weights of old historical diamonds are being discussed.

The carat is quite a small measure, yet so costly is the diamond that the carat is subdivided still further, especially in the United States, where it is divided into one hundred points. Thus a stone weighing one and a quarter carats is written 1.25 carats and this particular diamond would be described as being of weight one carat and twenty-five points. The carat is still retained as of old for the pearl, though in this trade a coarser sub-division is usual, the pearl grain, which is a quarter of a carat.

It is not easy to visualize carat sizes, but the following will help. A natural octahedron of height about 1 / 10th of an inch could weigh 1 / 10th of a carat. An octahedron of height one quartered an inch could weigh about 1 carat. For an octahedron of height half an inch, the weight might be 8 carats. The polished gem of the shape called the brilliant grades differently because of the material lost in shaping. A brilliant 1 / 10th of an inch across weighs about 1/16th of a carat, while a 1 carat Brilliant-cut gem

³² www.heerazhaverat.com

has a diameter of about one quarter of an inch. 'A brilliant gem of diameter half an inch would weigh about 8 carats. It will be seen that a 1 carat gem is a sizeable stone, hence the need for the division into points when estimating prices, especially of the finished products. Since a good quality 1 carat, finished, brilliant shaped diamond can cost currently some \$1,600 in the U.S.A. that very small additional quantity of weight which is called the point, although no more than a mere 10 milligrams, i.e. just about 1/14,000th part of an ounce, is worth as much as \$16! It is not surprising that finished brilliants are very carefully weighted to 1 /100th part of a carat nowadays by jewellers when valuation takes place.³³

As a reminder, attention is drawn to the unfortunate use of the word Carat in this Country to denote the fineness of gold. Pure gold is classed as 24 carat gold, and alloys are graded accordingly. For instance, 18 carat gold means that the alloy contains 18/24ths of pure gold, i.e. 75 per cent American, and continental practice favors a different spelling for the gold carat, replacing the to read karat. This is an admirable suggestion and we would be well advised to adopt this, practice here to avoid confusion with the carat which is internationally accepted now as a gem

³³ J.R. Sutton (1928) 'Diamond Murky, London. P.No.: -56

weight and should have nothing to do with the alloy/gold content.³⁴

❖ **Shapes of Diamonds**

Both diamond and graphite consist of a crystallized group of carbon atoms. In diamond the carbon atoms are locked into a very tight, regular pattern, whereas in graphite the pattern is looser and less symmetrical. The close packing of the carbon atoms in diamond makes it a relatively dense and heavy mineral. It is because the atoms in the crystal are so tightly packed that the diamond is so hard, for they cannot easily be pushed closer together. The density (ratio of weight to that of an equal volume of water) is 3.52. This is high if it be recalled that the densities of granite and marble are only 2.5 and those of quartz and sand just 2.6. The density of graphite is 2.3. This high density of diamond is exploited in the modern extraction techniques for mining diamond.³⁵

The diamond crystal can be found in a variety of related shapes, although the shape is often highly irregular. Of the regular forms which appear several are striking. Most

³⁴ A.N. Wilson (1660) 'Diamonds from Birth to Eternity', Gemological Institute of America, California. P.No.:-63

³⁵ Walter Schumann 'Gemstones of the World', Sterling Publishing Company Inc., New York. P.No.:-84

noteworthy in appearance is the octahedron (a crystal with eight faces, just like two Egyptian pyramids stuck base to base. It is the shape of this outline which is the diamond of our playing cards. The octahedron usually has fairly plane faces, but very frequently these have on them numerous tiny, regular, triangular pits which are called *trigons*. A fine, clear octahedron (known in the diamond trade as a glassy) is an attractive crystal and has often, especially in the Middle Ages, been used as a jewel by itself with no further treatment or polishing. The common octahedron shape has imposed itself upon the diamond polisher and is responsible for the emergence of the shape of gem called the brilliant, in a manner to be discussed in detail later. Anciently, the octahedron was often called a pointed stone. ***Octahedra*** are often found with Curved, rounded edges and sides and are only rarely of symmetrical shape. Usually, the larger the crystal the less perfect is the shape. Occasionally, crystals turn up in which each of the eight faces of the octahedron, instead of being flat, is itself a slightly raised three-faced pyramid, so there are in effect twenty-four faces, or there may even be a six-faced pyramid on each major face. Names like teriyakis and ***hexakis*** octahedron are given to such variants. ³⁶

³⁶ Olga Levinson (1983) 'Diamonds in the Desert', Tefelberg Publishers Ltd., Cap Town. P.No.:-128

Equally as common as the Octahedral are twelve-sided crystals called dodecahedra.³⁷ As a rule, these do not have flat faces but rounded ones, meeting in very sharp, curved edges. Dodecahedra are very variable in shape and many of the faces show fine striated line-marking. A third and touch more uncommon type of diamond is the simple cube, such diamonds invariably have rough, pitted surfaces and like frosted glass. A transparent club is a great rarity, most being dark or opaque.

Variations of the octahedral form present interesting types, at the times crystal develops as earlier a thin triangular plate or else, quite frequently, and it adopts the triangular shape known in the diamond trade as a macle. This is what the crystallographer calls a twin, for the two halves, upper and lower, are in the nature of image of one another. A macle can introduce formidable difficulties in connection with polishing. A notable rare type of macle has a crossed star shape.

Also a rare a diamond workers striking crystal shape is what is traditionally known as a portrait stone. This appears as a beautifully formed transparent fairly thin yet reasonably large flat hexagonal plate. Such crystals, when found, have been used as windows over small

³⁷ G.F. Herbert Smith (1990) 'Gem Stones', London. P.No.:-241

miniature portraits pointed on ivory, worn either as a brooch or on a ring, hence the name portrait stones.

Diamond is not always found as a single crystal, and, especially in Brazil, conglomerate masses of small, impure diamond crystals, locked together and lying in different directions, are found. Such a mixed mass of small crystals, called boart or carbonado, has the quality of very great strength and is highly prized as an industrial material for special technical processes which require very hard tools.

It is only infrequently that diamond is found in a highly pure condition, for usually a small amount of impurity is trapped in the crystal during its growth. Such impurity can vary from a minute amount up to perhaps ten or even twenty per cent and is responsible for giving the crystal either a colour or opacity. Cloudiness can exist in varying amounts, until it is such that the crystal is quite opaque, perhaps a deep green or a black. Colour is not necessarily detrimental to the value of the diamond as a gemstone. On the contrary, if the diamond still remains transparent and has what one might call a pastel shade of colour, it is very highly prized and the value can be enormously enhanced.

Although pure diamond is one of the simplest of materials chemically (i.e. it is pure carbon), very frequently a small amount of iron oxide impurity is included and it is this which is largely responsible for giving so many diamonds a yellowish tinge. The value of a diamond is determined by its size, colour, shape, and freedom from flaws. A diamond which is transparent and flawless is said to be of the first water, then the colour appellation is attached, if any, thus, a first-water pink gem. The rest are classified in diminishing value, largely according to colour. Several classifications have at times been adopted commercially. Typical is the following kind of grading: (1) blue-white; (2) white; (3) light Cape; (4) dark Cape; (5) light brown; (6) dark brown; and, of course, expert dealers subdivide these groupings. Special optical instruments called tint meters have been devised for the express purpose of grading diamonds by their colours to assist pricing and buying.

Of the delicately coloured transparencies, which can fetch very high prices, there occur, occasionally, canary-yellows, greens, and browns. Beautiful pinks have very rarely turned up and ruby-red is at times found. But perhaps the rarest of all is a sapphire blue colour which can command a peak price.

Completely black diamond, carbons, or carbonado, seem to be a mixture of diamond and opaque graphite and are useless as gemstones, but retain considerable technological value.

Many diamonds are found which appear matt, dirty, and opaque, but this is in some Cases only due to a thin skin-covering of impurity and if this be polished off a good transparent crystal can be found intact below it. Not infrequently a diamond contains an inclusion around which it has grown. This may be another mineral, but in rare instances it is another, separate diamond which is occluded by a double, act of growth. Such freaks are of considerable scientific interest.³⁸

❖ **Hardness of diamond**

The two particularly outstanding physical properties of the diamond are: (1) the hardness (2) its optical characteristics. Diamond is easily the hardest material in nature. It is also a good deal harder than the synthetic carbides developed within recent years which are considered to be next to diamond in hardness. Reports about a very hard new material, boron **azide**, reputedly comparable with diamond, are as yet uncertain. Although

³⁸ S. Tolansky (1962) 'History and use of Diamond'. University of London, London. Page No.- 3

most people vaguely understand what is meant by hardness, this is a difficult scientific concept to define with some precision, for it is easy to recognize quite a variety of different kinds of hardness. There is, for instance, amongst these, abrasion hardness, i.e. how does a material stand up to rubbing? Then there is indentation hardness, which is a measure of how a material resists penetration by another and harder body. A further useful measure, technologically, is re-bounce hardness, and, another long-used and useful property is scratch hardness. For perhaps 150 years (and even now) scientists, engineers and mineralogists made use of a hardness scale introduced by the mineralogist, **Mohs**. It is arranged ten minerals in a series such that any mineral could be scratched by any one above it. The softest, talc, was graded 1, and next came gypsum, graded 2, and so on. Towards the top of this scale topaz was placed at 8, **corundum** (sapphire) at 9, and finally, at the very top, diamond, at 10. Now in fact the real difference in hardness between diamond (10) and **corundum** (9) is very much bigger than the real difference between **corundum** (9) and topaz (8). The scale is not a proportional one; but is useful for defining the properties of minerals.

Other more accurate scales have since been developed and one which is widely used is the Vickers hardness Number, a number arrived at from measurement of the amount of penetration suffered when a body is

subject to pressure by a sharp diamond point of given shape, and using a given applied load. To give some idea of Vickers numbers, the hardness number of a typical brass is 100 that of a good steel some 500. Topaz (8 on our Mohs scale above) has a Vickers hardness number about 1,300, and corundum (Mohs 9), a Vickers hardness of 2,000. The modern, technical, very hard abrasives, boron carbide, tantalum nitride and silicon carbide, have, respectively, hardness 2,800, 3,200, and 3,500 on the Vickers scale.

How hard then is diamond? Here we run into formidable experimental difficulties in trying to get a figure, for, if diamond is the hardest of all materials, how then can we indent it to find its hardness? The answer is a curious and important one for it turns out that diamond is somewhat harder in some directions than in others, and it has been found possible to indent the 'softer' directions of one diamond with the 'harder' direction of another diamond. It would appear that a hardness figure of at least 10,000 is reasonable for these softer directions in diamond, although some experimenters have quoted much higher values-50,000 and more. Diamond is so hard that it is in a special category by itself. ³⁹

³⁹ L.J. Spencer (1936) Key to Precious Stones , Blackie, London, 1936. P.No.-258

❖ Cleavage

Despite the enormous hardness of diamond, if a steel blade be applied to it and pointed in the right direction, then tapped with a rod, the diamond will cleave apart quite easily. A cleavage plane is illustrated (shaded). Cleavage can take place on any plane parallel to the face of the octahedron. There are then four cleavage directions, but of course the cleaving knife can be set anywhere on the crystal edge, provided it points the right way. Cleavage is a valuable, simple technique for pre-shaping an irregular crystal, but it requires considerable skill, a skill both in identifying the cleavage direction and a much more refined skill in applying the cleavage blow correctly. Cleavage must not be confused with brittle fracture. When any crystal cleaves (many do), it splits along a reasonably near plane quite different from brittle fracture. Brittle fracture is usually irregular with splintered, curved surfaces, sometimes resembling the whorl of a sea shell, because of which it is often called concordat fracture. A diamond struck with an arbitrary, strong blow splinters and shatters. For good cleavage, the impact must be of judicious strength and fit the correct direction, and then the two pieces fall gently apart with very little shock.

The history of the origin of the knowledge of cleavage is wrapped in obscurity. This cleavage facility is, of

course, a most unexpected property of so hard a material and when first discovered must have seemed amazing. Surely there is a very real hint of guarded early knowledge of cleaving in the mysterious Pliny myth about the goats' blood. In those early days, the discovery of so curious a property as cleavage would be kept secret and cloaked by some distasteful story. What better than the goats' blood myth? It has been conjectured that the ancient Indian lapidaries knew the art, but strict evidence on this point is not available. It has been claimed that the eleventh century writer theophilus was familiar with the cleaving of diamond, but having searched Theophilus I have not been able to find such a reference. The earliest European written record about diamond cleavage appears in a work by de Boot, published in 1604, so clearly the cleavability of diamond must have been known in Europe during the late sixteenth Century at least. An early mention also occurs in the writings of Jean Baptiste Tavernier. Tavernier was a remarkable man, who died in 1689, aged 84. The son of a professional geographer, he was a great traveler and was an early pioneer in developing trade between India and France. He was essentially the world's leading gem expert of his time and in addition to having traveled widely in Europe, he made no less than six voyages to the East, part of his purpose being to study the gems of oriental potentates and also to bring back diamonds, pearls, and rubies, Indeed he brought back no less than twenty great diamonds which, as

we shall see anon, played some, part in history. His earliest oriental journey, reaching as far as Ispahan in Persia, was in 1631; his last in 1668, and in 1676 he wrote a treatise, The Six Voyages of J. B. Tavernier. It is in his account of his second Indian journey of 1638 that we find invaluable historical records about the diamond of the Orient.⁴⁰

There is very reason to believe that Tavernier was an accurate and precise observer and his reports and statements about individual great Eastern gems command respect and belief. It was on his second voyage, in 1638, that he first visited the extensive Golconda diamond fields in India and inspected the diamond treasures at the court of the Great Mogul. A merchant trader of the highest rank, his chief customers were the greatest princes of the East and he made a large fortune, acquiring also an unblemished reputation for reliability. His travel book is essentially an extended account of his journeying and his remarks on diamond jewels are only a part of the content.⁴¹

Tavernier records that on his visits to India he learnt that the Indian lapidaries had long been familiar with the art of diamond cleavage but for how long is still a problem. That knowledge of how to cleave diamond was part

⁴⁰ S. Tolansky (1962) 'The History & Use of Diamond', University of London, London.P.No.-124

⁴¹ Graham Hughes (1978) 'A Pictorial History: Gems & Jeweler', Phandon Ltd., Oxford. P.No.-65

and parcel of the jeweler's stock in trade by 1672 is revealed by the distinguished scientist Robert Boyle, who tells us that he was shown the cleavage art by a jeweller. It is a strange thing, but this cleaving art seems to have been lost and rediscovered more than once. The well-known early nineteenth century scientist Wollaston, famed for his discovery of the noble metals palladium and rhodium, and also for his work on crystals and optics, seems to have rediscovered cleavage for himself in 1814. It seems by then to have become a lost art, for it is said that by keeping this technique to himself, Wollaston made a pretty penny. He bought awkwardly shaped diamonds from lapidaries, then, after cleaving them into more manageable proportions, he resold them to the same lapidaries at a profit!

The expert cleaver, even, today, jealously guards his craft. The greatest cleavage story of all times concerns the mighty Cullinan diamond, found in South Africa in 1905. In 1908, it was decided after careful studies that this diamond, by far the largest ever discovered, and weighing 11¹/₃ lbs, should first be cleaved into three parts before ultimate fabrication into gems for the Crown Jewels of Great Britain. J. Asscher, head of the great diamond polishing firm in Amsterdam, was entrusted with the task. The diamond was mounted on the bench, anxious onlookers gathered round to watch with bated breath as Mr. Asscher applied the blade. The question was whether the enormous

crystal would cleave true, or, what was terribly feared, whether it was heavily strained and would shatter in to fragments when struck, which would be a financial catastrophe.

The blade was struck-nothing happened. A second blade was applied and struck. The crystal parted perfectly-and and Mr. Asscher collapsed and fainted and had to be revived with brandy! With noire confidence he then parted the larger fragment with a second blow and so the work of fashioning the gems could begin.

Myths about cleavage have also been exploited for gain by unscrupulous dealers in recent times, again amongst the credulous, ignorant diggers of last century. Diamonds are at times dug up which a, a clear everywhere except in some local corner or region where inclusion produces a cloudy cloudy or smoky patch. Dealers deliberately spread the story that a cloudy region quickly leads to cleavage Shatter and fracture as soon as the initially warm stone cools down (Warm if it mines from an appreciable depth). When a crafty digger found such a stone with a smoky region he either kept it warm in his mouth, or thrust it deep into a potato and then rushed it off to the dealer. Of course, if the dealer spotted the flaw the game was up and the dealer paid a low price, quite unfairly. If the dealer missed the flow and paid a fair price, the digger beat

a rapid, gleeful retreat, convinced that the stone might explode at any moment.

Apart from those very rare instances of diamonds having an inclusion of a high pressure bubble of gas or liquid, diamonds does not burst. Incidentally, I myself, in the process of various studies on diamond at different times, have had many hundreds of diamonds in a vacuum and they have suffered no damage, even after being repeatedly in such a vacuum. If diamonds are at all likely to burst, evacuating the air around them would certainly assist such bursting. ⁴²

❖ **Optical properties of diamond**

Diamond has very special optical properties which are responsible for the brilliant adamantine luster and fire which makes the well cut diamond gem such an object of beauty and attractions. It takes on a very high polish both because of its hardness and its high reflectivity. When light enters at an angle off the perpendicular into any transparent liquid or solid, the path taken by the light deviates, i.e. the light is refracted. The amount by which the light is deviated is called the refractivity. The refractivity of diamond is extremely high indeed. Refractivity is measured

⁴² Susannse Steinem Patch (1976) 'Blue Mystery Story of the Diamond', USA. P.No.-168

in terms of a number, the refractive index, which depends a little on the colour of the light. For diamond it is 2.42, an index exceeded for yellow light it is, for instance, 1.5 for glass and 1.76 for the gem sapphire, an index exceeded only by three somewhat rare and obscure minerals, anatase, brookite and rutilite, which, in any case, are not suitable for gems.

The reflectivity of a transparent solid surface is closely related to the refractive index and the higher the index the greater the reflectivity, When light falls perpendicularly on glass, only 4 per cent is reflected back, but diamond, with its much higher refractive index, has a much higher natural, inherent reflectivity, about 18 per cent being reflected back. So, when it is held in the light it looks brilliant. But there is a still more interesting consequence of the high refractivity and this concerns what is called total internal reflection. As a consequence of the high value of refractive index, if any of the light which enters the crystal ultimately meets a face at an angle exceeding 24.5 degrees, it does not leave that crystal face but is totally and perfectly reflected internally to some other direction and, in due course, by correct shaping it can be arranged so that the light returns 'Backwards'. This is cunningly exploited in a manner. The upshot is that by exploiting these optical properties on a correctly cut diamond, light is, reflected,

with a brilliance comparable to that of a highly polished silver mirror.⁴³

Now all transparent materials, in addition to refracting light, also exhibit what is called dispersion, that is, the refractive index is slightly more for the bluer component of daylight than for the redder. The different colours which constitute white light we differently refracted i.e. dispersed, and this is of course why a glass prism shows, the colors of the rainbow. In diamond, the dispersion is especially high, about five times that of glass. So what is the result when light falls on the well cut diamond? First, 18 per cent immediately reflected. Then the rest enters, but is largely reflected within the diamond and ultimately finds its way back to the eye of the beholder. But on its path it is strongly dispersed, i.e. split into brilliant, widely separated spectral colours. This, then, constitutes the famous 'fire' of the diamond, the flash of spectral colour from the dispersed Light spectrum.

It need only be added that fire is far more effective in flickering candlelight than in daylight or electric light. The changes in angle of incidence of light resulting from the flickering candles make a diamond jewel worn in such light appear to be virtually alive and flashing with fire. Truly the

⁴³ S. Tolansky (1962) 'The History & Use of Diamond', University of London, London. P.No.-194

thousand candles at Versailles, before the days of gas or electricity, must have brought out to perfection the brilliant fire of the diamond, worn by the ladies of the French Court. Incidentally, because of the high refractive index of diamond there is a ready test available to the expert, by measuring this we distinguishes the genuine diamond from the fake.⁴⁴

❖ Some Further Physical Properties of Diamond

Diamond has a number of other interesting physical properties which characterize it? Being pure carbon it can be burnt in oxygen to form carbon dioxide, the gas which puts the sparkle in lemonade! Even as early as 1664, Robert Boyle had discovered that a diamond, when subjected to high temperature, 'dissipated into acrid vapors' that a diamond burnt away in air when strongly heated was demonstrated in a famous historical experiment carried out by the Florentine Academicians in the year 1694 in the presence of Cosimo III, the Grand Duke of Tuscany. Using a powerful burning glass, these Florentine worthies concentrated on a diamond the heat of the strong Italian sun. A high temperature was reached in this early solar furnace, and the diamond burned away, to universal astonishment. It remained however, for the great French chemist Lavoisier (executed at the time of the French

⁴⁴ www.diamondworld.net

Revolution) to prove for the first time that the 'acid vapours' into which Boyle had burnt a diamond was, in fact, carbon dioxide gas and only this.⁴⁵

Diamond is relatively easily attacked by certain hot oxidizing compounds. It is found that if a diamond be heated to only 550°C in molten potassium nitrate, which is an active oxidizing agent, it begins to be eaten away, due of course to oxidation conversion to carbon dioxide. This eating-away mechanism is called etching. When exposed to the hot nitrate, after some minutes, tiny little pits, triangular depressions, first form. These etch pits grow rapidly and then coalesce. After, say, an hour, the surface exhibits a micro-structure which a high-powered microscope reveals to be of striking block pattern, very like a Giants' Causeway in miniature. The crystal is then slowly and gradually eaten away if etching be continued, but the process is slow unless the temperature be raised some 200 or 300 degrees more. The nature of the etching depends upon which crystal face is being attacked. On the octahedron faces small triangular pits form, on the dodecahedron faces the pits are elongated and canoe-

⁴⁵ 'Diamond Galaxy International', (April-2001) "Gem and Jewellery Informatics' publication", Surat. P.No.-25

shaped, while on the cubic faces they are square-shaped depressions.⁴⁶

Some years ago It was told tile. It seems that all old ladies had a valuable diamond necklace which she hid in the chimney of a disused room in her house. In due course, that old lady died and the house changed hands. Fires were lit in the formerly unused fireplace and the hot flue gases enveloped the diamond necklace and when after some years a chimney sweep was called in, down came the necklace.

Now the point of the story is this, that when the necklace was taken to a jeweller he pronounced the stones true diamonds, and I reported that these gemstones were all beautifully etched by the prolonged exposure to the hot gases. If this charming tale be true, the jeweller must have been something of a scientist, because tile, shapes of the etch pits on the polished faces of a gemstone would present interesting variations from facet to facet, and to recognize the markings as, etch would require a little more scientific knowledge than one expects from even all experienced working jeweller,

⁴⁶ Joshua, Davis (2004) 'The Diamond Wars Have Begun', SPAN, March-April, American Centre, New Delhi. P.No.-65

In the absence of air, oil oxygen, strong heating of diamond produces a strange, disconcerting effect. For at and above 12000 C it begins to convert into graphite and turns black, it can even break down completely into a graphitic powder. This conversion, graphitization as it is called, is a consequence of the looser packing.⁴⁷

Of the atoms in graphite for graphite and diamond are related an according to the pressure and temperature, they have a tendency to transform one to the other. At ordinary pressures graphite is really the more stable crystalline state, so that as soon as the temperature of a diamond is raised sufficiently high to give adequate mobility the atoms and thus loosen their binding, the atoms try to rearrange themselves into the less tightly bound state which is graphite. Thus, conversion takes place into what is the more stable form at normal pressures and the result is that change which is called graphitization.

It has been stated that diamond, when heated sufficiently, melts, and that the melting temperature is 3,700'C. Such melting can only occur if the pressure is high enough to prevent graphitization. Graphite itself melts at perhaps 3,500 C so that whether a diamond does graphitize or not, its melting point is still something at least as high as 3,500C.

⁴⁷ [www. diamond world.com](http://www.diamondworld.com)

The diamond is amazingly resistant to most chemical attack other than hot oxidation. Provided there is no free oxygen it is not affected, even at high temperatures, by the strongest acids or alkalis. Even that very corrosive agent hot hydrofluoric acid has no effect on it. Thus diamonds can readily be cleaned with strong acids or alkalis without danger, damage, or loss in weight.

A very useful property of diamond is its transparency to X-rays. X-rays are only absorbed by heavy atoms, and carbon, the constituent of diamond, is one of the lighter atoms. This has a two-fold application. First, X-ray diagnostic photographs reveal at once the difference between a diamond and either a mineral imitation or a glass 'paste'. Glass imitations require the high density and big collectivity properties usually found in a heavy lead glass. Such glass is completely opaque to X-rays because of its metal content, so the X-ray identification of a diamond is an easy matter.

A second use to which the transparency of diamond to X-rays has been applied has been in the employ of small diamond 'bombs' for high pressure experiments. A hole is bored through a thick and large diamond. At each end of the hole is a close-fitting piston of a strong alloy metal. A liquid or other material to be studied is compressed

within the diamond by the pistons. This is, of course, exploiting the great strength of diamond, permitting very high pressures to be reached. At the same time the material within the diamond can be studied with X-rays (because of transparency of the crystal to X-rays). By this means, changes in structure can be followed, and one expects such changes to appear in materials subjected to high pressure. Such a device is a remarkably simple high-pressure 'bomb' and deserves much more extensive use than it has already for pilot studies in high pressure work. There is a great future in high pressure physics. Under extreme pressures (say, something like 100,000 or, more atmospheres,), atoms and molecules are pushed sufficiently close together for them to lock and form new molecular combinations, a very useful property.⁴⁸

Diamond is a very strong material and therefore resists compression. It has the best compressibility property of any known material. It resists compression four times better than iron and two times better than the very hard metal tungsten. It is twenty times better than its carbon relation, graphite. Because of this high strength, diamond points can sustain considerable loads. Most people are aware of the use of small pointed sapphire rods and diamond rods as gramophone needles. Whilst the sapphire

⁴⁸ Edward Jay Epstein (1982) 'The Rise & Falls of Diamonds: the Shattering of a brilliant illusion'. P.No.-95

is four times superior to steel, tests have shown that a diamond point of the same size as a sapphire point can sustain a load four times greater than the sapphire before cracking.

Yet despite this, great strength I have found that there exist a curious, weakness in diamond. If a ball-shaped diamond, or even a tungsten, carbide ball be pressed on to a flat diamond surface, whether natural or polished, the relatively light load of only some 20 or 30 lbs produces a minute, well formed, hexagonal, ring shaped crack. This may is only 1/50th of an inch across, but such cracks play a part in the failure of diamond machine-tools.⁴⁹

Diamonds, apart from some late blue types, do not conduct electricity. They are good electrical insulators. This is in keeping with the properties of other transparent materials. There is a certain theoretical relationship between the transparency of a solid and its electrical resistance and most transparent crystals (and also glasses) are both good electrical insulators and good heat insulators. Conduction of electricity and conduction of heat are closely related physically, and those metals such as silver, copper, and aluminum which conduct electricity well also conduct heat well. Conversely, glass, which is a very poor conductor

⁴⁹ S. Tolansky (1962) 'The History & Use of Diamond', University of London, London. P.No.-266

of electricity, is equally a bad conductor of heat. One can hold a glass tube in a flame quite close to the heated part without discomfort. In this system of uniformity of relation between electrical and thermal conduction diamond stands out a queer exception. Most good quality diamond is a good *electric insulator*, as expected. Yet strangely enough, diamond is also a remarkably good *heat conductor*.⁵⁰ Its heat conduction is 150 times better than that of glass, and it is 50 per cent better than that of brass, being practically the same as that of the good heat conductor ***aluminium***; something quite unexpected for an electric insulator.

As a result, diamond feels quite cold to the touch just like a metal, because of its ability to conduct heat away from a region of contact. One of the cunning tests to distinguish diamond from an imitation, like glass or quartz (diamond conducts heat twenty times better than quartz) is to put the stone under suspicion on the tongue and feel the temperature. The diamond feels cool like a metal. It will be shown later that this good thermal conduction turns out to be of considerable importance in connection with the use of diamond for cutting tools. In such technological applications the diamond is often subject to fierce frictional work and it is the good conductivity which prevents overheating and helps to retain the diamond in its holding matrix.

⁵⁰ Susannse Steinem Patch (1976) 'Blue Mystery Story of the Diamond', USA. P.No.-88

Diamond has a second, unique *thermal* property. When any body, whether gas, liquid, or solid, is heated it expands. A good metallic heat conductor generally has a high expansion of any known solid body. When copper or aluminium is heated, for each degree Centigrade rise the length expands about twenty parts in a million. This sounds small but is easily measured. Changes in dimensions through heat expansion can have quite serious binding effects in machinery, Diamond only expands one part in a million for each degree rise, and i.e. it is twenty times better than copper, brass, alumina, etc. from this point of view.

Some years ago, a French scientist, Guillaume, made a notable invention when he discovered a 36 per cent nickel steel which has a very low thermal expansion when heated. This is called Invar, since its length is very nearly invariable when the temperature is raised. It is a material widely used in precision scientific instrumentation. Yet diamond is still 50 per cent better than this famous non-expanding steel, from the viewpoint of thermal expansion. No other known material yet equals diamond or thermal stability.

This low thermal expansion is another critically important property in connection with the technical employ of diamond, for diamonds in tools are often subject to rapid

temperature changes. The diamonds must often be mounted in some holding matrix. If the heat generated in working with the diamond were to expand it appreciably, it would either be subject to strong breaking stresses or else be forced out of the matrix. True, the diamond which does or the work generates heat but, as it is a good conductor of heat and as it expands very little, this combination is as perfect as could be desired for reducing heat strain effects in technological practice.

Most natural diamonds exhibit a certain amount of internal physical strain. This can easily be revealed by a simple device called a polar meter. A cheap material is now available, called Polaroid, which has the property of restricting the vibration of light passing through it to a vibration in a single plane. It is as if, within the molecular structure, there was a system like a fence with long narrow vertical bars, having spaces between the bars. We can visualize, in rough analogy that a wave impinging on such a fence will only be permitted to pass its vertical vibrations and none of its horizontal vibrations. Such a wave-restricted to vibrating in one direction is called a plane-polarized wave. The Polaroid sheet achieves this effect by its molecular content and from such a sheet light emerges vibrating in one definite plane only. It is plane polarized light.

Now if behind a first Polaroid we place a second sheet of Polaroid with its 'fence bars' parallel to those on the first sheet, it too will now permit the plane-polarized wave coming from the first Polaroid to go through it. If, however, we turn the second sheet through 90 degrees so that its 'fence bars' lie across those of the first sheet, then clearly no light gets through the combination at all, Such a situation is called a crossed polar field.

Now it has been found that any transparent material which has internal strains in it, whether glass, plastic, or a crystal, affects the plane of polarized light. If a strained transparent material is placed between crossed ***polars*** the plane of the polarized light coming from the first Polaroid is turned through an angle by an amount depending on the extent of the strain. So some light now gets through the second Polaroid. As a result we see light patches at those regions where the material is strained. A strained crystal, glass, or plastic is perfectly transparent to none polarized light, but between the Polaroid's the whole strain pattern, whatever it may be, is revealed.

Many diamonds show strain patterns when viewed in polarized light, but so inherently strong is the crystalline material that it is usually capable of tolerating

very great internal strain without any fracturing, though subject to strong working stresses.⁵¹

❖ **Some special optical properties**

Even in 1664, Robert Boyle knew that sonic diamonds can give out Light in the dark after being illuminated by daylight. There has actually been much traditional confusion about this property.

Some *diamonds; phosphoresce*, that is, if they are brightly illuminated either by daylight or artificial light and are then taken into a darkened room, they continue to give out a glow which gradually fades away. Such phosphorescence is not its special property of diamond alone for it is also shown by many other crystals. It is closely connected with impurities in the crystals and is not a property of very highly purified, materials. What happens when a phosphorescing crystal is exposed to light is that some electrons in the crystal are, lifted out of their usual places by the action of the light and become trapped in sites created by the impurities present. Now at room temperature there is still a great deal of vibration activity of the atoms of any solid, one must not imagine that atoms in a solid are at rest. Far from it! When such a Light-activated

⁵¹ Diamond galaxy International (March -2006) Published by Gem and Jewellery Informatics, Surat. P. No. 17

phosphorescent crystal is taken into the dark, the Normal vibration activity of the atoms enables some of the displaced electrons to drift slowly back into the vacant places created when they were initially lifted up by the original strong light illumination. Each displaced electron when it finds a home give out same light radiation and this Constitutes the phosphorescence.

Clearly, it must rapidly diminish with time, since more and more electronics find a home, and the effect soon fades out through lack of numbers of displaced electrons. There is then no special mystery about the phosphorescence of diamond. It is just one more case of a fairly widespread phenomenon apparent when dealing with crystals, however, in the seventeenth century it was a rarity since few suitable phosphorescing materials were known.

Some diamonds when rubbed in the dark will-emit a glow, and this, too, is very closely related to phosphorescence. It is typical also of many other crystals carrying impurities. It is sometimes called tribo-luminescence and is by no means peculiar to diamond.

Many diamonds when illuminated with invisible ultra-violet light give out a visible glow. This is called fluorescence and it leads to the emission of a blue or a yellow-green light. Much scientific research has recently

been done in connection with these phosphorescing and fluorescing properties of diamond, especially in relation to structure and to impurities.

Fairly lasting colours can be artificially induced clear diamond by irradiation and bombardment with high-energy, fast atomic particles. If a diamond be placed in an atomic reactor of the kind available, for instance, at Harwell, then as a result of bombardment green coloration is produced in the first instance. If the radiation dose is increased the diamond then turns black. Now this quite attractive artificial green coloration has an entirely different Cause from the green colour sometimes found naturally in the diamonds obtained from the earth. In the natural case, the green colour is due to the accidental inclusion of a suitable metallic impurity, and in this sense it has a permanent character, fixed into the diamond. The radiation green arises in a different way. When the crystal is exposed in the nuclear reactor and heavily bombarded by atomic particles there are numerous collisions between carbon atoms in the diamond crystal and these atomic particles called neutrons, of which there are intense streams in a reactor. When a carbon atom is struck by a neutron, it is knocked out of its position the crystal and this creates what is called a vacant site, a hole. At the same time the displaced carbon atom must find a resting place somewhere and this it does by pushing aside a number of (already

closely packed) other carbon atoms. It becomes what is called an interstitial atom. Both the vacant site and the interstitial atom lead to an internal state of strain. This is such that when light is passed through the crystal some of it is absorbed and the result is the production of a colour, which happens to be green.

If a crystal which has been turned green by irradiation is heated to about 400°C, the rise in temperature considerably increases the vibrations of the atoms; in the crystal, and gives the trapped interstitial atoms a chance to work loose from their traps and find homes in nearby vacant sites. As the result of heating is to permit the interstitial, to find homes, the green colour therefore disappears on heating. It is, if you like, destroyed by annealing.

Now this is not the case with the natural green crystal for the colour here does not vanish when the crystal is moderately heated so one can distinguish, by heating, between the natural and the artificially induced green colour. The fact that such a distinction can be made might well influence the question as to whether or not artificial induction of colour will affect the value of the gem. A natural green gem, being all the more attractive for its rarity, fetches a higher price, as things are now, than the corresponding gem without colour, buyers have, however, a horror of synthetic

or man-made effects where gems are concerned and if it can be demonstrated (as it call be) that a particular colour is man-made and not natural, it may well be that the man-made Colour will not induce the buyer to pay the increase he would pay for the natural colour.⁵²

Whilst caution bombardment produces green, the more prized colour, blue, Call be induced by electron bombardment. For this purpose high-voltage generators which produce electrons at an energy of about five million volts have been used. Here, too, the color can be largely destroyed by heating, which in effect is a sort of annealing process. It remains to be seen yet whether radiation bombardment coloring will have commercial value in the future or not.

When diamonds are over-dosed by irradiation the local shock of impact leads to a partial conversion into local fine graphite particles. Thus diamond is permanently turned black by this means and it also becomes opaque. Nothing can be done to repair such damage. There is some evidence that the very physical hardness of a diamond is also affected by exposure to radiation and this is not surprising, but the evidence accumulated so far with respect to this is rather flimsy.

⁵² G.F. Herbert Smith(1994) 'Gem Stones', London. P.No.-40

Clear diamonds are transparent to ultra-violet light, but it has been discovered that there exist two kinds of diamond which are conveniently called type I and type II. These differ by the extent to which they transmit the ultra-violet. Most diamonds transmit ultra-violet down to a certain wavelength described as 3000 Angstrom units and to light of shorter wavelength they are opaque. (The visible spectrum stretches from about 4000 to 7000 A.U.) These are called type I diamonds. Quite a small proportion, perhaps only one in a thousand diamonds, are transparent to still shorter wavelengths, beginning to absorb first at a shorter wavelength (2200 A.U.). These are classed as type II among the type II are few very rare diamonds which are blue and have the surprising property of being able to conduct electricity. In fact, one known example can be made red hot by passing so much current. These diamond electric conductors (called type II_b) are extremely rare and have only been found very occasionally. The real distinction, between the common type I and the rarer type II is not yet fully understood and is the subject of much active study. Not only, do these two groups differ in their ultra-violet, transparency, they differ also in the way they transmit heat, i.e. in their infra-red transparency.

All diamonds, whatever their type, transmit infra-red heat radiation (up to a wavelength of about 40000 A.U.) and beyond this absorb heat in certain wavelength bands.

They again become fairly transparent to heat for still longer wavelengths, but here a difference crops up between the type I and the type II diamonds, for the type I (and only the type I) have a particularly strong absorption of radiation at about 80000 A.U. Historically the difference between the two kinds of diamond was first found from infra-red studies, but the ultra-violet absorption difference is easier to measure, so that usually one uses this to determine the type.

It is of academic interest to note that the rarer type II diamonds, which usually happen to be quite small, more nearly approach the physical properties expected for perfect diamond. Two slight physical differences have been detected between the two types. It has been found that the type II has a higher thermal conductivity than the type I, and it is established that the cleavage of type II is appreciably better than type I, the cleavage faces in the type II being a good deal smoother. From the viewpoint of general use as diamond, either as a gem or for commercial and technological purposes, the existence of type II is of very little significance. There is little practical difference between the two and, in any case, the greater majority of type II diamonds are quite small crystals. It must not be forgotten, too, that type II in any event is only present to the extent of one part in a thousand, so that gem buyers and industrial

users need not worry themselves unduly over any slight physical differences between the two types.

It is only to the scientist that type II is of such real interest, throwing light on the nature of the diamond. And, of course, special scientific interest attaches to the few blue type II diamonds which conduct electricity. A very wide range in electrical conductivity has been found in the few diamonds that do conduct. Two or three of the blue type II_b diamonds are very good conductors, having a low resistance like a metal and can take a heavy current. However this is exceptionally rare, for the majority of the blue type II_b crystals found (still of course a mere handful) are what are called 'semi-conductors'. They have electric conduction properties halfway between those of a metal conductor and a non-metal insulator. The scientist is especially interested in these extreme rarities. It has already been established that the semi-conducting diamonds are also good phosphors, and it is very likely that both phenomena are due to the common cause of inclusion of impurities trapped in the crystal when it grew.⁵³

Within recent years scientific research on diamond has received considerable support and encouragement from the great diamond producing and marketing organization of South Africa, The Diamond

⁵³ www.diamonds.net (Rapaport India Pvt Ltd.)

Corporation. This organization, which is responsible for the marketing of some 95 per cent of the total world output of diamond, has notably assisted scientific research on this material; Recognizing the growing technological importance of diamond as an industrial hard material, it has encouraged and supported research along three distinct ways, First, it has set up in Johannesburg the Adamant Research Laboratory, an establishment devoted to seeking improvements in methods of winning diamond and of using diamond industrially to the best advantage. Second, it sponsors and supports a good deal of fundamental pure research on the physical properties of diamond, the work it so sponsors being conducted in various Universities. This work is largely academic, being concerned with the purely scientific properties of the crystal itself. No industrial bias is imposed and the investigators are supported both with grants and with adequate supplies of diamonds to conduct their researches. Thirdly, it has initiated and organizes an annual scientific conference on the physics of diamond. A tradition has now grown up over the past dozen years such that the conference-international in scope and attended by about a hundred scientists has been held largely in alternate years at the Universities of Oxford and Cambridge. The considerable output of research reported there, together with the lively ensuing discussions, have considerably increased our knowledge of the many obscurer properties of the diamond crystal. Despite the apparent simplicity one

might expect from a crystal built up out of only one kind of atom (carbon), one meets formidable structure complexities in diamond.⁵⁴

⁵⁴ www.gemjournal.com

SECTION-2

DIAMOND INDUSTRY IN THE WORLD

To represent the concept of diamond production and sell means to explain the concept of centralization and monopoly of the diamond industrial structure. From the ancient times the market of rough diamond becomes the monopolistic market, whenever India had the monopoly in diamond production at that time there was a monopoly of northern state i.e. Nursing Dar and Golaconda, whenever Brazil became the one main Army in diamond production at that time it was the monopoly of British. Than after South Africa and pan - Africa has taken the monopoly as a central control of De Beers consolidated mines limited.

The present diamond trade has been started at 18th century. Africa is the legend till the date from the starting. There was an individual ownership of mine owners on Kimberley mines. There were near about 1600 owners but after time being Joined venture also established due to the scarcity of labour and high wage and De Beers has taken his own ownership up to 1888. It has given sells right to famous diamond syndicate in 1890 among these sells

right has taken only 48% share for three main branches. Rest 52% has given to other 7 company on the gain of 2% to 10%.

In the time of 1930 diamond industry was suffering with a depression so to save the diamond industry from the depression, diamond industrialist and producers have established central selling organization (C.S.O). The central selling organization (C.S.O.) popularly known as the "Syndicate" handles and controls almost the entire production of gems and industrial diamonds of the world. It is the marketing arm of De Beers and acts on behalf on the world's major production centers. It employs near about 2000 workers, The C.S.O is a collective name used to describe an international group of associated companies involved with the buying, valuing and selling of about 80 percent of the world's rough diamond production. It acts on behalf of producers on an entirely voluntary basis. Two of the most important companies in C.S.O. are the D.T.C. which sorts and sale rough Gem diamonds and the De Beers Industrial Diamond Division "sights" or sale to select the people are hold on South Africa, London and in Lucerne.⁵⁵

⁵⁵ Kantilal Chhotalal (1990) 'Diamonds: From Mines to Market'.
P.No.:-64

Nicholas "Nicky" Oppenheimer is the chairman of the C.S.O. While Sir, Philip Oppenheimer is its president, Its Executive director includes Alec Barbour, Anthony Oppenheimer. Tim Capon and G. M. Ralf and Jeremy Pudney. Among the others is Michael Grantham marketing directors and Nigel widen the sales director, Rajiv Bhadiri is the President Director with overall Responsibility for India.⁵⁶

Nicky is a man of action, Pragmatic and decisive. He has now desired to spend half his time in South Africa. He has a strong sense of humor. He has the power to create a sense of brotherhood and make man from different countries feel at home. Miners and manufacturers feel alike that C. S. O. is of benefit to all.

Till the beginning of the early 1930s the diamond industry was in confusion. It was entirely due to the efforts of the late sir Earnest Oppenheimer that the industry was established and organized on its formation. The C.S.O. became the acknowledged leader in the international diamond business and indisputably still holds that position.

The Diamond trading co. Ltd, (D.T.C.) is a proprietary concern of C.S.O. It was formed in 1934. The DTC markets the production of the DeBeers mines, as well

⁵⁶ S.P. Kashyap & R.S. Tiwari: (1987) 'Shaping of Diamonds in Surat some passes Fassets)', Sardar Patel Institute of Economics & Social Research, Ahmedabad. P.No.:-87

as that of Australia, the U.S. S.R, Zaire and other countries with which it has marketing agreements; DeBeers constitutes only Rs.21/- Per cent of C.S.O. sales, but the C.S.O. distributor 80 % of all the world's rough stones. Integrated into every aspect of the trade, the company excludes competition, punishes defection and governs supply of diamonds with such determination that prices never fluctuate. It realizes that if prices begin to fluctuate in a luxury item like diamonds, the consumer very often abstains from buying. It has a highly efficient world-wide Market intelligence network and annually spends 125 million on promotion in 29 countries.

Before diamonds are offered for sale, they are valued and sorted into more than 5,000 classifications of size, shape quality and colour, for which more than 600 sorters are employed. The sales or sights take place ten times a year. DTC gives "sight holder ships" to their buyers. Now these buyers of DTC are known as "Sight-holder" and what they buy from DTC is called sight of the DTC. This method or structure is used for the world-wide production and sale.⁵⁷

⁵⁷ Kantilal Chhotlani (1990) 'Diamonds: from Mines to Market'.
P.No.:54

(1) Diamond Trade:-

All over the world 80% rough diamonds are produced and sell by diamond producer association and C.S.O. in that most of the trade is done by D.T.C. London, is the main center of trading. Information is also not available for the prices obtained for different varieties of diamonds exported. Only a broad averages unit value realization be worked out this may not be useful.

India manufactures about 70% of the world's diamonds, most of which cannot be processed in other centers. Each stones has to be treated individually which in not possible on auto0matic machine. Lately china, Thailand and Srilanka have started manufacturing these qualities.

(2) Diamond mines in the world.

- (i) Angola
- (ii) Botswana
- (iii) Central African Republic
- (iv) Ghana
- (v) Ivory cost
- (vi) Lithia
- (vii) Libya

- (viii) Russia
- (ix) Sierra Leon
- (x) South Africa
- (xi) South West Africa
- (xii) Tanzania
- (xiii) Venezuela
- (xiv) Zaire
- (xv) India

(3) Manufacturing Countries in the world.

- (1) America
- (2) Belgium
- (3) France
- (4) Holland
- (5) India
- (6) Israel
- (7) Russia
- (8) South Africa
- (9) West Germany
- (10) China

(4) Trade Centers in the World

- (1) America
- (2) Australia
- (3) Brazil
- (4) Canada

- (5) France
- (6) England
- (7) Italy
- (8) Japan
- (9) South Africa
- (10) West Germany
- (11) India ⁵⁸

Manufacturing centers are arranged according to A.B.C.D. As per the more manufacturing centers Brazil, Israel and India are the main Centers.

The issue of conflict diamond is the most pressing one that confronts the diamond industry today. It is an issue that knows no boundaries and has gripped the global diamond industry.

Even the United Nations is seized of this burning issue. This world body, through three resolutions passed by its Security Council has called governments and trade bodies to impose a total ban on all trade in these diamonds. These resolutions display the determination of the UN to stop trade in these conflict areas.⁵⁹

⁵⁸ www.gjepc.org.com

⁵⁹ 'Diamond Galaxy International', (September-2003) "Gem and Jewellery Informatics' publication", Surat. P.No.:-87

In response, all bodies and organizations connected with the diamond industry have come forward to take measures to deal with the situation within their own sphere of influence.

The origin of conflict diamond is to be found in the strife-torn areas of Angola and Sierra Leone as defined by the United Nations. These countries are known for their deposits of this valuable commodity.

Recently, attention was drawn to the fact that diamonds were being used to finance the war efforts of rebel forces in these countries. It is a war which has caused severe hardship and resulted in widespread death and devastation for the people of Africa.

In India, the Gem & jewellery Export Promotion Council has reiterated its resolve to keep away from conflict diamond. The council supports the resolutions passed by the UN and strongly condemns any trade in these diamonds.

The Council in a resolution issued on June 23, 2000 said, "The times has come for the diamond community worldwide to join hands and express solidarity with the UN resolutions and uphold are sanctity and respect for human

lives. The Indian diamond community is committed to achieve the objectives set by the U.N. and creates a world free of conflict diamonds”.

It is estimated that only 3.7% of the entire world rough diamond producer comes from these war zones as against this the majority of the diamond trade. The mainstream industry, has brought prosperity to many other African countries, India and other countries whose economies depends on diamonds.

In India, about one million people directly and indirectly depend on the diamond industry. It is clear that the main stream diamond industry has played a positive and beneficial role.

What is needed therefore is a strong mechanism to stop any illegal trade in these banned diamonds.

The entry of conflict diamond into India is a rarity. This is because diamonds from these conflict areas are priced at an average of U.S. \$ 250 and above per carat, while India consumes diamonds that are priced at an average of U.S \$ 25 per carat. There is no direct import of diamonds into India from these conflict areas. The diamonds that are imported into India come from D.T.C.

(19%), Israel (7%), Antwerp (73%) and other countries which do not include any African countries (1%).⁶⁰

However, all members have been alerted to refrain from trading in conflict diamonds. They have also been informed that those found contravening these guidelines will have their membership to the Council cancelled. Banks too have been asked to withdraw credit facilities extended to such exporters.

In order to ensure that India is in line with the international community, the Council has formulated some steps which are mandatory on every import. All diamonds that are imported have to be accompanied with an invoice declaring that they are not from any conflict area. This measure has been taken so as to ensure that the diamonds imported into the country do not originate from any conflict area.

The Council is determined to keep these conflict diamonds away from the Indian trade and has resolved to

⁶⁰ 'Diamond Galaxy International' (February-2002) Gem and Jewellery Informatics' publication, Surat. P.No.:-96

spare no effort to ensure that the UN resolutions are implemented in their letter and spirit.⁶¹

After two years (1997 and 1998) of sluggish and diminishing sales resulting in increased inventory levels, De Beers called for a strategic review of their business to take a hard look at the way business was carried out and the ways in which their diamonds were distributed and sold to customers.

De Beers' strategic review identified the opportunity for the diamond industry to match the growth rates enjoyed by the leading companies in the luxury goods sector. To grasp this opportunity, the DTC launched the "Supplier of Choice" strategy, which will drive demand for diamonds, protect consumers and shift the industry's culture to one of customer focus.

Supplier of choice is a major new initiative of the DTC, the marketing arm of De Beers. The DTC will be working in new ways with its clients and equipping them to service their downstream partners. This will drive consumer demand for diamonds and put the diamonds industry in a more robust position to face the challenge of the 21st century.

⁶¹ 27th Annual Award Report,(2007) Confronting Conflict Diamonds, GJEPC, P.No.- 51

The various impacts of this strategy can be highlighted as;

❖ Distribution system:

Presently, we have a very complex and long distribution system. The new strategy will bring reforms to this system, so that diamonds will be both effective and speedily sold to the end consumers.

❖ Increase Consumer Confidence:

The new identity given by the De Beers to their sight holders and the new hallmark through which diamonds will be sold to the end consumers will result in increasing consumer confidence.

❖ Advertising and Marketing:

The strategy will impact advertising and marketing spend by involving sight holders in the marketing efforts. The total money spent on marketing and advertising may increase, resulting in increasing total sales of diamonds.

All in all the new strategy will drive demand for diamond jewellery, and transfer the industry which has been 'supply driven', and I believe that India begin the world leader in this industry will stand to benefit more.⁶²

DIAMOND INDUSTRY IN INDIA

❖ Introduction:-

Richest persons were the legendary of diamond trade but now the whole scenario is completely changed. A normal person can also buy the diamonds. This is vitally for an Indian diamond industry.

Indian Diamond industry has changed its working system many times. Indian diamond industry stabilized against world diamond trade depression. It is remarkable that in 1993 the whole world is sinking into the depressing but India has saved the world.⁶³

The Indian diamond industry has cornered a 55 per cent share of the world market by value. This is, in large measure, due the efforts at the micro level—the contribution

⁶² www.gjepc.org

⁶³ Mehrotra, S. N., 'Labour Problems in India,' S. Chand & Co., New Delhi. P.No.:-110

of all the artisans, manufacturers and traders making the country's diamonds all over the world. The gem and jewellery industry as a whole has also reached a new high in the financial year 1999-2000.

All exporters, especially the award winners have played an important role in this achievement. Those in the cut and polished diamond sector, particularly, have realized a good growth.

A significant development on the international front has been De Beer's new policy announcement, which will put the growth rate of the diamond jewellery on par with other luxury products.⁶⁴

However, the industry cannot grow with only DTC sight holders. There are many more people involved in the diamond industry today, whose contribution to the industry is important as well. In this context, the annual meetings that De Beers holds at various centers are significant. The council also meets with the DTC every year to hold discussions and exchange views on the world industry, demand and supply etc.

Their recent announcements, therefore, came as a surprise as there had been no hint of the measures they

⁶⁴ www.heerazhaverat.com

intended to take. It would have been good to have taken the industry in to confidence, and to have held discussions with the Council.

The Indian government's Ministry of Commerce and Ministry of Finance of Finance have always co-operated with Council and whatever measures have been required to enhance exports, have been taken by them. The introduction of the diamond dollar account especially is a tremendous contribution in taking the industry ahead and to help make India a trading centre. The constant support from the government and its willingness to make the necessary policy change have had a beneficial impact on the Indian diamond industry.⁶⁵

It is the important to note that the Indian manufacturing centre is now capable of producing the entire range of goods required by the market. It has in the last three to four decades emerged as the leading manufacturing centre with the support of De Beers and Argyle. It is in the interest of the industry that these producers ensure that a regular rough supply continues to flow in to the country.

Keeping in mind both, the willingness of the government to support the industry with the requisite liberalization in policy, and India's developed infrastructure

⁶⁵ www.idexonline.com

and capabilities, Indian entrepreneurs should concentrate on expanding the industry within the country rather than on looking outside for opportunities.

❖ **Bank Finance**

The strong support of financial institutions in the country has been a corner stone of our business. However, there are some peculiarities of the diamond trade. All banks are aware that export bills are realized within 120-150 days from the date of shipment.

We market a luxury item, and service and credit are very important, especially as overseas offices require holding large stocks for their marketing purpose.

Presently, a penal interest rate of 25 percent is charged on overdue bills even within 180 days. Looking at the peculiarities of this business, and the lower interest rate internationally, the RBI should allow normal interest rate on export finance up to 180 days. The levying of penal interest rate of 25 percent increases operating costs and makes exports unviable.⁶⁶

⁶⁶ 27th Annual Award Report, "Discussing the Diamond Trade, Published by GJEPC, P.No.- 17

❖ **Diamond Mines:-**

In India diamonds are mined only in M.P., Andhra Pradesh and Orissa but it is very low.

❖ **Diamond Workers:-**

In India the no. of diamond workers is more than the world's other countries. Most of the workers are villagers. In 1989 the total no. of workers in India was near about 8,00,000 but it is depends on the market situation in 1995 It was near about 6,00,000 due to the market depression, presently it is expected to near about 15,00,000.

❖ **Diamond Trade:-**

It was only from 1966 onwards that Indians started to capture the Belgium business in eight cut manufacturing and the country regained its position as a centre of the cutting and polishing industry.

When India became independent in 1947, foreign exchange requirements for numerous industrial developments were projected. And priority over all other demands was considered restricting which placed on the

import of cut and polished diamonds into the country. By 1952 only 1.5 % of the peak import of cut and polished diamonds was granted to established importers.

It was during the post independence period when certain enlightened entrepreneurs rose to the occasion. The pioneers in this movement were H.H Javeri, H.B Shah and Mohandas Raichand & Sons who established the first up-to-date factory in 1949.

Nearly 300 well trained artisans in cutting and polishing worked in Surat and Varanasi. Some like Liloobhai and Shantibhai were intelligent and of exceptional skill. They however depend on suppliers from local mines and old miners imported from Burma and local collection.

The local market was enough to absorb the company's entire production which was mainly in size. Subsequently the import of rough diamonds was freely permitted within certain parameters.

Accelerating inflation low rates of speculation and overseas investments are larger than better goods. Especially during 1973-74 and 1978-80 consumer market

was world wide expanded during this decade and Middle East markets including Iran sagged during 1976 to 1981.⁶⁷

❖ **Diamond processing in India**

The major supplier of diamonds into the Indian market is the Rio Tinto-controlled Argyle mine in Western Australia, followed by De Beers/CSO diamonds and a small but growing illicit trade in diamonds smuggled out of Russia. While De Beers now admit that there is a child labor problem in the sector in India, they claim that they do not use cutters who exploit child labor. During recent Parliamentary hearings in South Africa, De Beers pointed to the Rio Tinto-controlled Argyle mine as "supplying many of the Indian cutters" (Mail and Guardian, South Africa, 22 August 1997).

Diamond cutting and polishing is concentrated in Western India - in Mumbai, Surat, Navasari, Bhavnagar, Ahmedabad, and has recently spread to parts of Southern India. Mumbai is the primary centre for diamond imports and exports, including some diamond factories which are operating in the Santa Cruz Electronics Export Processing Zone (SEEPZ). While the sale and production of diamonds is

⁶⁷ Diamond Galaxy International, Gem & Jewellery Informatics Publication, Surat- Volume-7,P.No.-10

monitored through Mumbai, 60% of the cut and polished diamonds exported from India are handled in and around Surat. There a multitude of subcontractors, organized on a pyramid structure, process vast quantities of diamonds.

In 1995, India imported 92 million carats worth of diamonds to be cut. India cuts and polishes 70% and 40% of the global diamond yield in terms of weight and value, and because of this has the world's largest workforce involved in the trade, with about 800,000 people engaged in diamond cutting and polishing, and as many as 700,000 involved in other aspects of the diamond trade. Wages equal just 1 % (or less) of the wholesale price for which each diamond is sold, and most workers do not receive any social benefits.⁶⁸ The vast majority of the workforce some estimates are as high as 95% - is not organized into any union, and workers' incomes often depend on whatever the employer or middle-man decides to pay them. In many cases, workers trying to organize or join unions have been dismissed and even threatened with guns. Because of its reliance on traditional labour intensive methods, the Indian diamond cutting industry has concentrated on small diamonds with low value and low risks.

Today the diamond industry of India is mainly export oriented. Diamonds are cut and polished from all

⁶⁸ www.diamondigest.com

over of the world. The export trade is in the hands of small & big traders.

❖ Historical Background of Diamond Business in India

India had a long and traditional association with gem and jewellery and diamonds in particular. In the Vedic and classical Sanskrit literature, in the first place, and the accounts of foreign travelers such as Tavernier in the subsequent periods, frequent references to the use of gem and jewellery and especially diamond are found. The etymology of the term diamond can be traced back to 'Adames', a river in India which was pronounced as 'Handmant' in Latin and from this diamond (English) and Diamant (Greek and French) words were derived. This is one more proof of the strong association that India had with diamonds.

❖ Early Phases of Development



India was the sole source of diamonds in the world until the discovery of diamonds in Mines Gerais, Brazil in 1725. The Krishna River valley was extensively worked for diamonds in alluvial places and conglomerates

by open cast working shafts, which were inter-connected along diamondiferous layers.

In the early times, Varanasi was the main trading center for diamond. Subsequently, Madras took the top position. More recently Bombay has emerged as the largest trading center for diamonds in India.⁶⁹

❖ **Pre-Independence Period**

During the British rule, India was using indigenous rough diamonds though some rough diamonds were also imported from Belgium. An important aspect to be remembered is that there were no restrictions on import of out as well as polished diamonds till 1947. In July 1947, just before independence, all imports of diamond were stopped.

❖ **Post-Independence Development**

Between 1947 and 1953, the Indian diamond industry was almost nonexistent due to near non-availability of imported rough stones and negligible indigenous production of rough diamonds. Certain factors operating in the international markets were also responsible

⁶⁹ Diamond Galaxy International, Gem & Jewellery Informatics Publication, Surat- Volume-7, P.No.-73 -74

for this slow growth. Firstly, the Jewish community that had settled in Israel developed their diamond industry. Belgium re-established itself as an important diamond cutting and trading country. But these developments notwithstanding, the markets for diamonds had not yet developed in the world. The growth of diamond trade and industry was therefore slow.

India used to receive hard and small roughs as raw material which was difficult to cut and polish. These roughs were however, uneconomical for other countries looking to their technologies and skills of workers and therefore, were sold to India as industrial diamonds. Indian cutters started cutting and polishing these diamonds in such supply of roughs initially created demand for small diamonds in the international markets. The first modern Indian diamond cutting factory was established in Bombay by pioneering entrepreneurs like H. B. Shah, Mohanlal Raichand and sons and H. H. Jhaveri. They took the help of a Belgian, Piese De Winew in setting up cutting and polishing operations.⁷⁰

❖ Encouraging prospects of the diamond exports as globe economy pick up.

⁷⁰ Desai K.M. (1986); "Diamond Business" Volume-2, P.No.:-43

The globe city of cut and polished diamonds export Mumbai: though dispatches of cut and polished diamonds from India have slackened in April 2004, yet compared with the preceding month, they are significantly higher than the outflow in the same month of the earlier year. This explains the present confidence in this sector, that prospects for 2004-2005 on the whole are quite reassuring. If the industry can be assured of the much needed supply of rough to meet the expected growth in overseas demand for polished goods, in might again be in a position to outperform itself in 2004-05.⁷¹

It is a well-know fact that the industry tries to put its best foot forward in March very year; to present the best export performance is bankers. Thereafter the activity normally slackens, as the three-month period form April to June is traditionally dull for this sector. The demand starts picking up again form July onwards as overseas buyers prepare themselves for the ensuing Christmas season. However if the volume of business in April, the first month to the slack season, is better than in the same month a year ago. That may imply a strong under-current of demand.

⁷¹ 'Diamond Galaxy International', (May-2201) Gem and Jewellery Informatics' publication, Surat. P.No.-67

If one takes a casual look at the statistics available from the Bharat Diamond Bourse that clears the bulk of diamond shipments, this trend becomes clear at once. Shipments of cut and polished diamond passing through the Bharat Diamond Bourse's customs Clearance Centre reached US\$ 424.30 million in the same month of the earlier year. This is naturally considered an encouraging trend.

In the last quarter (January-March) of 2003-04 exports of cut and polished diamonds from the country reached US\$ 2,746.58 million, from US\$ 2,172.79 million in the same quarter a year ago. In terms of cartage also, shipments for the quarter were higher at 110.47 lacs carats, compared with 91.50 lakh carats in the same period of the earlier year.

Exporters of cut and polished diamonds are also happy, as their price realizations have improved, responding to the increase in the cost of rough as well as in overseas demand. In the overseas markets also polished price remain firm, as shortage of select qualities continue to push them up. Particularly, larger sizes are scarce as well as firm. Fancy shapes are also ruling firm. Retail chain stores in the USA are reporting improved sales.

The global economy, including that of the U.S.A. is showing signs of revival. The International Monetary Fund (IMF) in its latest up date on the world economy has projected that the world output would grow by 4.6 percent in 2004. This is higher than the earlier projection of 4.1 per cent. In the US, the growth momentum is expected to be sustained. Though the recovery in the Euro area is slow, the growth outlook seems to be improving. Growth in the U.K. has been gaining ground and growth prospects in Japan, reinforced by foreign and domestic demand, have improved lately. The growth in the volume of world trade (all merchandize) is projected to pick up from 4.5 per cent in 2003 to 6-8 percent in 2004. The clouds of slowdown that plagued the economies of several countries since 2000 are slowly dispersing improving the overall global business outlook, unless some unexpected developments suddenly change this picture.⁷²

The shortage of rough diamonds in the open market has increased with the result that prices of rough have hardened to complicate this situation; the number of buyers in the open market has suddenly shot up. A number of while Sight holders who have lost their status, as Sight

⁷² Pathak, H. N. (1984) 'Diamond Cutting and Polishing Industry of Gujarat-II', Diamond Trade and Industry in India, Indian Institute of Management, Ahmedabad.P.No.:-134

holders have no alternative but to turn to the open market to obtain rough. If they went to run their factories. Thus the overall demand in the open market has gone up, while the supply to it remains restricted.⁷³

DIAMOND INDUSTRY IN GUJARAT

(1) Introduction

Gujarat is a state of India. It was existed in 1st may 1960. Geographically Gujarat is divided into North Gujarat, South Gujarat, Saurashtra and Kuchchh. According to Indian population census, the population of Gujarat was 4.84 Crores (without earth quack effected areas) and 5.06 Crores with earth quack effected areas. In that population 51.70% were male and 48.30% were female. The percentage of the people who are living in the villages and cities is 65.51% and 34.49%.⁷⁴

At the time of the establishment of Gujarat state, Gujarat held the 8th position in the terms of industrial

⁷³ Diamond Galaxy International, (June-2003)Gem & Jewellery Informatic Publication, Surat Volume-6,P.No.-3 to 5

⁷⁴ Kashyap S.P. and Tiwari R.S. : Shaping of Diamond in Surat Some Possess (facts), Sardar Patel Institute of Economics and Social Research Ahmedabad. P.No.:-194

development, is an important features of the economic and industrial development of Gujarat state, the establishment of refineries have changed the scenarios of Gujarat. Many other factors have played an important role in the all round development of Gujarat. Among these contribution factors are the Mumbai, Baroda, and Ahmedabad. Broad gage railway line, beautiful highway, rivers, big cities as well as social and industrial facilities, and also labour resources, all these factors have lead Gujarat in the foremost position.

Gujarat diamond industry has made a history in diamond business. In Gujarat has been initiated diamond business after world war-II. Importers and exporters became active very sketchy in this direction after the world war-11. In this way of progress, license system entered and plenty of traders get the permission of rough diamond import and export that of cutting & polished increased after that period.⁷⁵

(2) Diamond trade

Gujarat is exporting most of the cutting and polishing in Hong Kong. Japan & U.S.A.

⁷⁵ Diamond Samarat, (1999) Surat Diamond Association, Surat, Volume-11 P.No. 6

(3) Growth of diamond industry

Diamond business is widened not only in Surat but also in Navasari, Bhavnagar and Rajkot.

Gujarat is manufacturing 70 % diamonds in all over the world Surat, Palanpur, Amareli, Bhavnagar and Ahmedabad is the main centers of manufacturing, cutting and polishing of diamond.⁷⁶ This business established due to the inter link with international market. Surat is the main manufacturing center in all over the world. Now a days Surat in known as the "Diamond city" of India.

SURAT: Despite a decline of 3.19 per cent in the diamonds, gems and jewellery exports from India in 2001-02 compared to previous financial year, the overall performance considering the global trend is an indication of brighter days ahead for the diamond, gems and jewellery industry here.

If post September 11 appeared to be full of gloom across the globe for the industry, the last six months registered an upward move in exports of precious metals from India.

⁷⁶ Diamond Galaxy International, Gem & Jewellery Informatic Publication, Surat- Volume-4,P.No.-20

According to Gems and Jewellery Exports Promotion Council (GJEPC) chairman Sanjay Kothari, the gems and jewellery exports registered a turnover of over \$ 7.53 bn in 2001-02 as against \$ 7.77 bn in 2000-01. Though there has been a decline, but considering the global slowdown due to recession in the first half of the last financial year and then the post September 11 impact on trade, the recovery in exports from India has been remarkable, Kothari said.

According to trade analysts, a decline of around 15 per cent in the export of diamonds, gems and jewellery was forecast following gloomy global scenario after September last year, but exports picked up after the third quarter of the financial year with the decline, compared to corresponding period of the previous financial year, narrowing down to 2.48 per cent, Kothari said.

The factors that helped boost exports of the precious metals from India included abolition of licensing regime for importing rough diamonds and lower Customs duty on the same, Kothari forwarded.

According to Surat Diamond Manufacturers' Association president Pravin Nanavati, though the upward trend in exports for the diamond industry here has been

able to revive economy, the need is to go for value addition for the industry.

The overall demand for the precious metals at global level has increased substantially. However, to have bigger international market share, the emphasis should be on jewellery production, he said.

Of the total supply of diamonds in the global market, 90 per cent are from India whereas jewellery from India comprises just one per cent of the total international production, Nanavati said.

Notably, jewellery are priced nearly 10 times more compared to diamonds, hence more jewellery production would mean substantial increase in the exports of the precious metals from here which is Rs 36,000 crore per annum at present, Nanavati said.

Hence, there should be efforts at all levels for developing jewellery design centers in the country, aiming for more production of the same in the near future and also to keep the international market share intact, particularly in the wake of China and other countries trying desperately to grab the global share in the past few years, Nanavati added.

This business is progressing very speedy since 1967. International market ever makes its policy depending on Surat. No doubt that Mumbai is also ahead in diamond business but we cannot compare Mumbai with, Surat. Surat is very nearer to the Mumbai so it progress higher.

It's not enough but the people of Saurashtra and North Gujarat have migrated to Surat and done its level best to develop diamond business. At that time we were suffering with unemployment so lakhs of the people have compelled to accept this business. This business is not demanding much investment, so a middle class person have also started diamond factories we know that trained and killed labors our are the most precious part of any business. By eye testing this situation, Government has started Institute for training in Surat named "diamond institute". A diamond expert says that this business will develop double after the starting of diamond brush in Surat.

Now days near about 15, 00,000 people are, near about 25000 factories running in Gujarat. Diamond Industrialists are doing their diamond business by near about 2000 to 2500 offices. In Surat near about 2 lakhs people are getting employment in near about 10000 factories. In Gujarat most of the rough diamonds are cutting

in Surat. Surat is manufacturing 4 lakhs diamonds daily, there are three big diamond trade markets in Surat.⁷⁷

Diamond business was centralized in south Gujarat up to 1965. Presently it is developed in Bhavnagar, Ahmedabad, Junagadh and Amreli also. This business is developed in Amdhara, Chikhali, Bardoli, Botad, Dhandhuka, Shihor, Vallabhipur, Umarala, Talaja, Gadhada, Palitana, Lilya, Lathi, Babra, Dhri, Kodinar, Jafrabad, Dholka, Viramgam, Dahegam, Limdi, Lakhtar, Gondal, Jetpur, Dhoraji, Uplata, Mendrada, Keshod, Tala etc.... This business is developed by **Leuwa Patel** of these talukas.

Diamond is very precious thing, so diamond manufacturing is not trusted on others so they believe in dynasty rule. So they are the legendary of this business. In 1965 the market takes the position of growth. And this dynasty rule ends.

After 1965 this business started truly growth in all over the Gujarat most probably drought became the responsible factor for this growth.

⁷⁷ Diamond Digest, Surat Diamond Association, March 1992 P.No. 37 to 38

(4) Diamond Industry in Saurashtra.

Diamond Industry is very vital for Indian Economy. It is important due to its income, Export policy and employment. This business gives employment to villagers, where the apricot's. Take place when ever agricultural. Season ends in the year; people turn for employment in this side. It is important for truly and partially employment Illiterate people also get employment IN This sector without age differentiation. This business is developed in industrial backward areas. Diamond industry is important as small-scale industry.

(5) Growth of diamond industry in Saurashtra.

The economy of Saurashtra is depending on the agriculture so at the end of agricultural season diamond business provides opportunity employment to the Saurashtra people.

Saurashtra has seven districts. Like as Rajkot, Surendranagar, Junagadh, Bhavnagar, Amreli, Porbandar.It and Jamnagar. Diamond business is very slow and little in Jamnagar and Porbandar.It is developed in Bhavnagar and Amreli also in its taluka's and in villages. This business

developed in Saurashtra due to the regular supply of rough and with the policies of central government.

If we think about Bhavnagar diamond business is widened in all the taluka's and in all the villages. There are 5000 diamond factories, providing employment to 5, 00,000 lacks people. Internally and externally out of the total unit, only 60% are in Bhavnagar and rest 40% are spreader in Botad savarkundla, Gariyadhar and in palitana. ⁷⁸

If we think about Amareli near about 84% villagers are getting employment through agriculture. Out of the total population near about 30% to 40% people are engaged in diamond business. Out of the 10 talukas diamond business is developed fully in 7 talukas In Amreli, chital, babara, Damnagar, lathi, Lilya, varsada, Ishwariya and Dhari are much developed. There are 12000 factories providing employment to 30,000 people. There are 1000 women workers also working in this sector.

Thus diamond business is important to provide employment to the world, nations, states, districts, talukas, and villages.

⁷⁸ Pathak H.N.,(1988)Diamond Cutting and Polished Industry in Gujarat. P.No.:-64

SECTION-1

THE STATE OF LABOUR IN THE DIAMOND

INDUSTRY

This chapter is also divided into two sections. Section-1 represents the concepts of state of labour in the diamond industry and section two gives the detailed description about, 'The State of Labour in the Diamond Industry in India with Special Reference to Gujarat State'. This chapter is the heart of the study.

The State (Conditions) of labour in the Diamond Industry

Diamond cutting and polishing is done in large sub-divided factories and in tiny cottage-based artisan shops. Factories, which employ more than 10 workers at one premise, have to be registered, which would help to regulate working conditions. However, it is extremely common for owners to divide ownership among family members. In many cases, a number of small companies

divided into different ownership in this way and operate under one roof.

In Mumbai, about 28% - 30% of the total workforce is female and the majority is aged 15 years – 40 years, while in diamond factories in Southern India, female's account for a much higher percentage of the workforce. There is a clear gender-based division of labor, as the more highly skilled jobs are allotted to men, while the lower skilled jobs are allotted to young women.⁷⁹

The workers learn to work the diamonds by training as apprentices, and they often have to pay fees for the training period. After an initial training period - which can vary from six months to three years, depending on the region - they are paid a stipend. Because it is a very labor-intensive industry this system of apprenticeship means that employers can employ a worker for a very low wage during the 'training period', which is usually much longer than is actually required to learn the skills.⁸⁰

⁷⁹ Walokar, Deepak (2001) 'Woman Entrepreneur', Himalaya Publication House, Mumbai.P.No.:-24

⁸⁰ Kashyp, S. P. & Tiwari, R. S. (1982) 'Shaping of Diamond in Surat: An Enquiry in to Some of its Passas (Facets)', Sardar Patel Institute of Economic and Social Research, Ahmedabad. P.No.:-65

The industry operates a piece-rate system of pay, so the average day can be as long as 12 hours -14 hours, without overtime or weekly holidays. Relatively speaking, workers earn more than that of workers in other industries, and so the average wage of an unskilled adult is between 25 - 50 rupees per day, for semi-skilled it is 75 - 85 rupees per day, and for highly skilled workers it is between 135 - 150 rupees a day.⁸¹ Because many of the workers come from drought-prone areas, where they have witnessed the opportunities for agriculture dry up in the last few years, diamond cutting is seen as a good trade to be in.⁸²

Despite this, workplace conditions are generally bad, being congested and poorly lit and ventilated, and over half of the industry's workforce suffers from work-related ailments such as kidney dysfunction, tuberculosis, lung disease, stomach problems, wheezing, pains in their joints and eye sores. These are all ailments, which could be prevented if measures were taken to control occupational health hazards. Due to the difficulties in organizing unions in the industry in order to improve wages and conditions,

⁸¹ Diamond Digest, Surat Diamond Association (March-1997) P.No.:-87

⁸² Desai, Kiran & Raj, Nikhil (2001) 'Child Labour in Diamond Industry of Surat', V. V. Giri National Labour Institute, Noida. P.No.:-98

many parents are forced to send their children to work in order to survive their family.

The wages of adult workers are generally slightly above the legal minimum wage, which makes the industry attractive for poor families, which see the industry as a way for upward mobility, especially for their children. Employers and contractors find child labor cheap and therefore economically attractive, and many parents let their children work because it is one way of supplementing the family income.⁸³

Because the majority of manufacturing units are situated on small ***varandahs*** at the side of the street or inside the home, they are often very congested and lack facilities, water and toilets. Many units are light only by daylight, so when the sun goes down, work stops. This also means that at the back of the unit, it is often very dark, causing eye strain and older workers constantly complain about their eyesight.

⁸³ Miranda Engelshoven (1999) ‘Diamond and Patels : A Report on the Diamond Industry of Surat’, J. P. Parry, Jan Breman, Karin Kapadia, The world of Indian Industrial Labour, Sase Publication, New Delhi. P.No.:-125

Patel community is found to be the legendary of the diamond industry. Diamond business is known as the business of lower level but rather than Patel community, the people of Brahmin, Vaniya, and Rajaput etc. have also Joint this business to get an employment.⁸⁴

Most of the diamond workers who were engaged with the work of diamond cutting, **Ghat** work and **fancy** work were earring more from their work. In other types of work male's earning was found more than female diamond workers.

As per the belief, in 1990, near about 9000 diamond workers were working in this sector. In all over Gujarat, Surat is main sector for diamond cutting and polishing industry. It is famous as diamond city in all over India. This industry is mail-dominated industry. There are fewer ratios of women in this industry. Now days, diamond cutting and polishing work has been running at many places of Gujarat.⁸⁵

⁸⁴ Work, Wage and Life Style of the Child Labors: (A Study of Child Labor in the Diamond Industry of Surat City) (June -1998) Varasani Dilip C., M. Phil thesis, Economic Department, V.N.S.G. Uni, Surat. P.No.:-132

⁸⁵ Shaping of Diamond in Surat: An Inquiry into Some of its Passas (Facets) (1982) S. P. Kashyap and R. S. Tiwari, Sardar Patel Institute of Economics and Social Research, Ahmedabad.P.No.-187

Most of the diamonds workers who are doing diamond cutting and polishing work are living alone in Surat city and they are unmarried. They haven't their family in Surat city. They are living into rental house in a group. Whenever the question of the rent is arising, they are distributing rent among them in the same proportion. ***Kanabi Patels*** from Saurashtra and North Gujarat have joined this business by leaving their agricultural work. Their ratio is one half. Migrants who came to Surat were migrated from Saurashtra, Palanpur and Mahesana. More and diamond workers entered into this business in 1970. At that time Navasari has become the most competitive center of the diamond business in India. Competitors have started their factories at Surat, Navasari and in the vicinity of South Gujarat.

The period of 1980 was of great depression into the diamond business. Due to this depression diamond industrialists have lost their confidence in the work of diamond cutting and polishing. During this period they have suffered much as far as the financial matter is concern. Some of them have stopped their diamond cutting and

polishing work. Thus, the question of unemployment increased in this sector.⁸⁶

People from other states and backward communities were showing their future in this industry. Thus they have started to leave their job due to heavy financial loss. But these workers have not presented their interest to rejoin this business.

Diamond industry is mostly divided into unorganized sectors. Workers who are getting employment through this business are not on permanent basis. Thus, whenever they feel dissatisfaction in their working environment, they changed their job. Doing their work on their choice means they are libber to do their work whenever they want job change; they left the factory and joint another factory. Workers who are living into the Surat city gets up early in the morning and started their work at 7:00 a.m. until 8:00 p.m. continuously at noon, they have to given an hour recess for lunch. They are getting wages on piece wage system. Some of the diamond workers leave their work during the farming season and went to their native to help their family members in agriculture work. Diamond

⁸⁶ Manufacturers, Exporters, Workers and Growth of the Diamond Industry of the Surat Region (June-2004), Dilip L. Varasani, Economics, Department, V.N.S.G.Uni., Surat. P.No.:-88

workers have to face misbehavior ness of their owners, so they left factory and joined another factory, in this way, there is high ration of job changes in this business.⁸⁷

Diamond workers are feeling suffocation, due to the arrangement of many Ghanties in room. They are also suffering the problems like lack of satisfaction, lack of toilet facilities, lack of proper ventilation etc. where as owners should not face this types of problems. They have free space for their work, proper ventilation and personal toilet.

➤ **INDIA AND CHILD LABOR**

The widespread existence of child labor in India is well documented, despite the existence of provisions in the Indian Constitution and law prohibiting child labor. Various legislative and judicial initiatives in recent years have given further force to these provisions. However, notwithstanding these good intentions, child labour is flourishing, and

⁸⁷ Miranda Engelshoven (1999) 'Diamond and Patels: A Report on the Diamond Industry of Surat', J. P. Parry, Jan Breman, Karin Kapadia, the World of Indian Industrial Labour, Sage Publication, New Delhi. P.No.:-10

makes a major contribution to India's Gross Domestic Product.

Estimates of the numbers of working children in India vary between 20 million and up to 100 million. Due to the clandestine nature of much child labour, accurate figures are hard to obtain. Over the last ten years the government has outlined policies, drafted legislation and created programs to deal with child labor, but despite all this, child labor is on the increase. Evidence from projects supported by the International Labor Organization, by trade unions and by non-government organizations has shown that the problem can be tackled effectively, and in the state of Kerala, where the state government has put a high priority on education, the incidence of child labor is only a fraction of the level in neighboring states.⁸⁸

The nature of child labour is changing, with increasing numbers of children in urban areas working. There is clear evidence that, as industries such as the gemstone and diamond industry have grown, they have acted as a magnet for poor rural families to move into cities,

⁸⁸ Work, Wage and Life Style of the Child Labors: (A Study of Child Labor in the Diamond Industry of Surat City) (June -1998) Varasani Dilip C., M. Phil Thesis, Economic Department, V.N.S.G. Uni, Surat.P.No.:-228

and often whole families end up working, particularly where schooling is inadequate.⁸⁹

India is the world's biggest diamond and gemstone cutting centre, with the biggest canters for this at Mumbai, and Surat. The gem and jewellery industry has seen a dramatic rise in recent years, growing from 1 % of India's exports in 1960 to 17% of exports in 1994/5, and is now, alongside agriculture, the country's biggest export earner. The gem and jewellery trade consists of importing, polishing and cutting (or otherwise treating) and then exporting diamonds, gold jewellery, coloured gemstones, pearls, non gold jewellery, synthetic stones and fashion jewellery. Because of their greater individual value, diamonds contribute between 85% - 88% of the total export value of gems and jewellery.⁹⁰

Part of the explosive growth in this industry can be directly attributed to the exploitation of cheap labour, including child labour, as it is difficult to form unions for

⁸⁹ 'World Labour Report', International Labour Organization (1992), Geneva.P.No.:-167

⁹⁰ Patel, B. B. (1987) 'Carried Out at the Instance of Ministry of Labour Govt. of India,' Gandhi Labour Institute, Ahmedabad.P.No.:-67

the reasons given below. Many are forced to supplement their income by sending their children to work instead of school. Evidence from the gem processing industry in India has shown that providing several hours per day of education to working children, while it did have some positive effects, is no substitute for full-time education. Working children, particularly girls who have extra domestic work at home, were simply too tired to get the best out of the hours of schooling provided.

Nevertheless, finding a job cutting and polishing diamonds and gems is often seen as the best available option for poverty-stricken families. The enormous potential of the industry to provide lasting benefits to local communities is still largely untapped. This is exacerbated by the way in which many employers use artificial arrangements to avoid labour laws and tax, depriving the local and national governments of tens of millions of dollars in much-needed revenues, which could be used to pay for schools and other social programs.

➤ **Prevalence of Child Labour in the Diamond Industry**

De Beers maintain that the prevalence of child labour in Indian. Diamond cutting is slightly over 3% of the total workforce (this would mean around 24,000 children),

mainly in the "traditional" rather than modern sector of the industry trade union officials in Surat City, where the problem is most serious, estimate a much higher level in that city, as high as 25%. Other estimates put the prevalence at 10% (with an average age of 12 years old) and 20%.⁹¹

Whatever the actual figures, it appears that even on the most conservative estimates; over 20,000 children are working in diamond processing in India. The Indian Government obtained much useful information on the situation of these children in 1996 through surveys involving 1,851 children working in the diamond industry and their families. In these families, averages of 40% of the children were workers. The families interviewed tended to fall below the poverty line, from which it is clear is that one of the main reasons for child labour in the diamond industry is poverty. As the children are drawn into the industry and do not go to school, the cycle of poverty is perpetuated.

A researcher from the Universal Alliance of Diamond Workers visited families in Surat in June 1996,

⁹¹ An Economical and Social Condition of Diamond Worker, (A Study on Surat City) Pratimaben Atulkumar Vyas, Economics Department, V.N.S.G.Uni, Surat. P.No.:-114

and parents of child workers explained that their earnings largely depended on the regularity of the power supply to the industry, and so on the number of days they were able to work each month. Many of the parents saw little prospects for their children to get a good education, and hope that the entry of their children into the diamond industry will enable the children to eventually escape from poverty, which they realize they themselves, will never be able to escape.

According to trade unions and NGOs in Surat there is another category of children in Surat who live in the workshops themselves and start working at an early age. These children usually accompany the adult workers who migrate to the city, and stay within the workshop.

The average age of the children was 12 years old, and they work for 12 hours a day, without an employment card or pay slip. They are paid on a piece rate basis, which is 60% - 70% of the adult workers, once they have served an apprenticeship and acquired the same skills.

CHAPTER-4

SECTION-1

STATE OF LABOUR IN THE DIAMOND INDUSTRY



SECTION-2

RESULT DISCUSSION

SECTION-2

RESULT DISCUSSION

THE STATE OF LABOUR IN THE DIAMOND INDUSTRY IN

GUJARAT STATE

In the first chapter of the study, the introduction, Proposal for Ph.D. registration, history of diamond and state of labor in diamond industry are clearly described. In the second chapter of the study description has been given about the researches made on this topic or related to this study by the name 'review of literature'. In the third chapter of the study, information is presented about the diamond industry in the World, India and Gujarat.

In this chapter no-4, description has been given about, '**The State of Labor in the Diamond Industry in India: with Special Reference to Gujarat State**'. This chapter is the heart of the study. It's not enough to be aware about the diamond industry only but the vital matter is presented about the state (condition) of the diamond workers.

This chapter, gives the description about the age, religion, migration, cast, social status etc. the diamond workers.

On the basis of the study of B.B. Patel, P.A. Vyas and K.M. Desai, there is a less ratio of child labor in the diamond industry, but in this study. Researcher has tried to be aware about the ratio of child labor in this industry.

As per the study of P.A. Vyas, K.M. Desai, Preeti B. Patel and Dilip Varasani, there is a high status of migrates in this industry. So I have tried to be aware about this situation also. With the migration's status of the labor of the diamond industry of Gujarat, I have tried to know their family status also.

Beside above points, information is presented about the academic standards of the diamond workers. Whether illiterate people can also get easily entry in this business or only literate can get entry in this business? Researcher has also tried to get the fact about the impact of education on their income. Here in this chapter. Some important information related to the education and impact of less education on their income and progress has been clearly presented.

Sometimes due to the economical condition, Childs have to leave their education that's why researcher has described the reasons of discontinuing their education and their reasons to prefer this industry to get an employment.

On the basis the view of the traditional Economists analyses on the state of labor, there is a higher co-operation between the education and profession of the workers. Thus in this chapter researcher has tried to be aware about the relation between the education and profession.

Training is a very vital factor in any types of business. So, in this chapter discussion is also made about the training factors of the diamond industry, by which they have complied their training? How they have completed their training and how much time they had required completing their training? The analyses related to these questions are described in this chapter, how much time they work per day, how much in a year they work and how they go to their working place and about the residential place related information is also presented in this chapter.

Not only their working and residential status but also their likes and dislikes in relation to their hobbies and

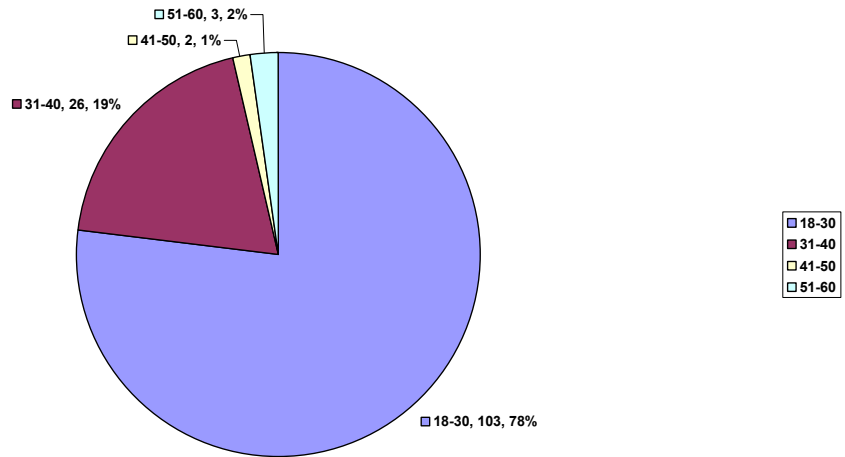
habits are also described in details in compare to the hypothesis.

In addition to above points, description has been given about many other points like the job behavior, out of the job behavior, facilities provided to them by the factory owners, their problems during the work, their pocket expenses, leaves, etc.

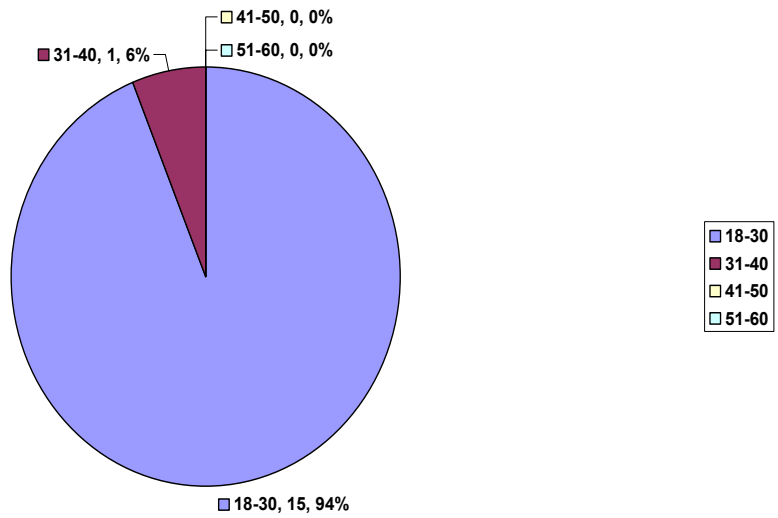
As far as the diamond industry is concern, it is believe that only young are the bases of this industry. So in table 4.1 I have given clarification regarding this belief on the basis of the age of the diamond workers.

CHART NO. :-1

LEVEL OF AGE OF MALE DIAMOND WORKERS



LEVEL OF AGE OF FEMALE DIAMOND WORKERS



LEVEL OF AGE OF DIAMOND WORKERS

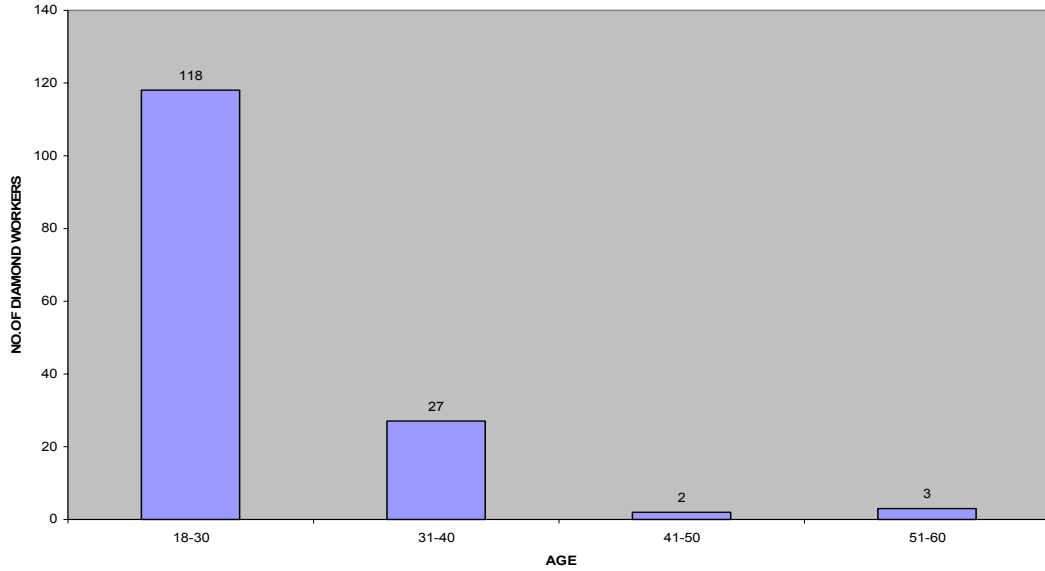


Table – 4.1

Distribution of diamond workers on the basis of Age

AGE	NO. OF MALE	PER CENTAGE	NO.OF FEMALE	PER CENTAGE	TOTAL
18-30	103	76.9%	15	93.8%	118
31-40	260	19.4%	1	6.2%	27
41-50	2	1.5%	0	0%	2
51-60	3	2.2%	0	0%	3
TOTAL	134	100	16	100	150

Statistical information given in table no. 4.1 declares to the diamond workers of Gujarat state belonging to different age groups.

In this study, the method of random sampling has been used. Surprisingly, no child laborer was identified as a part of the diamond work force in this study. This study in fact controversial to the earlier study made by Dilip L. Varasani in which he categorically states that out of the total work force working in the diamond industry, 30% is found child labor. As far as the Surat city is concern diamond association has prepared a plan to prevent the entrance of the child labor in this industry.⁹²

As per the study, it is found that most of the diamond labors that are working in the diamond industry are found young. Out of 134 male workers 103 workers belongs to the age group between 18-30 years. Their proportion is 76.9% and out of 16 female workers 15 females (93.8%) are also between the age of 18-30 years, it was further found that 19.4% males and 6.2% females are between the age group of 31-40 years. who constitutes experienced. workforce however as per the static's given in

⁹² www.ilo.com

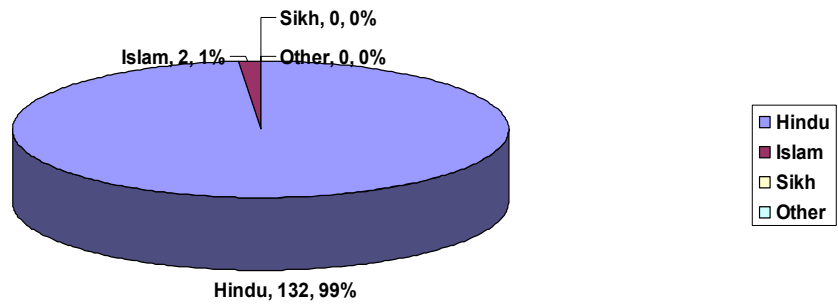
the table, there aren't found any female diamond workers between the age group of 41-50 years and 51-60 years.

It can be concluded that approximately 50% of the diamond workers employed in the industry are young. Here we cannot say that only young can do this business but labors are found young because industry is also started in the short period of the time near about since 1968.

Age is an important factor as far as the state of labor is concern but the same vital point is to be aware about the religion of the diamond labor. India is a country in which there are many religious people are living, thus I have tried to know that which types of religion's people are presently engaged with this business. The information regarding the religion of the diamond workers is described in the following table.

CHART NO.:-2

LEVEL OF RELIGION OF MALE DIAMOND WORKERS



LEVEL OF RELIGION OF FEMALE DIAMOND WORKERS

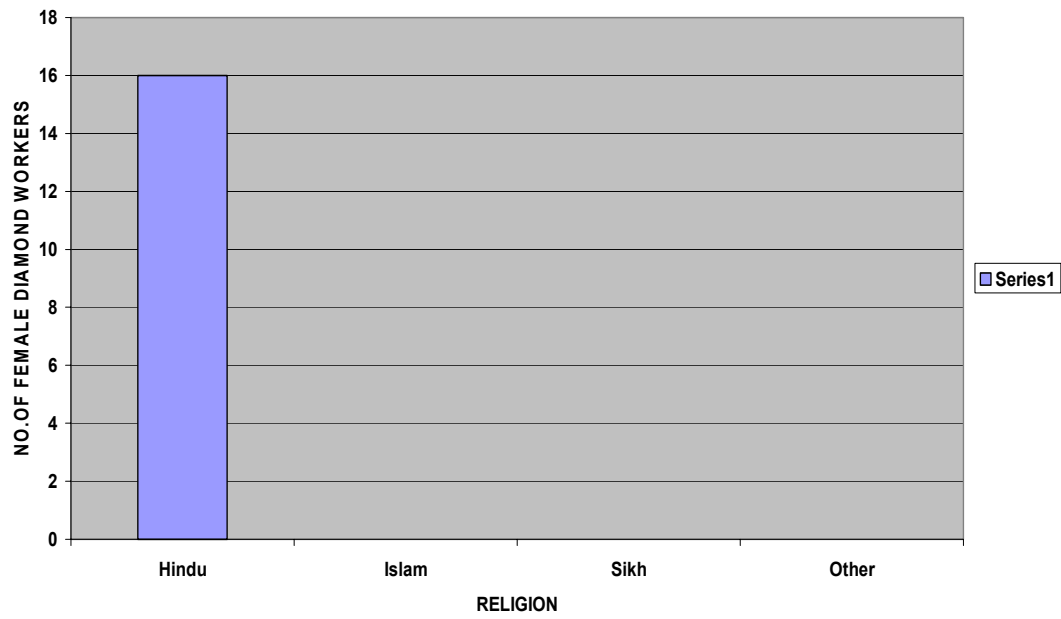


Table – 4.2

Distribution of diamond workers on the basis of Religion

TYPES OF RELIGION	NO. OF MALE	PER CENTAGE	NO. Of FEMALE	PER CENTAGE Of FEMALE	TOTAL
Hindu	132	98.5%	16	100%	148
Islam	2	1.5%	0	0%	2
Sikh	-	-	-	-	-
Other	-	-	-	-	-
TOTAL	134	100	16	100	150

Table No. 4.2 reveals that out of total 150 studied diamond workers 148 diamond labors are belong to Hindu Religion, where as only 2 Male workers are belong to Muslim Religion.

I haven't found any diamond workers rather than these two religions. The No. of male diamond workers who are doing this business belong to Hindu Religion is 98.5% and female diamond workers are 100%. In my study I have found an Interesting point is that the female workers from Muslim and other religions are not entering in this business. I have seen that workers are from only Hindu and

Muslim religion. By this way I become aware about the religion ratio of the labors in this industry.

After getting the knowledge about the religion of the diamond workers it becomes important to know the cast of the diamond workers. Cast is very vital social factor in the diamond industry. Cast and profession are engaged with each other.

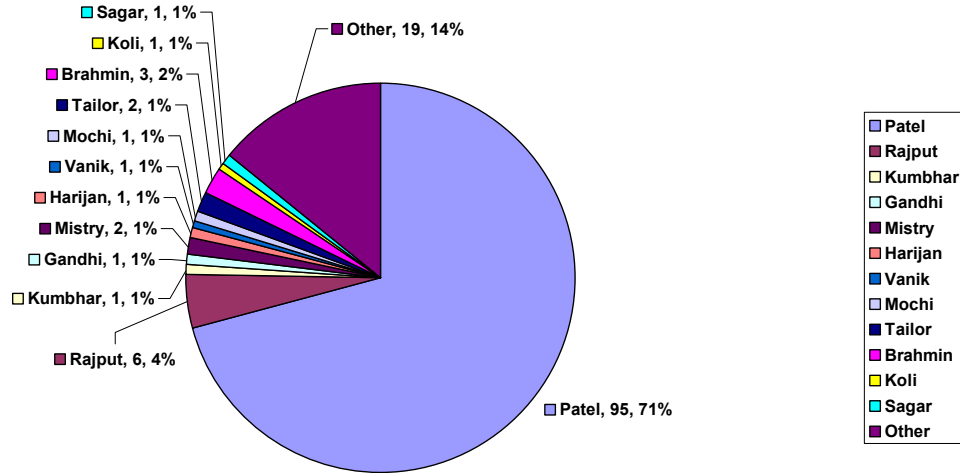
Indian population is distributed among many religions like Hindu, Muslim, Parsi, Jain, Sikh, etc. This is very different as far as the rules and regulations of the religions are concerned. Religions are divided into various casts.⁹³

Cast is very important factor as per other studies also. Thus in this study I have tried to be aware about the cast of the diamond workers by the following table.

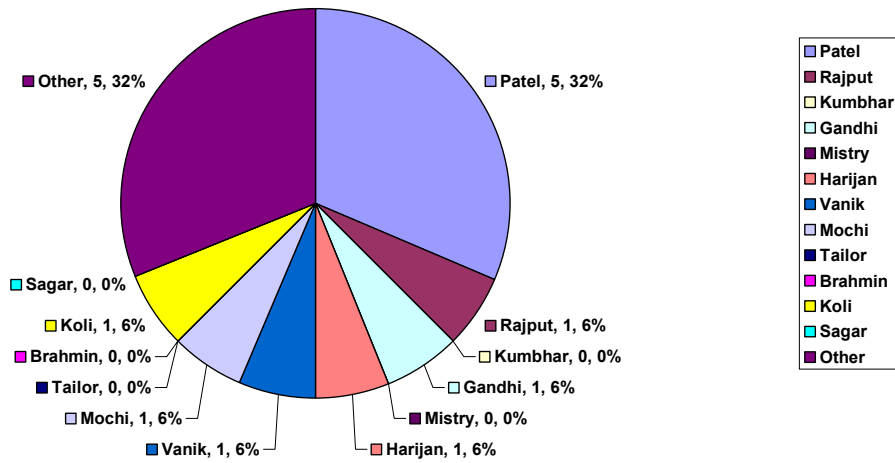
⁹³ Diamond Galaxy International, (Dec.-2005) Published by Gem Jewelry Informatics Publication, Surat. P.No.:-11

CHART NO.:3

LEVEL OF THE CAST OF MALE DIAMOND WORKERS



LEVEL OF CAST OF FEMALE DIAMOND WORKERS



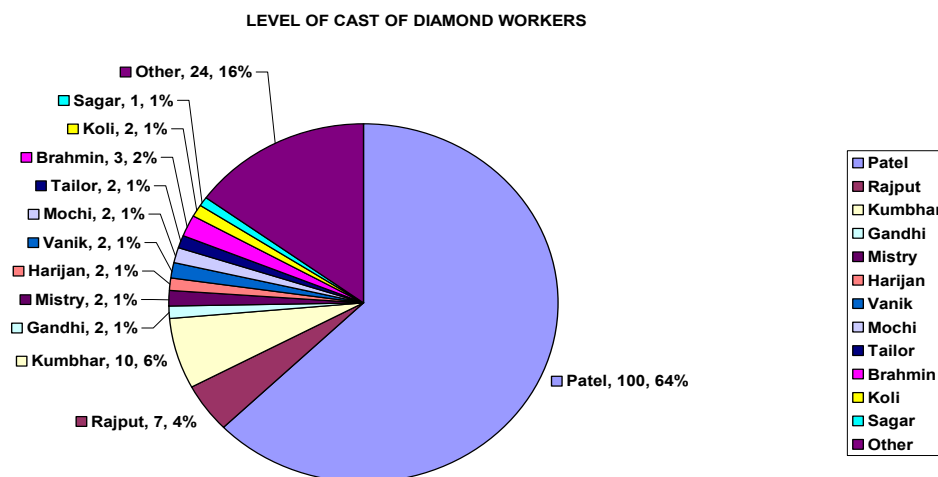


TABLE – 4.3

Distribution of diamond workers on the basis of cast

TYPES OF CASTS	NO.OF MALE	PER CENTAGE	NO.OF FEMALE	PER CENTAGE	TOTAL
Patel	95	70.9%	5	31.3%	100
Rajaput	6	4.5%	1	6%%	7
Kumbhar	1	0.7%	0	0%	10
Gandhi	1	0.7%	1	6.3%	2
Mistry	2	1.5%	0	0%	2
Harijan	1	0.7%	1	6.3%	2
Vanik	1	0.7%	1	6.3%	2
Mochi	1	0.7%	1	6.3%	2
Tailor	2	1.5%	0	0%	2
Brahmin	3	2.2%	0	0%	3
Koli	1	0.7%	1	6.3%	2
Sagar	1	0.7%	0	0%	1
Other	19	14.2%	5	31.3%	24
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected.

As mentioned in table no. 4.3 out of the total strength of the diamond workers most of the diamond workers belong to Patel cast. This study clarifies that the proportion of male diamond worked is 70.9% and female is 31.3% who came from Patel cast.

Many people who are directly and indirectly related to this business are giving their statement that this is the business, which has less popularity in compare to other businesses. Some other has said to me as on visit that the people from higher class are not interesting to get employment through this business. So, researcher has tried to be aware about the cast, Are other cast's people entering in this business or not? By this way, I identified Rajput, Kumbhar, Gandhi, Mistry, Harijan, Vanik, Mochi, Tailor, Brahmin, Koli, Sagar and other cast's workers who are working in this industry.

As per the discussion presented in the last chapter, there are many diamond workers working in this business who are of different castes, it happened due to the modernization, industrialization and urbanization of the

diamond industry. Now a day, government is also playing a positive role to grow the diamond industry.

This table also reveals that there are 7 Rajput, 1 Kumbhar, 2 Gandhi, 2 Mistry, 2 Harijan, 2 Vanik, 2 Mochi, 2 Tailor, 3 Brahmin, 2 Koli, 1 Sagar and 24 from other castes diamond workers are identified out of the total no. of sampled workers.

As far as the Brahmin diamond workers are concerned this study is contradicted to kishor C. Patel's study. He has clarified that Brahmins are not entering in this business but here in this study researcher has found Brahmin labors also.

This study indicates that people of other castes except Patels are also getting employment through diamond industry. No doubt to say that Patels are the legendary of this business or we can say that this industry is purely dominated to the Patel community but there are some other communities people are also getting employment through this business.

Experts who have done their studies on this topic are giving their opinion that Surat is the only city which attracts employment in this business but sample shows that rather than Surat, Ahmedabad, Navasari, Bhavnagar,

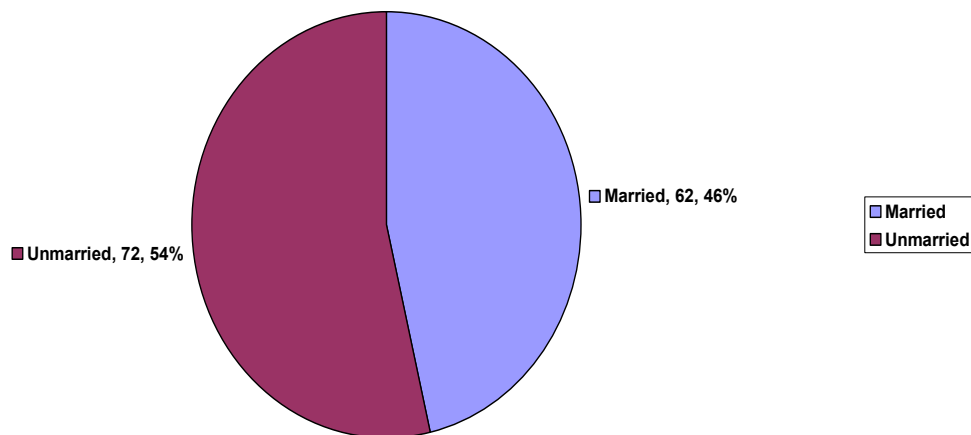
Amareli, etc. are also attracting diamond workers from the rural areas.

In this table I have provide the information related to the cast of the diamond workers but after discussing about the cast factor I want to know the marital status of the diamond workers.

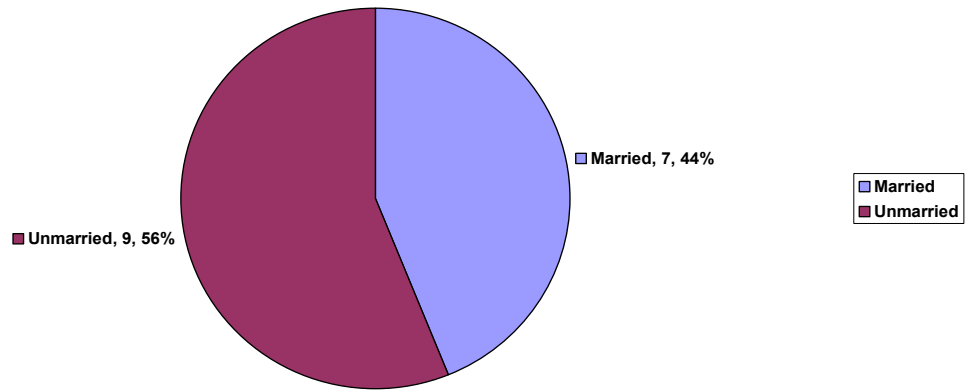
Marital status is important to be aware about the saving pattern, likings, disliking, habits etc. among the diamond workers. The table described under this provides the exact information about the marital status of the diamond workers.

CHART NO.:-4

MARITAL STATUS OF MALE DIAMOND WORKERS



MARITAL STATUS OF FEMALE DIAMOND WORKERS



MARITAL STATUS OF DIAMOND WORKERS

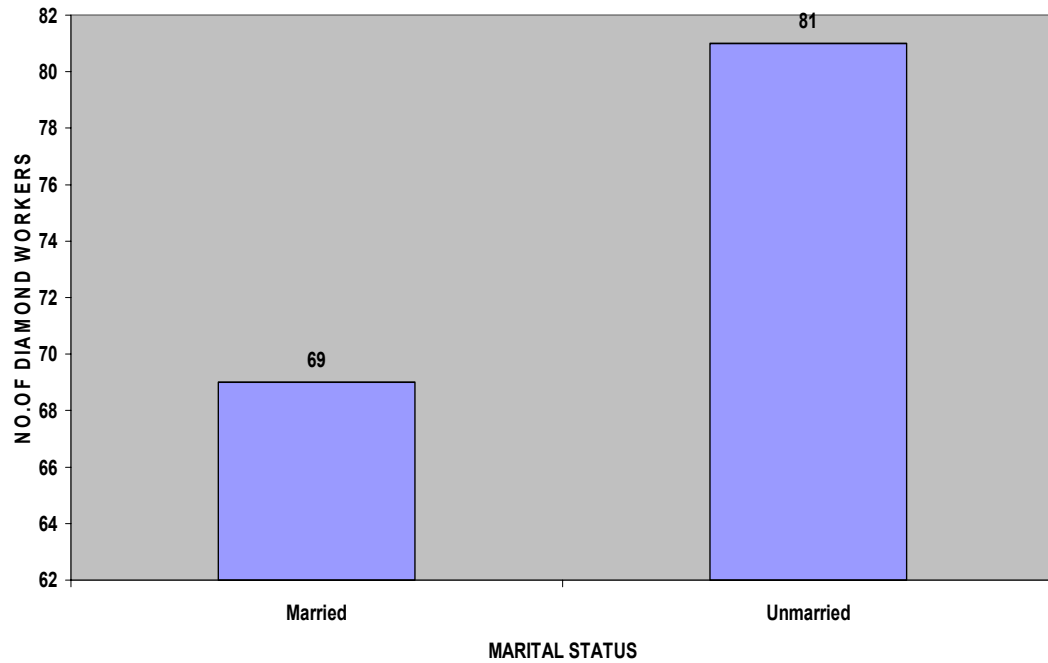


TABLE – 4.4

Distribution of diamond workers by Marital Status

MARITEL STATUS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Married	62	46.3%	7	43.7%	69
Unmarried	72	53.7%	9	56.3%	81
TOTAL	134	100	16	100	150

This table shows that out total the total studied 150 diamond workers 69 diamond workers are married and rest 80 diamond workers are identified unmarried.

Present study describes that out of total male 46.3% are identified married and 53.7 % are identified unmarried where as out of total female 43.7% is identified married and 56.3% is unmarried.

Here, an interesting point found is that researcher has not found any widow, divorcee etc. diamond workers who were working at the time of the visit.

Indian social system is used in diamond industry. In this social system only men are the earners; we can see in earlier table that men are doing more economical activities rather than women. Where as women are doing only household activities. But now a day, this scenario is changed and day-by-day because out of the total 81 unmarried diamond workers 56.3% are female. Thus, it is clarified that to maintain the economical condition of theirs family, women have also started to do economical activities by entering in this business for more and more earning.

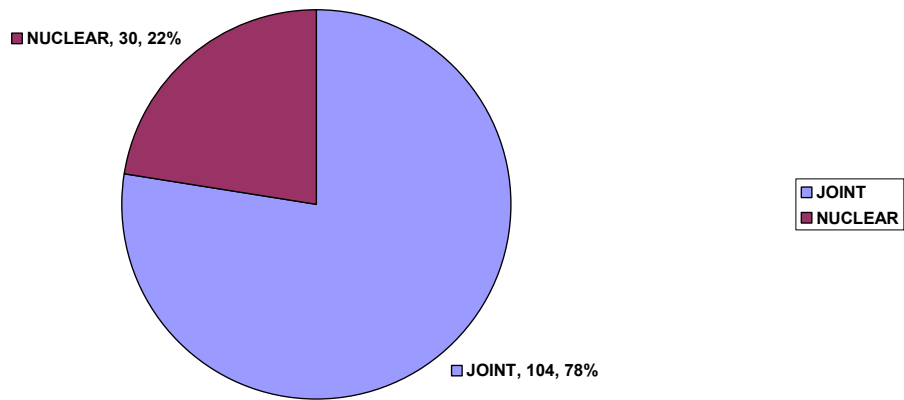
As far as the marital status is concerned, it became necessary to know the types of the family of the diamond workers. Are they coming from joint or Nuclear family? Whenever any person is living with their wife, children, brothers, sisters and parents at that time it is called that he or she is living in a joint family and if he is living only with his wife and children, it is said that he is living in Nuclear family.

This business is growing more with unorganized sector. So, it is not providing social safety to the diamond labor. In this response, joint family system became useful for the society. Expert's opinions are like this, joint family system working as a shoulder of the society when they are not getting social safety. The following table shows

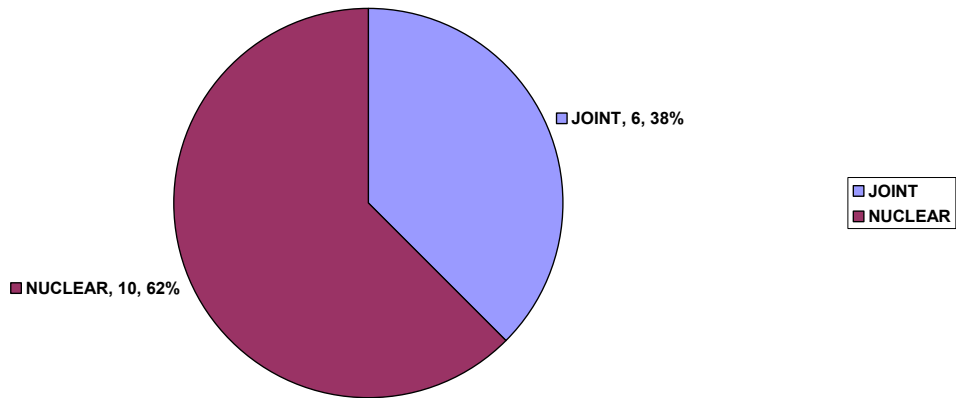
distribution of diamond workers on the basis of types of family in which they are living.

CHART NO.:-5

FAMILY PATTERN OF MALE DIAMOND WORKERS



FAMILY PATTERN OF FEMALE DIAMOND WORKERS



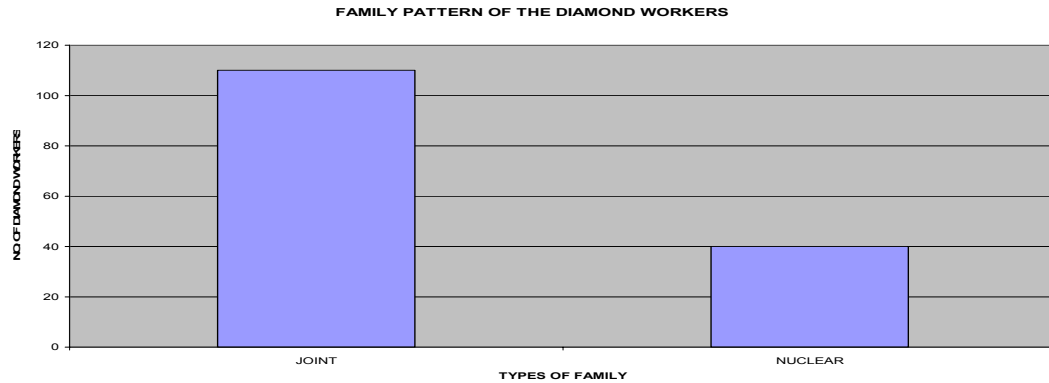


TABLE - 4.5

Distribution of diamond workers on the basis of the types of the family

TYPES OF FAMILY	MALE	PER CENT AGE	FEMALE	PER CENTAGE	TOTAL
JOINT	104	77.6%	6	37.5%	110
NUCLEAR	30	22.4%	10	62.5%	40
TOTAL	134	100	16	100	150

Table no.4.5 specifies that out of the total number of diamond workers near about 73% diamond workers are living in joint family. Male diamond workers who are living in joint family are 77.6% and female are 37.5% where as the proportion of diamond a worker of male and female is 22.4% and 62.5% who are living in Nuclear family system.

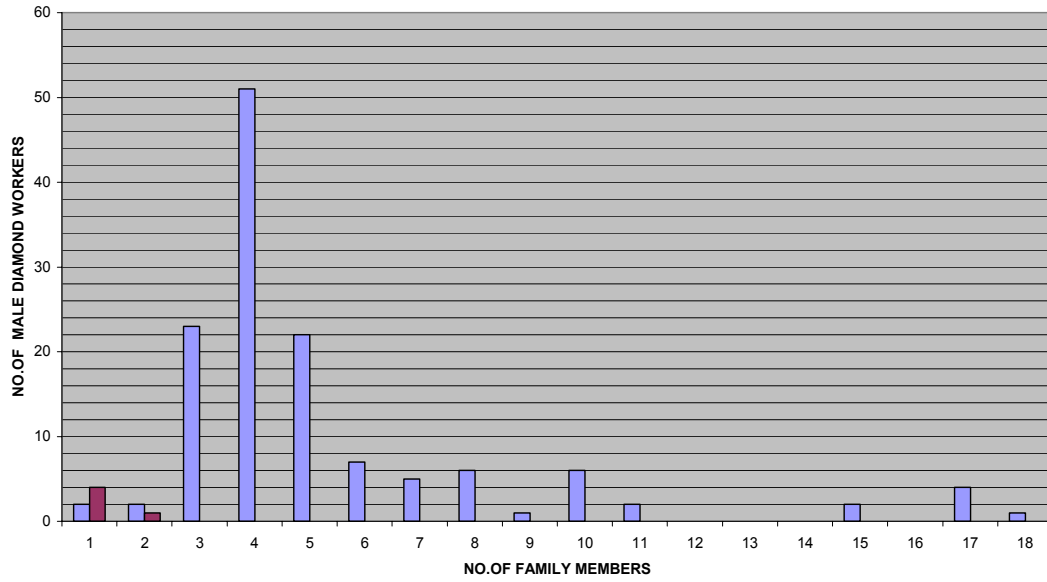
We have been aware by our table no. 4.1 that most of the diamond workers working in the Gujarat State are of Lower aged and identified young. So it becomes clear that due to their lower age, they are unmarried and they are living with their family members like parents, brothers and sisters. Thus, here in this table it becomes clear that most of the diamond workers are living in joint family system. Some married male and female are also living in joint family because they are following the tradition of joint family of their heritage. Thus, in this business more and more diamond workers are living in joint family system rather than Nuclear family system.

On the basis of discussion made in last table, diamond business is mostly spreader in unorganized sectors and is not providing social safety to their labor. Thus, joint family system is proved a vital social factor in this study.

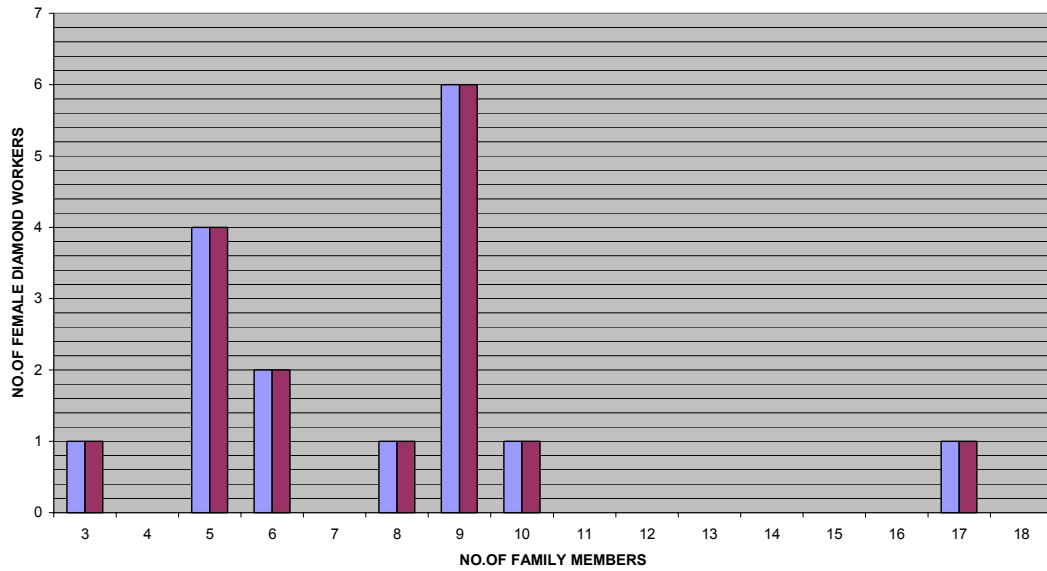
To know the economical and social condition of diamond workers, it is very important to know the total no of family members of the diamond workers. Table no. 4.6 gives the analyses of diamond workers on the basis of total no. of family members of their family

CHART NO.:-6

LEVEL OF NO.OF FAMILY MEMBERS OF MALE DIAMOND WORKERS



LEVEL OF FAMILY MEMBERS OF FEMALE DIAMOND WORKERS



LEVEL OF FAMILY MEMBERS OF DIAMOND WORKERS

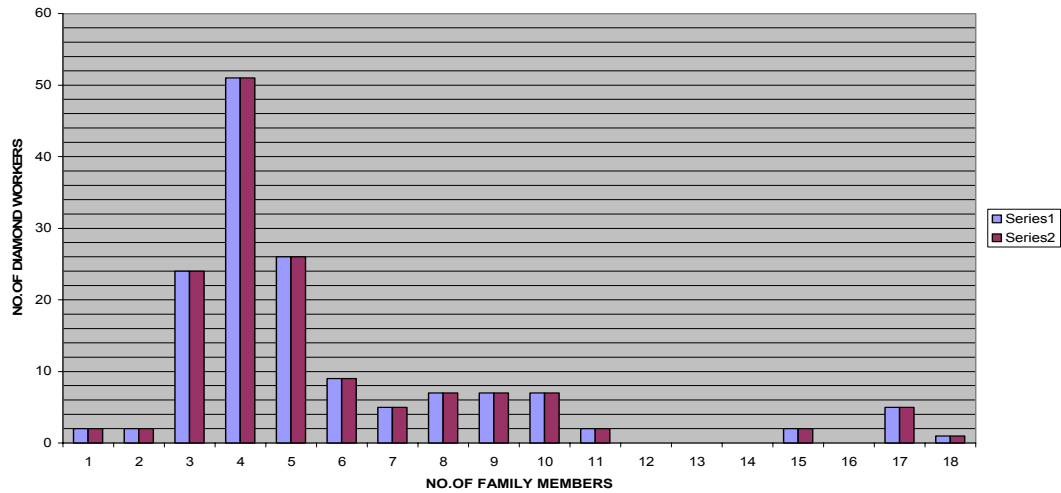


TABLE- 4.6

Distribution of diamond workers by the total no of family members

TOTAL NO.	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
1	2	100%	-	-	2
2	2	1.5%	-	-	2
3	23	17.2%	1	6.3%	24
4	51	38.1%	-	-	51
5	22	16.4%	4	25%	26
6	7	5.2%	2	12.5%	9
7	5	3.7%	-	-	5
8	6	4.5%	1	6.3%	7
9	1	0.7%	6	37.5%	7
10	6	4.5%	1	6.3%	7
11	2	1.5%	-	-	2
12	-	-	-	-	-

13	-	-	-	-	-
14	-	-	-	-	-
15	2	1.5%	-	-	2
16	-	-	-	-	-
17	4	3%	1	6.3%	5
18	1	0.7%	-	-	1
TOTAL	134	100	16	100	150

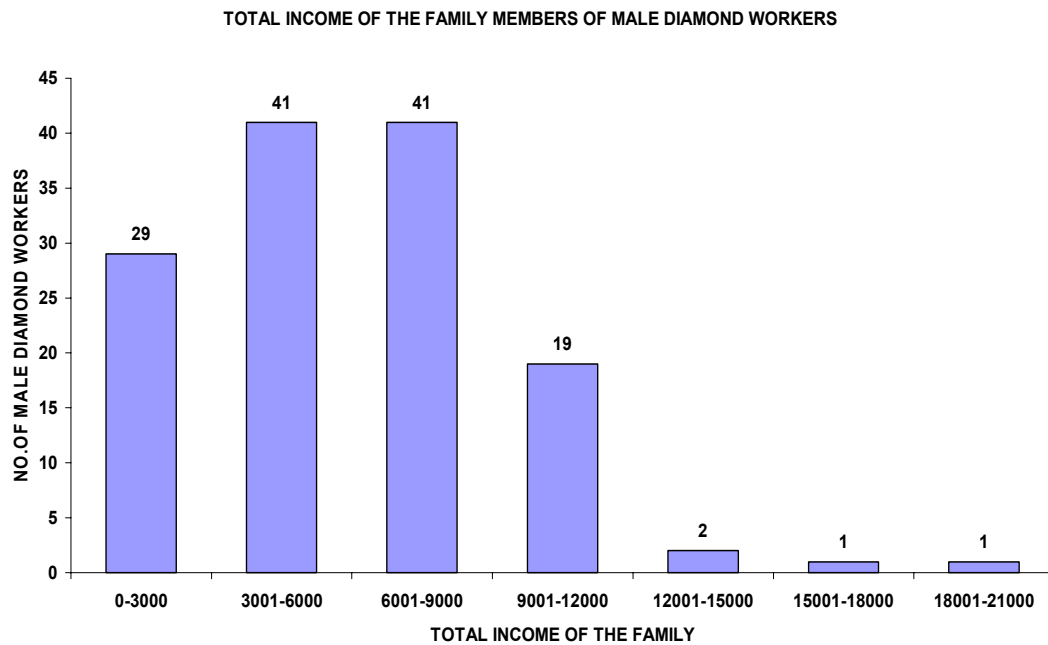
Table no. 4.6 reveals that 38.1% male diamond workers are living in that types of family in which there are total no. of family members is 4 and 16.4% male have total no of family members is 5. The ratio of female diamond workers who have 9 family members in their family is 37.5%. In this study research has not found any female who is living single or alone. Where as two male workers are living single. A male having 18 family members in his families are identified during the visit and 4 females are found who have 17 family members in their family.

Most of the diamond workers have not got higher education. However their family size is identified very small. It is a good factor as far as the government's family plan system is concern. It shows that family planning is going to be successes.

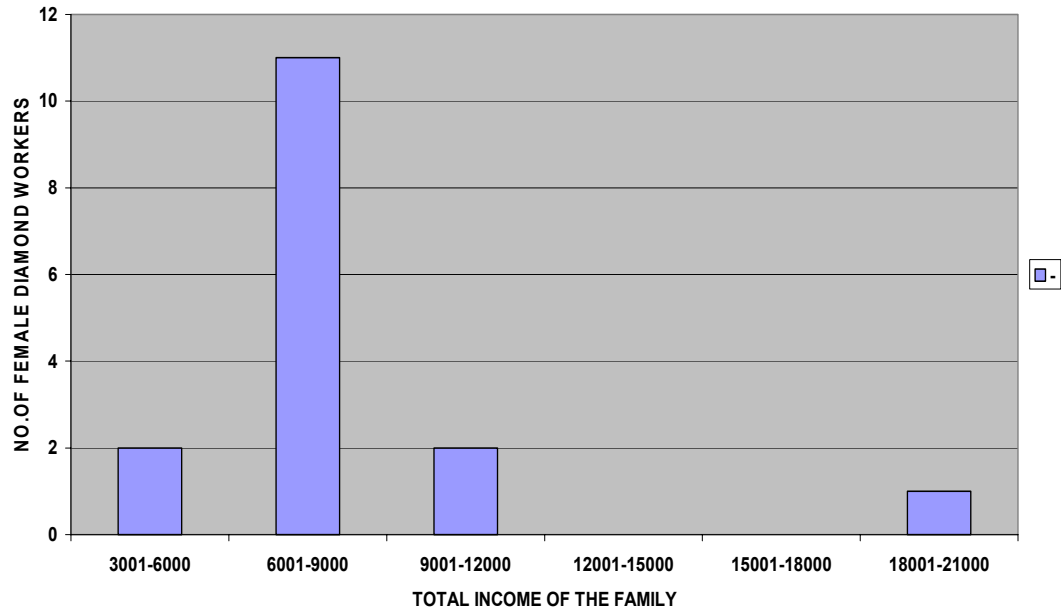
Analyses of total no. of family members of the diamond workers show that they have small size of family.

Average family members are identified 5 members. Thus, it becomes clear that they believe in small family tradition but the types of the family is depends on the education and income of the family. Here in the following table I have given presented the clear picture about the total income of the family members. So that we can be aware about the relationship between the types of education, types of the family and income of the family. In this table description of the total income of the family is given.

CHART NO.:-7



TOTAL INCOME OF THE FAMILY MEMBERS OF FEMALE DIAMOND WORKER



TOTAL INCOME OF THE FAMILY MEMBERS OF DIAMOND WORKERS

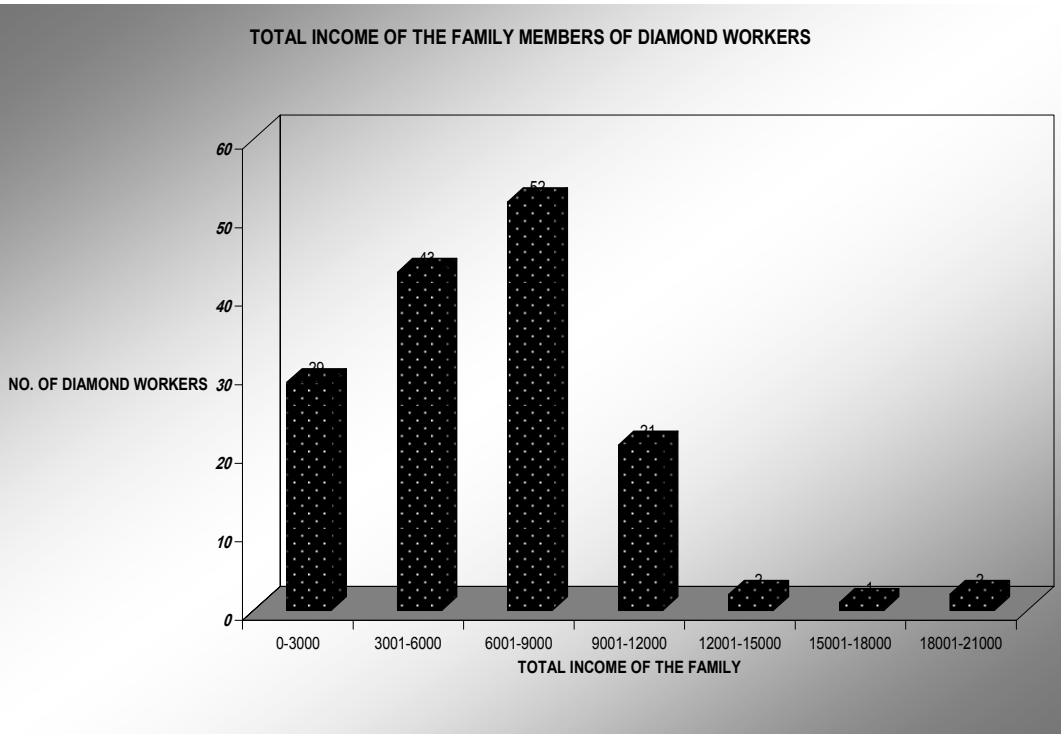


TABLE – 4.7

Distribution of the diamond workers on the basis of total income of the family members

TOTAL INCOME	NO. OF MALE	PER CENTAGE	NO. OF FEMALE	PER CENTAGE	TOTAL
0-3000	29	21.64%	-	-	29
3001-6000	41	30.6%	2	12.5%	43
6001-9000	41	30.6%	11	68.75%	52
9001-12000	19	14.18%	2	12.5%	21
12001-15000	2	2.68%	-	-	2
15001-18000	1	0.75%	-	-	1
18001-21000	1	0.75%	1	6.5%	2
TOTAL	134	100	16	100	150

Table no: 4.7 gives the information related to the total income of the family members of the diamond workers. Most of the diamond workers family income is between Rs. 6001 to Rs. 9000. Out of total no of diamond workers 34.6% diamond workers family have their income between Rs. 6001 to Rs. 9000. The no. of total income of the family members of the diamond workers whose income is between Rs. 3000 to Rs. 6000 is 43 means 28.66%. None of the

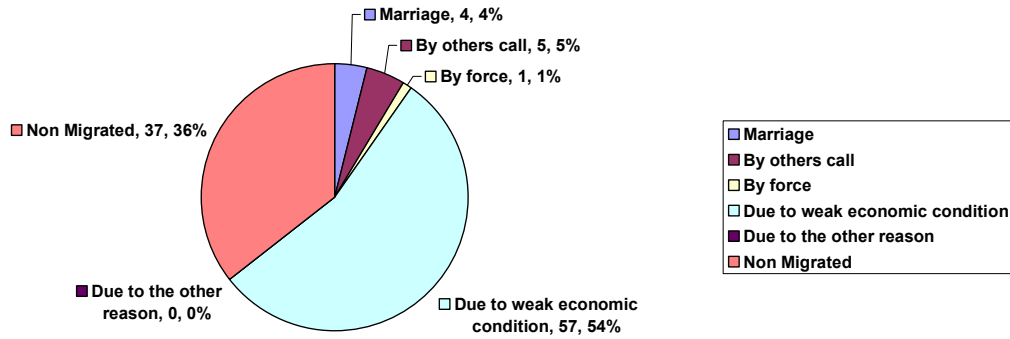
female workers total family income is found less than 3000 Rs. is per the study; a female is found whose family income is between Rs. 1800 to Rs. 2100. Out of the total no of the diamond workers 30% diamond workers are found whose family income is between Rs. 3000 to Rs. 9000. Average monthly income of the male diamond workers is identified more compare to the average monthly income of the female diamond workers total family income.

On the basis of the statistics presented in the above table the economical condition of the diamond workers is found better in compare to the other industries workers.

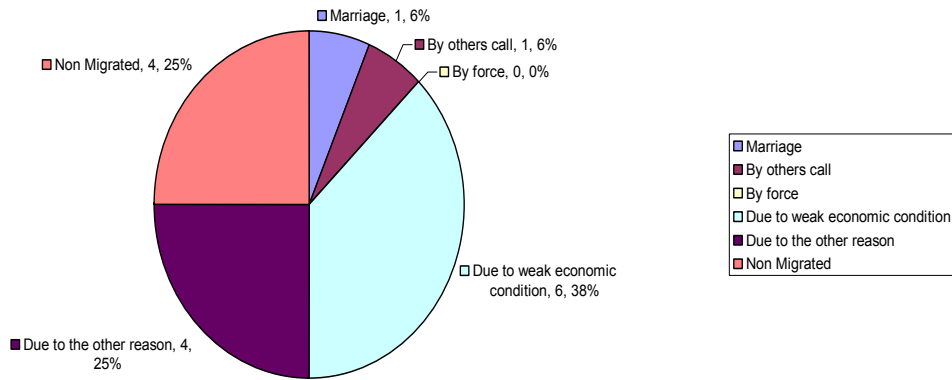
Most of the diamond workers of Ahmedabad, Surat and Navasari are found to be migrated and among them most of the diamond workers are till doing agricultural work. That why their income is found lubricate. By this table we can get the information related to the total income of the family members of the diamond workers but the most important point here we should described is that out of total sampled diamond workers how many workers have migrated from the rural areas to the urban areas to get employment in this business and the next question is that what should be the reason behind their migration. A detail regarding this point is given in the following table.

CHART NO. :- 8

RESONS OF MALE DIAMOND WORKERS FOR THEIR MIGRATION



REASONS OF FEMALE DIAMOND WORKERS FOR THEIR MIGRATION



REASONS OF DIAMOND WORKERS FOR THEIR MIGRATION

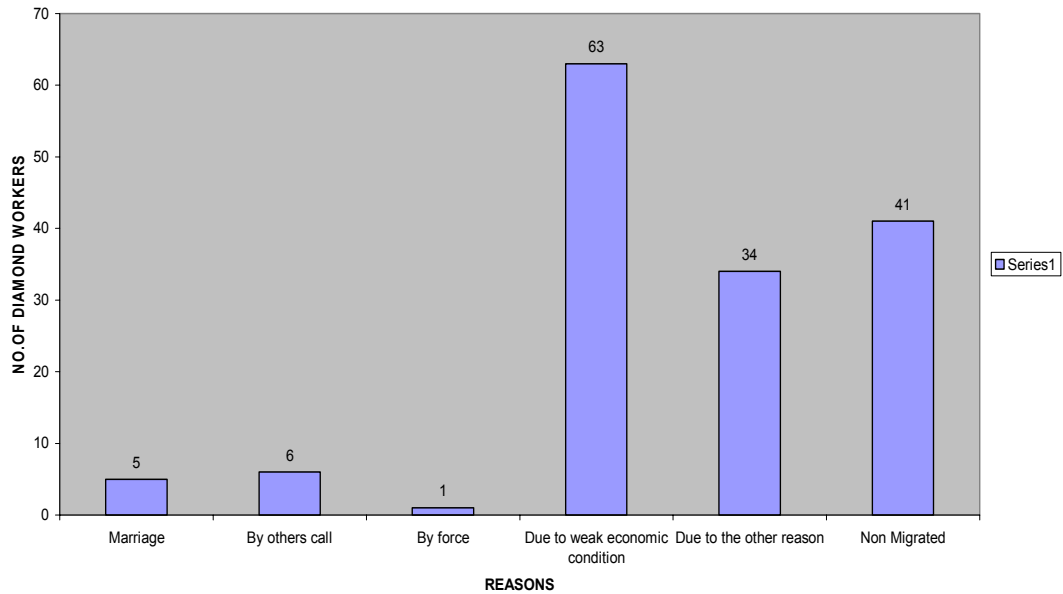


TABLE – 4.8

Distribution of the diamond workers to their Migration and Non-migration

REASONS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Marriage	4	3%	1	6.3%	5
By others call	5	3.7%	1	6.3%	6
By force	1	0.7%	-	-	1
Due to weak economic condition	57	42.5%	6	37.5%	63
Due to the other reason	0	22.4%	4	25%	34
Non Migrated	37	27.6%	4	25%	41
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_0) accepted and alternative hypothesis (H_1) is rejected.

Table No. 4.8 announces that in all over the Gujarat state only 27.33% diamond workers found to be non migrated means they are found to be local and rest 72.67% diamond workers are found to be migrated means they have migrated from the rural areas to the urban areas to get the employment through this business.

Out of the male migrated diamond workers 3% migrated due to their marriage, 3.7% are by others call for employment 0.7% are migrated due to the work force from their elders, 42.5% are migrated due to other reason. Where as in female diamond worked 6.3% females are migrated due to their marriage, 6.3% are due to there call, 37.5% are migrated due to their economical condition and 25% are migrated due to others reasons.

Diamond workers of Ahmedabad and Surat cities are found to be migrated mostly but workers of Navasari, Bhavnagar and Amareli are not found much migrated.

An interesting point is that out of the total migrated diamond workers 90% diamond workers are migrated from the Saurashtra region to the south Gujarat

ad Gujarat. There are some other states migrated workers are also getting employment through this business but more of the diamond workers working in this business in all over the Gujarat state are of Saurashtra region. So the result we are getting here is that this business is dominated to the Saurashtra people in all over the Gujarat because in Saurashtra also diamond business is running but in less proportion in compare to the South Gujarat and Gujarat region. In South Gujarat and In Gujarat region most of the workers are found having their native at Saurashtra.

Due to the uncertainty of rain, irrigation facilities, division of farming land, joint family system, lowers ratio of education, opportunity of employment, weak economical condition etc. They have to migrate from Saurashtra and other backward areas of Gujarat.

Another reason is identify in this business is that this business gives more earning to the workers in compare to other types of labor work. That's why most of the diamond workers have joint this business for more earning and an important matter to give preference to this business is that training in this business is very easy and they start their earning within a short period of time. As par the study most of the diamond workers have competed their training within a 6 months and another vital factor is that this is the only business which gives more and more employment to

the illiterate people because illiterate can easily do diamond cutting and polishing work. This industry is not giving preference to the education.

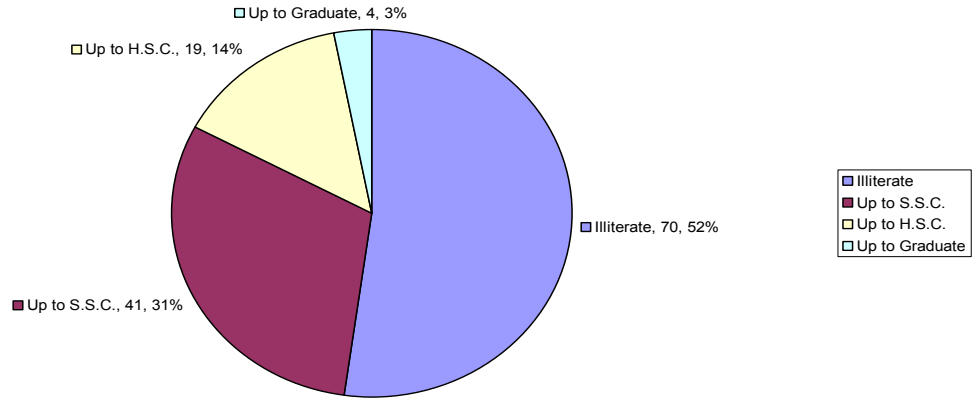
As far as the male and female diamond workers are concerned, they can get easily entrance by their relatives, by friends, by owners etc.

Ordinarily the study of sociology and education shows that if elders are educated then they can provide education to their children and should care for their children and should care for their children academic career. There is a perfect relationship between the education of elders and their children. In response to this idea, it becomes important to know the condition of the education of the diamond workers and their family members.

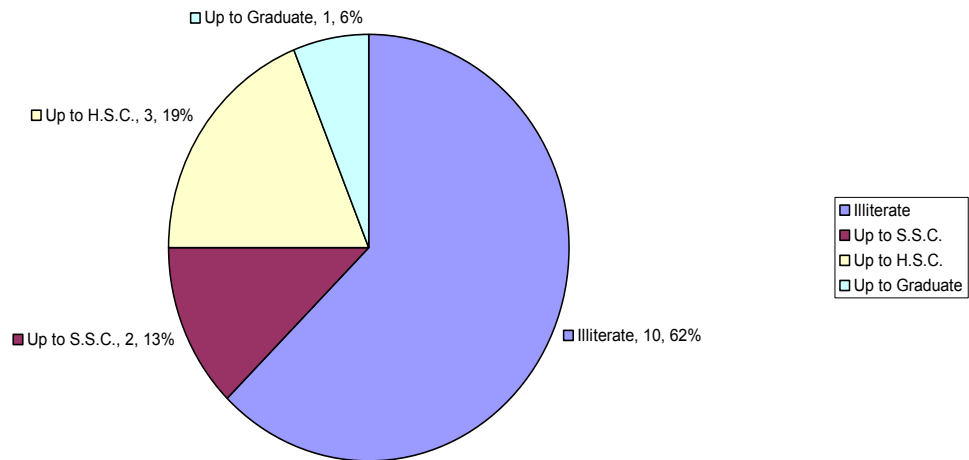
Earlier I have provided the information related about the relationship between the educations, profession and income if there is high education and profession, there are higher income but here in the following table I have discussed about the education of the diamond workers.

CHART NO.: -9

LEVEL OF EDUCATION AMONG MALE DIAMOND WORKERS



LEVEL OF EDUCATION AMONG FEMALE DIAMOND WORKERS



LEVEL OF EDUCATION AMONG DIAMOND WORKERS

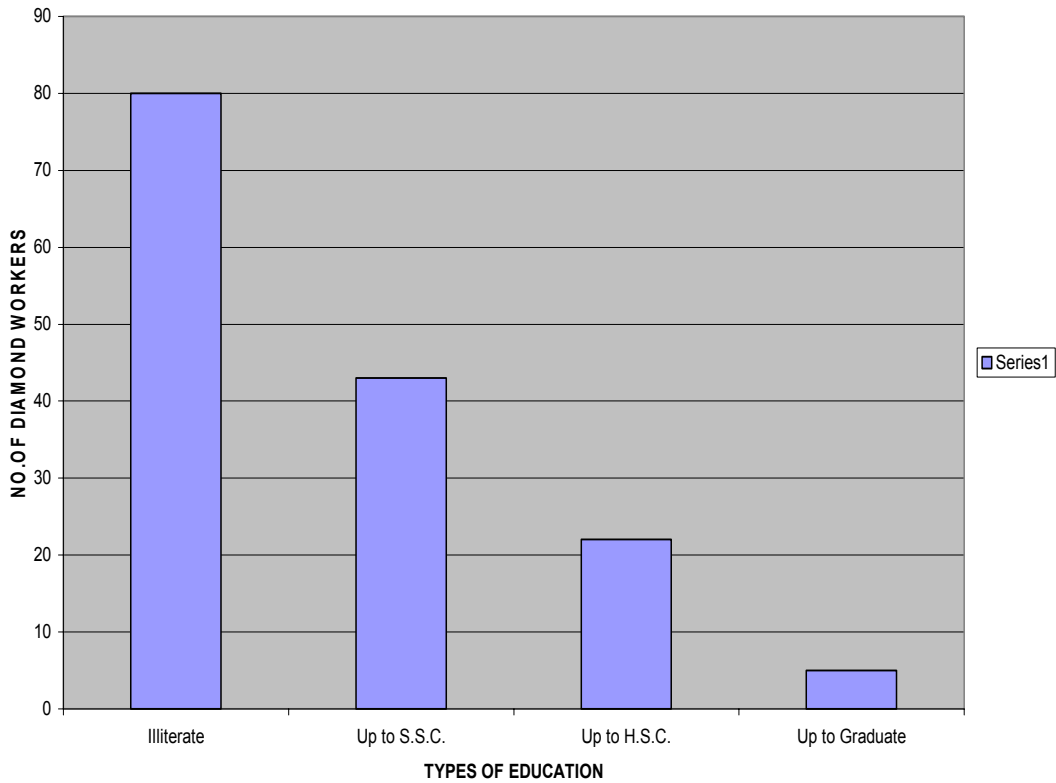


TABLE – 4.9

Distribution of the diamond workers on the basis of their education

TYPES OF EDUCATION	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Illiterate	70	52.2%	10	62.5%	80
Up to S.S.C.	41	30.6%	2	12.5%	43
Up to H.S.C.	19	14.2%	3	18.5%	22
Up to Graduate	4	3%	1	6.3%	5
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected.

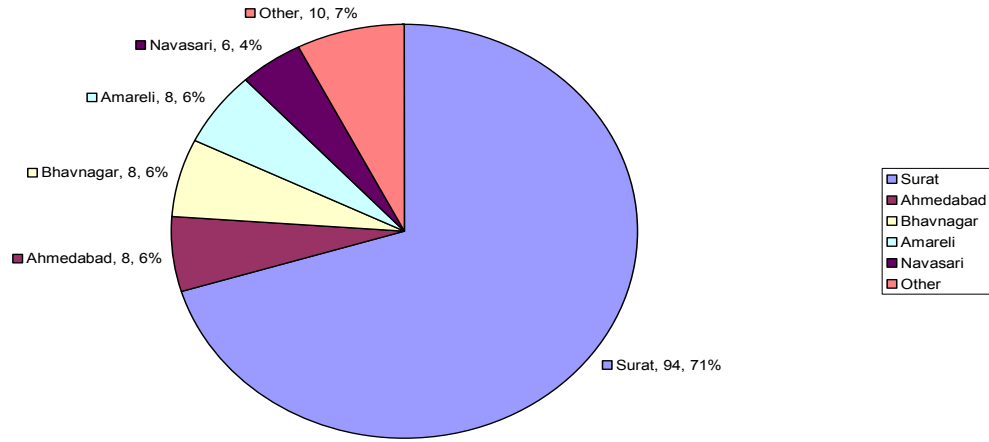
Table No. 4.9 gives the information about the education of the diamond workers. In this study no one diamond worker is found who have studied up to post graduation. 53.33% diamond workers are found to be illiterate. Among them 52.2% are male and 62.5% are female. Where as 30.6% male diamond workers have studied up to SSC or we can say that they studied from standard first to ten and 12.5% female workers are also found up to SSC education.

As far as the higher education is concern only 3.3% diamond workers are found graduates in which 4 male and 1 female.

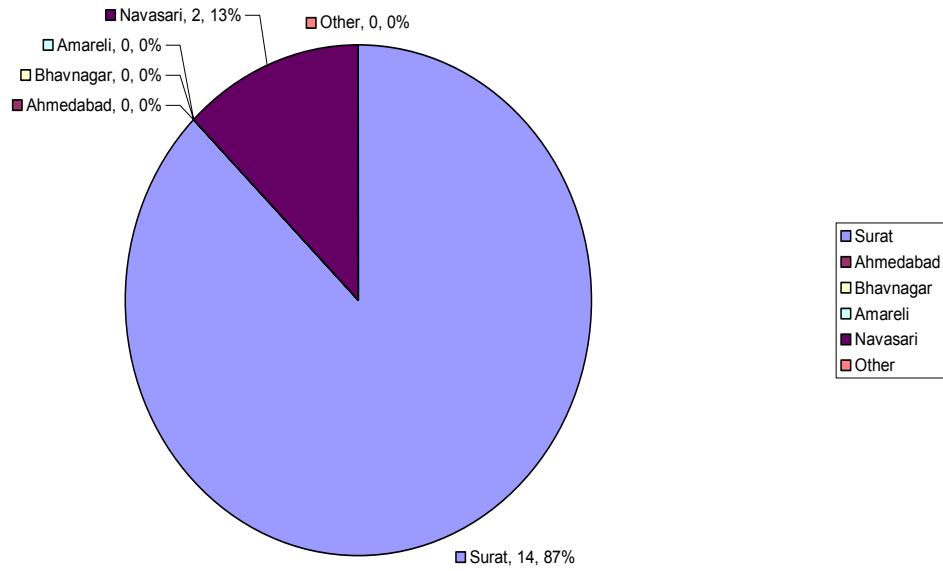
This study is completely, contrarily to K. M. Desai's study. K.M. Desai says that diamond workers are illiterate and lowers educated. According to him most of the diamond workers are illiterate but this study is not supporting to his opinion because workers are illiterate only 53.33%, thus there are educated diamond labors are also doing their work.

CHART NO.: -10

LEVEL OF THE DISTRICT PLACE OF MALE DIAMOND WORKERS



LEVEL OF THE DISTRICT PLACE OF FEMALE DIAMOND WORKERS



LEVEL OF DISTRICT PLACE OF THE DIAMOND WORKERS

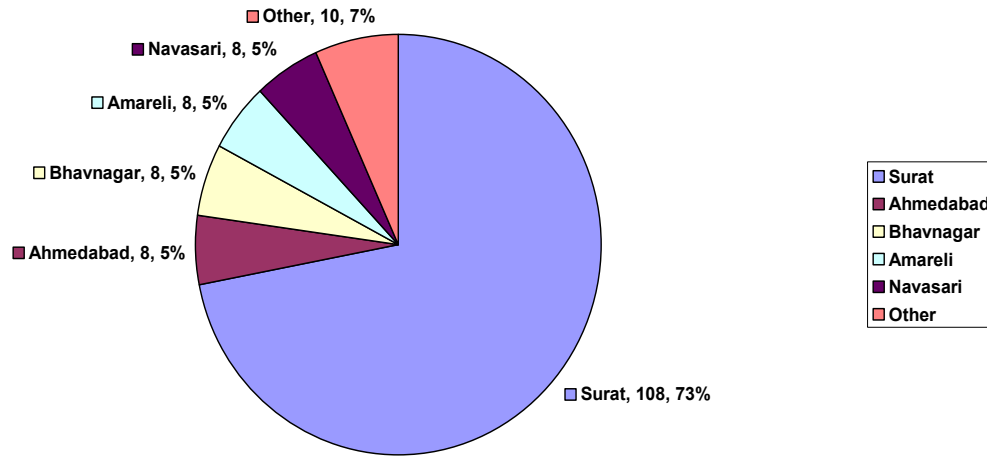


TABLE – 4.10

Distribution of the diamond workers on the basis of working place

PLACE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Surat	94	70.1%	14	87.5%	108
Ahmedabad	8	6%	-	-	8
Bhavnagar	8	6%	-	-	8
Amareli	8	6%	-	-	8
Navasari	6	4.5%	2	12.5%	8
Other	10	7.5%	-	-	10
TOTAL	134	100	16	100	150

In this random sampling method, researcher has tried to be aware about the growth and progress of the diamond industry. Presently Researcher is giving his service as an Editor in charge to Gem and Jewellery Informatics' Publication for publishing it's by monthly magazine named Diamond Galaxy International. So I have selected the samples of the diamond workers on the basis of the growth of the diamond industry in the districts of the Gujarat states. Out of the 10 diamond polished and cut into the Gujarat 8 is Prepared only in Surat. Thus I have selected 72% diamond workers from the diamond city Surat and 21.33% from Ahmedabad, Bhavnagar, Amareli, Navasari and rest 6.67% samples are taken from the other districts of Gujarat.

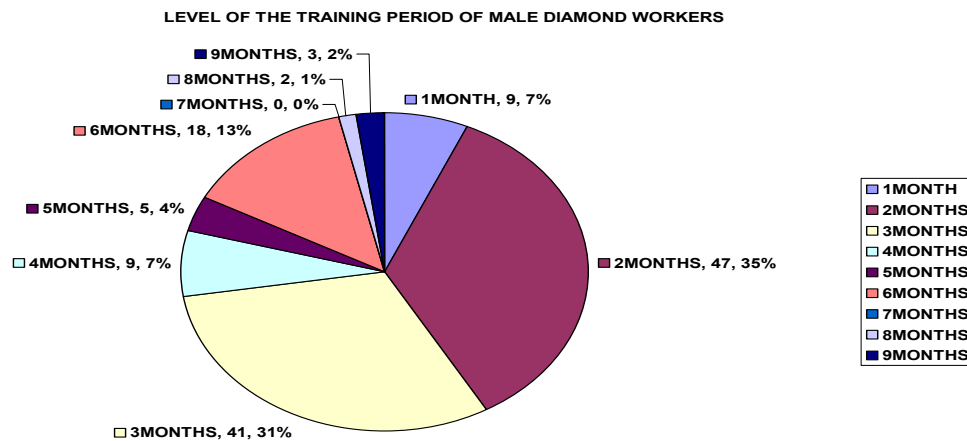
As far as the samples of the diamond workers of the varied districts of the Gujarat state is concern out of the 10 diamond prepares in Gujarat 8 are made only in Surat and near about 1 and 1.5 diamond is made in the other prime diamond city of Gujarat. Thus samples are taken on the basis of that ratio. Except Surat, Ahmedabad, Bhavnagar, Amareli and Navasari, rest 1 to 0.5% diamonds is made in other cities of Gujarat state of India.

Diamond business is much widened in Surat city of Gujarat state. In other districts of Gujarat it is not still spread as in Surat where as it is found very lower in

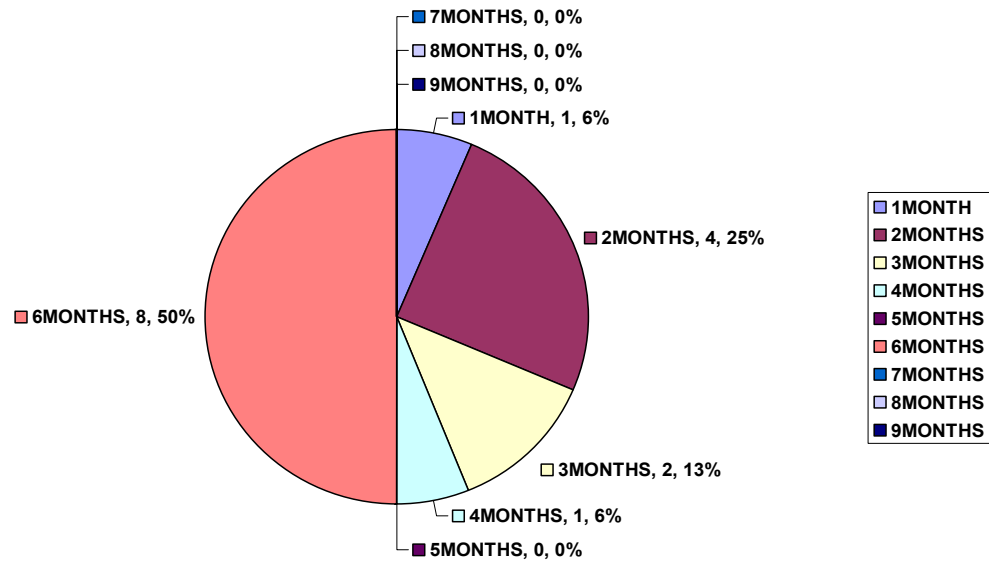
Junagardh, Palanpur, Vadodara, Porbandar, Surendranagar, Ankleshwar, Bharuch, Valsad, Anand etc. Thus here in this study opinion of the diamond workers and other experts are also taken with the researcher's opinion on the basis of his experience as Editor In charge in publishing the international Gujarati magazine named 'Diamond Galaxy International', Published by the Gem and Jewell Informatics' Publication, Surat.

Education is not much important in this business but the important is given to the training. Industrial training is vital to achieve the best result in work, higher productivity; to obtain objective etc. training is beneficial not only to the workers but also important for the management and economy also. So in the bellowed table I have tried to be aware about the time of training taken by my sampled diamond labor.

CHART NO.: -11



LEVEL OF THE TRAINING PERIOD OF FEMALE DIAMOND WORKERS



LEVEL OF THE TRAINING PERIOD OF DIAMOND WORKERS

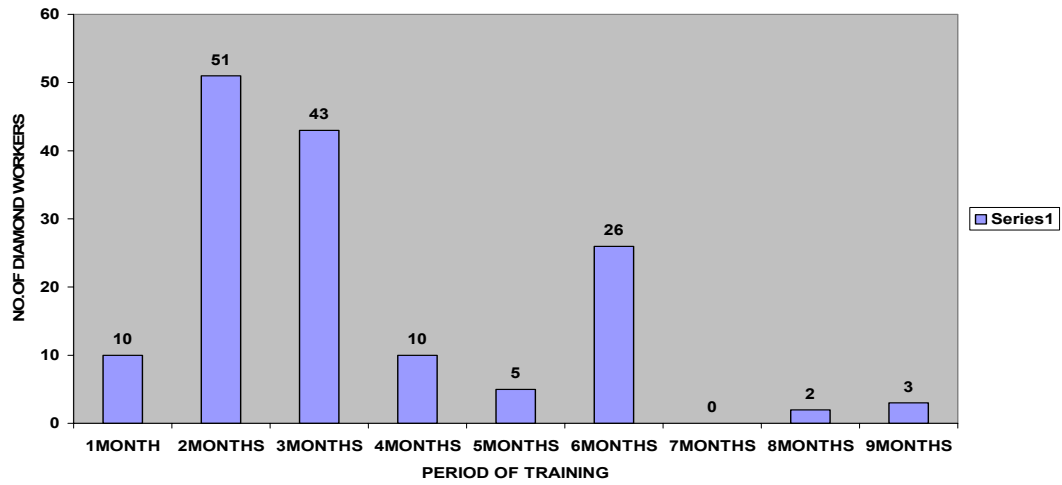


TABLE – 4.11

Distribution of the diamond workers on the basis of training time

TIME OF TRAINING (MONTHLY)	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
1	9	6.7%	1	6.3%	10
2	47	35.1%	4	25%	51
3	41	30.6%	2	12.5%	43
4	9	6.7%	1	6.3%	10
5	5	5.3%	-	-	5
6	18	13.4%	8	50%	26
7	-	-	-	-	-
8	2	1.5%	-	-	2
9	3	2.2%	-	-	3
TOTAL	134	100	16	100	150

From the above table no: - 4.11, we can say that out of the total 150 diamond workers have taken 2 months training and 10 workers have taken only one month training. Out of the total studied male diamond workers 6.7% diamond workers have got one month training and 35.1% diamond workers have taken 2 months training. As per the study 6.3% female is found with one month trained and 25% found two months trained workers. More even out

of the total number of female 50% female have taken 6 months training to learn the work.

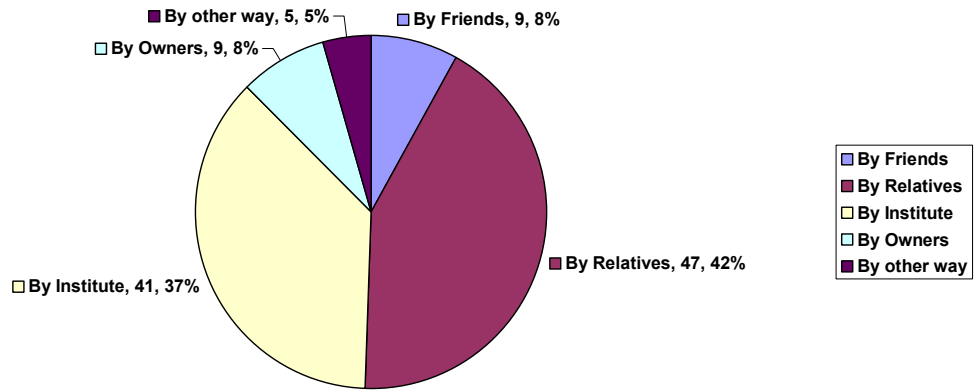
Other study shows that most of the diamond workers learn their job work within 2 to 5 months. This statement is proved to be right in this study on the basis of analysis of time taken by the diamond workers during the training.

There are 1.5% and 2.2% male diamond workers are identified who have taken 8 to 9 months of training. It shows that in compare to male, female can easily got the training within a short period of time.

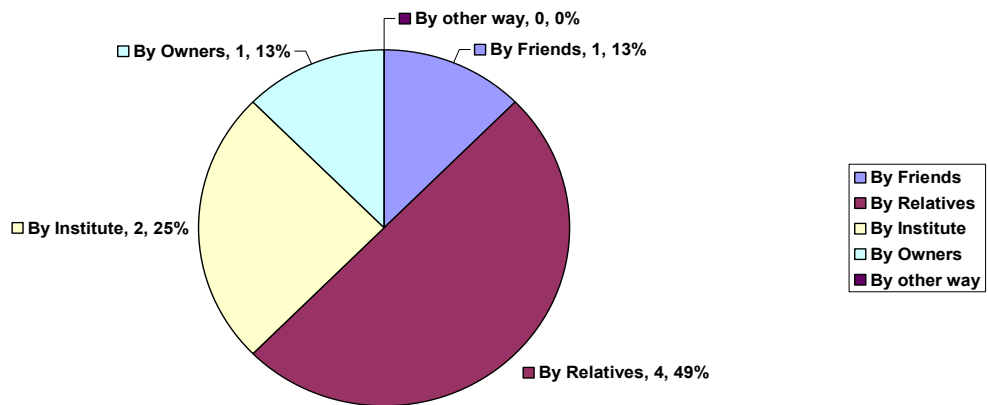
How much time they are taking to got training is an important matter but it is more important that by whom they got training? What should be the structure of their training? For getting the training they have to pay fees or they were getting stipend during their training period. These types of questions give the clarification regarding the training structure of the diamond workers. Are their any diamond institutes giving training to them or not? The details related to above questions are described and analyzed in the following table.

CHART NO.: -12

TYPES OF THE TRAINING OF MALE DIAMOND WORKERS



TYPES OF TRAINING OF FEMALE DIAMOND WORKERS



TYPES OF THE TRAINING OF DIAMOND WORKERS

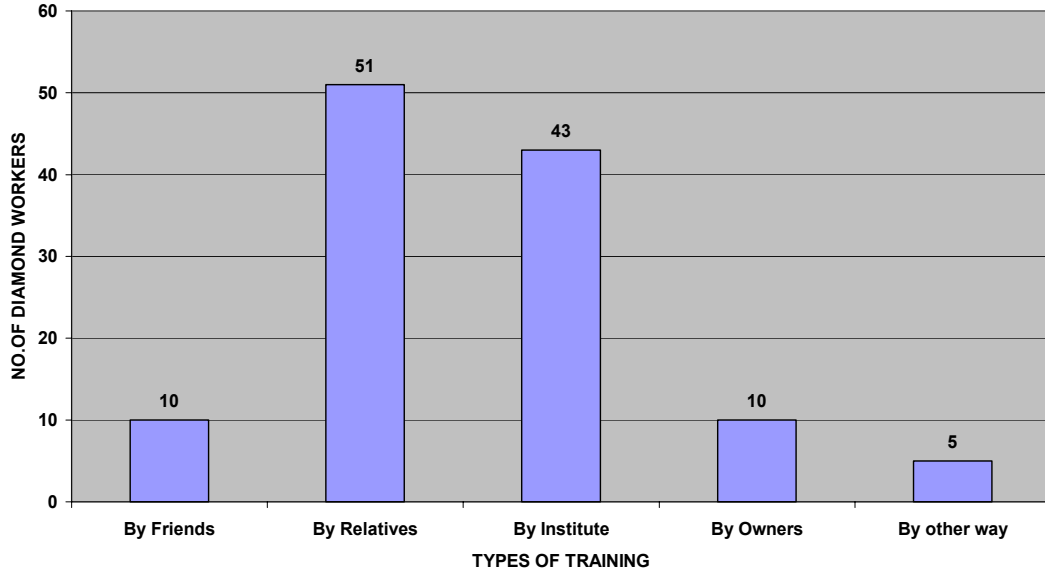


TABLE - 4.12

Distribution of the diamond workers by whom they have got training

TYPES OF TRAINING	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
By Friends	9	6.7%	1	6.3%	10
By Relatives	47	35.1%	4	25%	51
By Institute	41	30.6%	2	12.5%	43
By Owners	9	6.7%	1	6.3%	10
By other way	5	5.3%	-	-	5
TOTAL	134	100	16	100	150

Apart from the training structure table no. 4.12 mentioned that out of the total 150 diamond workers 51 diamond workers have completed their training through their relatives and 10 - diamond workers have completed their training from institutes.

We all know that diamond is a very precious metal. Diamond industrialists have fear of diamond cheating so diamond industrialists always give preferences to their relatives. Thus, most of the diamond industrialists have their relative diamond workers. The diamond workers whose relatives are not engaged with this business have completed their training by the institutes, friends and by other way.

Sometimes owners' gives training to the unemployed so that they can get trained and trustful workers in their factory and unemployed workers should not be wandering for training.

By this way, training is very vital factor in the diamond industry.

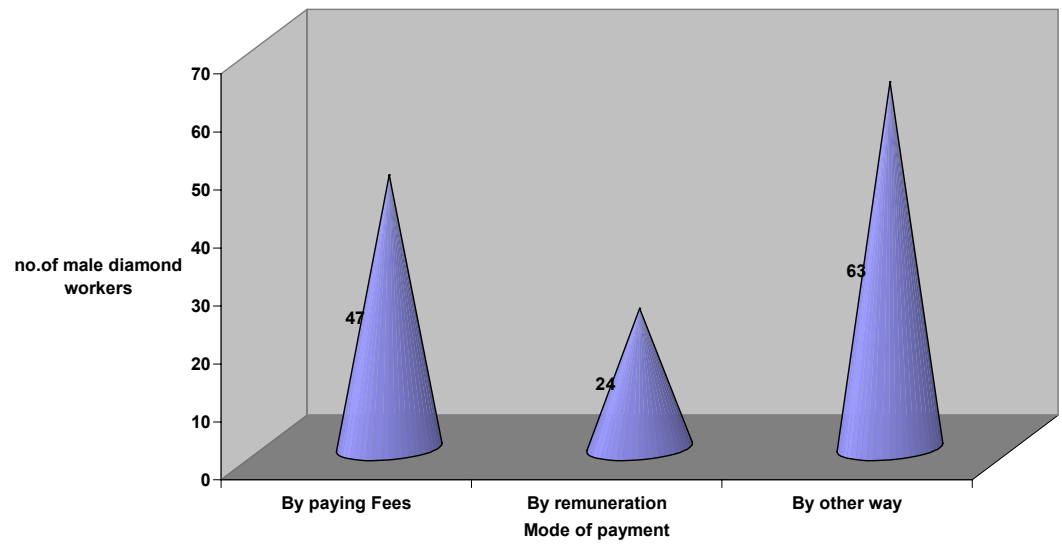
An interesting matter is that out of the total diamond workers 14 diamond workers have got their training through IDI (Indian Diamond Institute) and rest of the diamond workers of Surat, Ahmedabad, Bhavnagar and

Navasari have taken their training through private diamond classes. It shows that most of the diamond workers are not giving their preferences to the IDI or we can say that they are unknown about the government approved diamond institute. Diamond teaching classes are also producing best result as per the view of the some expert and experienced diamond workers. On the basis of these types of analyses, we can say that government has to start more and more government institutes, which can provide training to those persons who want to get employment through diamond business.

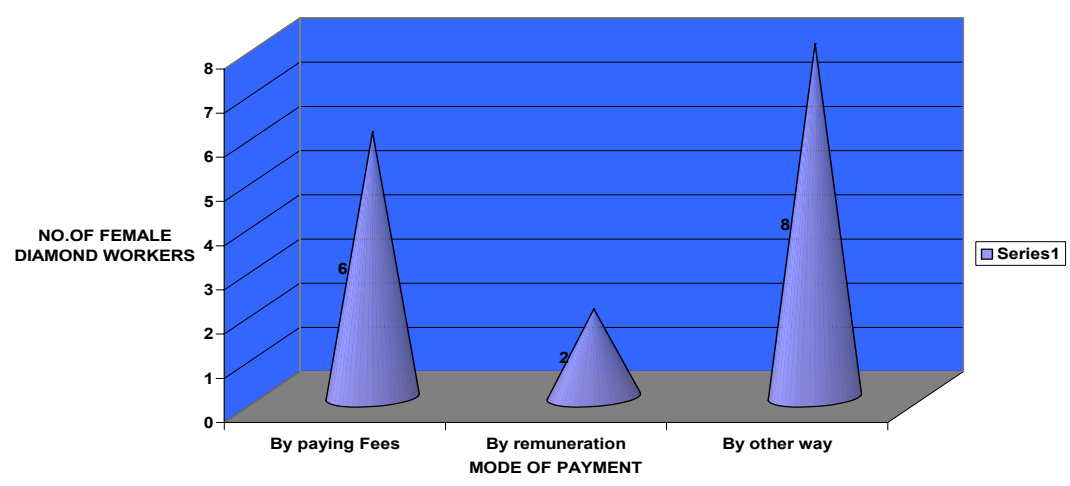
After the discussion of how much time diamond workers are taking to complete their training, by which they get raining, it's become important to know weather they are paying fees or not to get their training. This is the question, which shows us the logic of training structure. The discussion is made related to this point is in following table.

CHART NO.: -13

LEVEL OF TRAINING FEES OF MALE DIAMOND WORKERS



LEVEL OF TRAINING FEES OF FEMALE DIAMOND WORKERS



LEVEL OF TRAINING FEES OF DIAMOND WORKERS

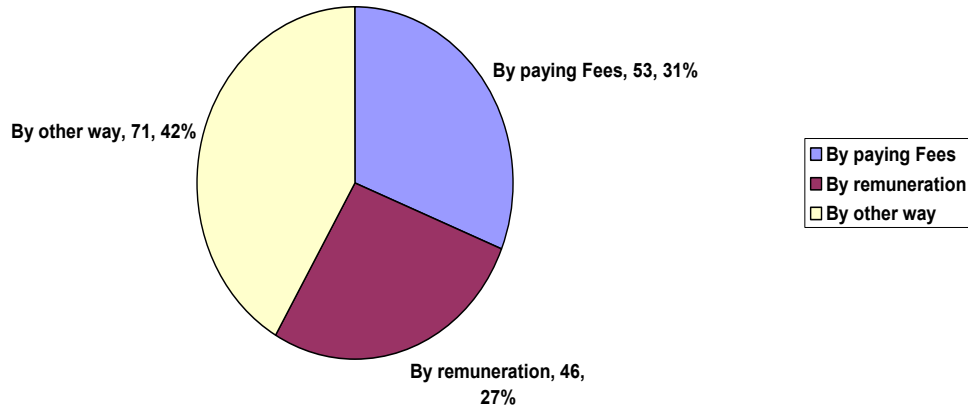


TABLE – 4.13

Distribution of the diamond workers on the basis of how they completed training

TYPES	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
By paying Fees	47	35.1%	6	37.5%	53
By remuneration	24	17.9%	2	12.5%	46
By other way	63	47%	8	50%	71
TOTAL	134	100	16	100	150

Table No. 4.13 implies that out of total numbers of diamond workers near about 35% diamond workers have completed their training by paying fees and near about 30% diamond workers have completed their training on the basis of remuneration and stipend and rest of the diamond workers have got training by other way.

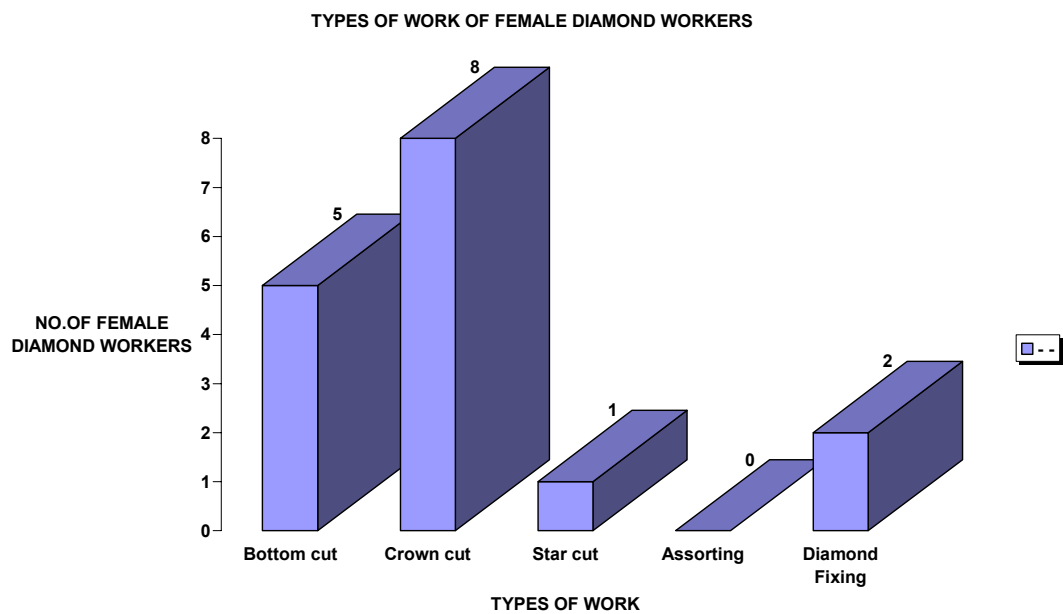
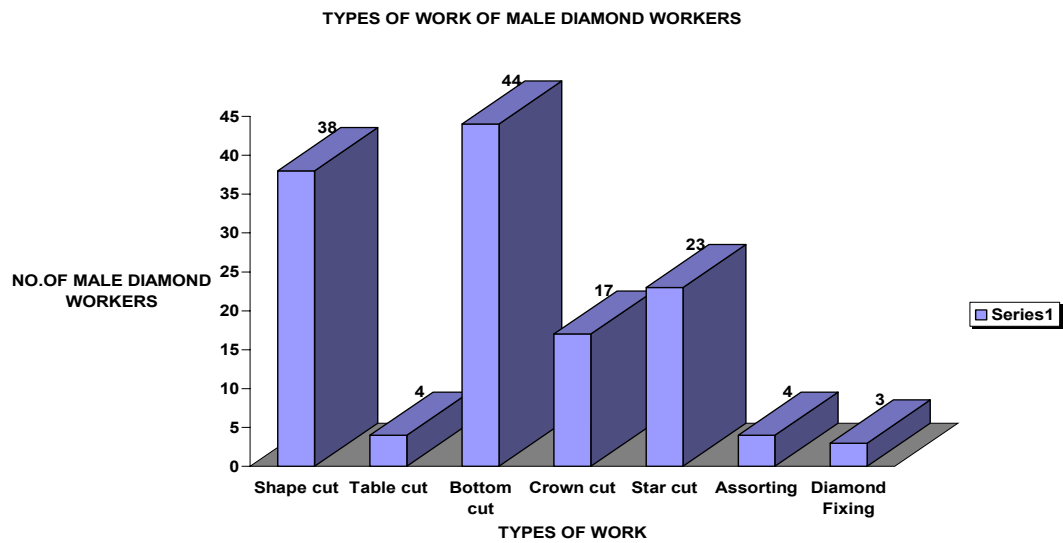
Out of the total male diamond workers 35.1% diamond workers and 37.5% female workers have got their training by paying fees and 17.9% male and 12.5% female diamond workers have got their training on the basis of remuneration and the static presented in the above table shows that 47% male and 50% females have got their training by other way.

There is a scarcity of diamond workers is found in the diamond industry. To fulfill the scarcity of the diamond labors, presently diamond industrialists are providing free training to the unemployed people.

There is a high ratio of migration in the diamond industry of Gujarat. So that important is given to the local workers. Most probably male diamond workers are found highly migrated and found the relatives of the workers that's why relative diamond workers of the trained diamond worker have not required paying fees during the training.

It becomes clear from the above discussion that what is the training structure but more about this is necessary to be aware about the work of the diamond workers. Which types of work diamond workers are doing?

CHART NO.: -14



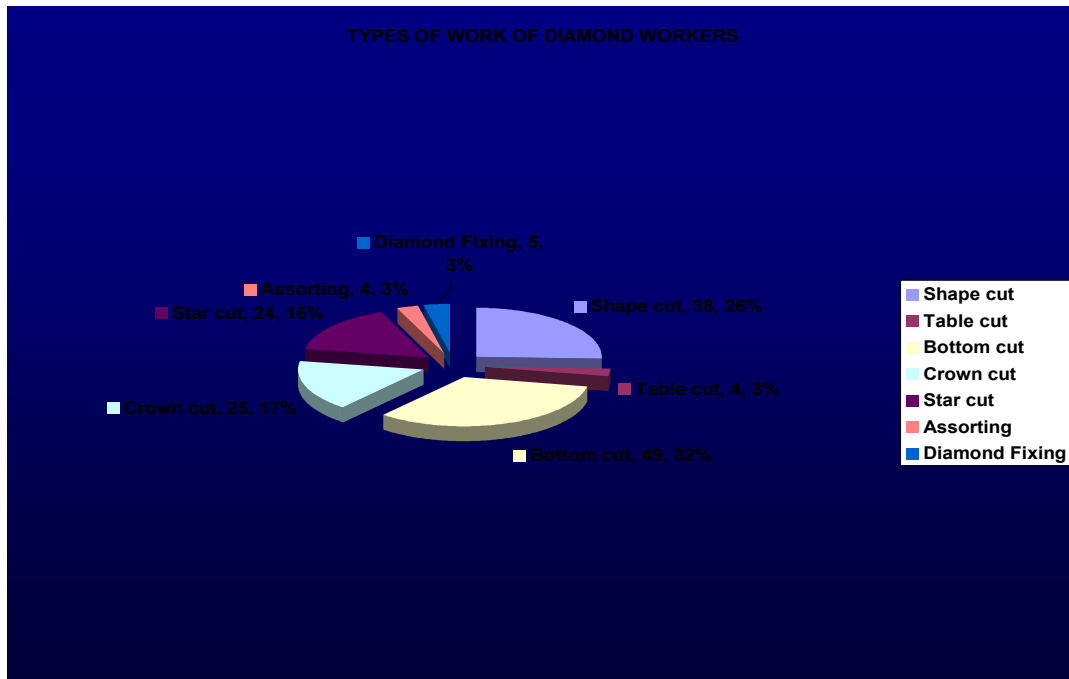


TABLE - 4.14

Distribution of the diamond workers on the basis of the types of work

TYPES OF WORK	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Shape cut	38	28.6%	-	-	38
Table cut	4	3%	-	-	4
Bottom cut	44	33.1%	5	31.3%	49
Crown cut	17	12.8%	8	50%	25
Star cut	23	17.3%	1	6.3%	24
Assorting	4	3%	-	-	4
Diamond Fixing	3	2.3%	2	12.5%	5
TOTAL	134	100	16	100	150

Table no: 4.14 implies the type of cut of their work. I have studied 150 diamond workers, out of that 38 diamond worker are found to be working on shape cutting and 49 diamond labors are identified in table cutting work.

If you want to get pure cut and polished diamond, first of all you have to assort the rough diamond and than you have to pass many cutting process.

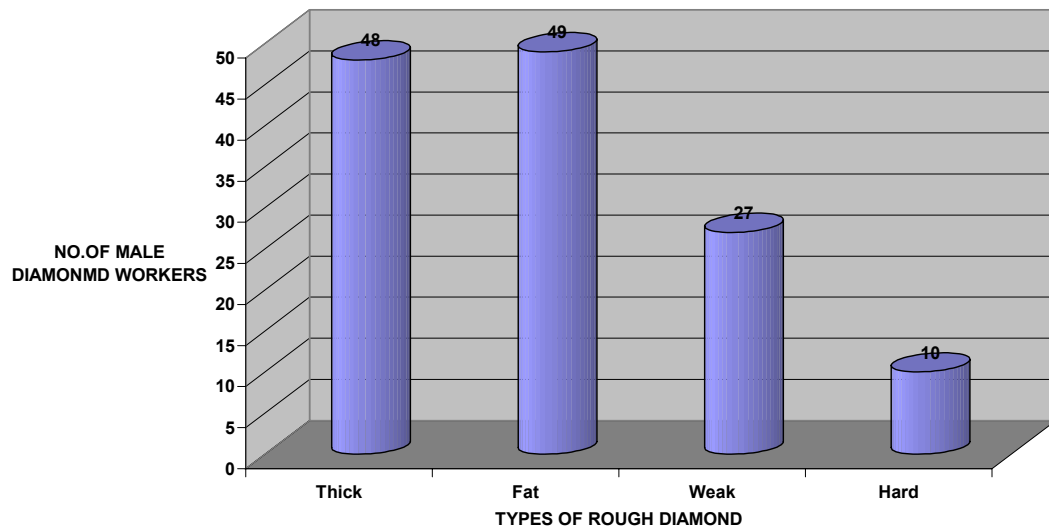
Out of the total studied male. I have found 28.6% in shape cut, 3% in table cut, 33% in bottom cut, 12.8% in crown cut, 17.3% in assorting of diamond and 2.3% in diamond fixing where as in female 31.3% in bottom cut, 50% in crown cut, 6.3 in star cut, and 12.5% in diamond fixing but there isn't any female worker is found to be working in the work of shape cutting. Male diamond workers can do all types of work which is identified hard and sift but female diamond workers can do only easy work. They can't do each and every work but do some special work.

From the above table we have got the information related to the types of work with which diamond labor are working but it is also important to know the types of rough they are getting in their work and are they satisfied with that types of rough and also important to know the income of the diamond labors which is purely depends on the types

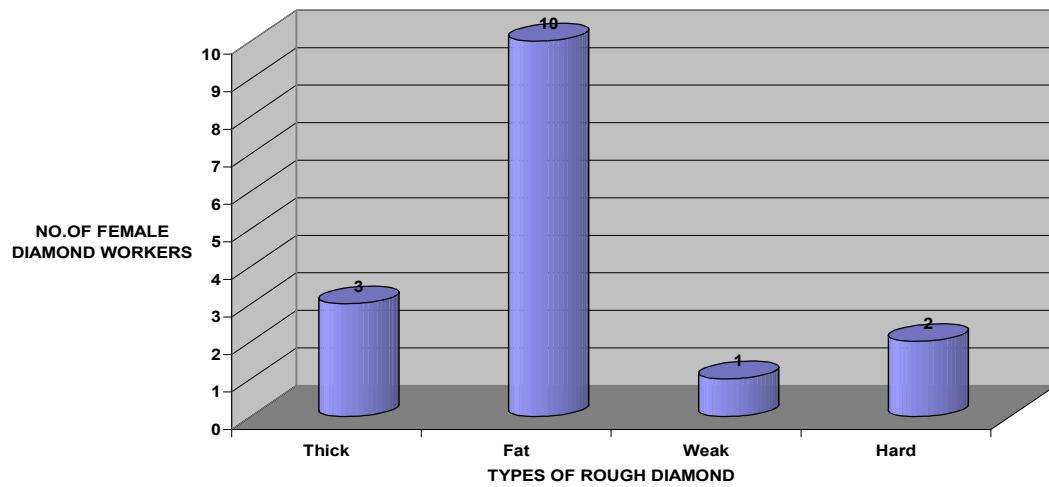
of rough. In which types of rough they can easily work and able to earn more wage.

CHART NO.: -15

TYPES OF ROUGH DIAMOND RECEIVED BY MALE DIAMOND WORKERS



TYPES OF ROUGH DIAMOND RECEIVED BY FEMALE DIAMOND WORKERS



TYPES OF ROUGH DIAMOND RECEIVED BY DIAMOND WORKERS

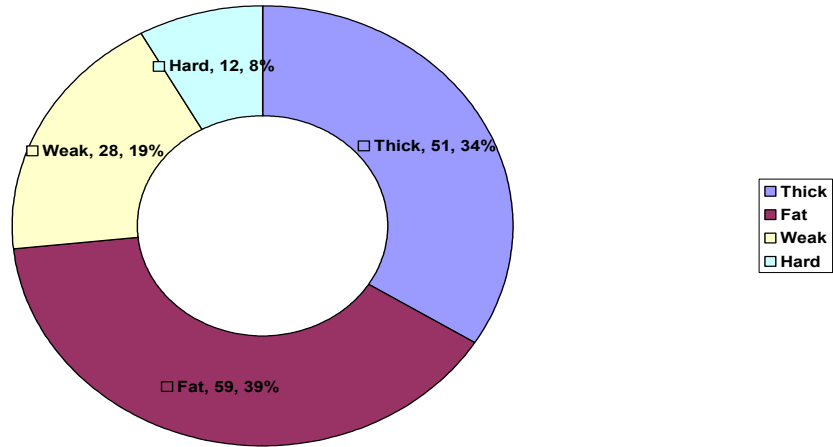


TABLE – 4.15

Distribution of the diamond workers on the basis of rough diamond received during the work

TYPES OF ROUGH	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Thick	48	35.8%	3	18.8%	51
Fat	49	36.65%	10	62.5%	59
Weak	27	20.1%	1	6.3%	28
Hard	10	7.5%	2	12.5%	12
TOTAL	134	100	16	100	150

Diamond business in Indian is the business of cutting and polishing of diamonds. So we have tried to know that which types of rough they are getting for their work and are they easily do their work with that rough.

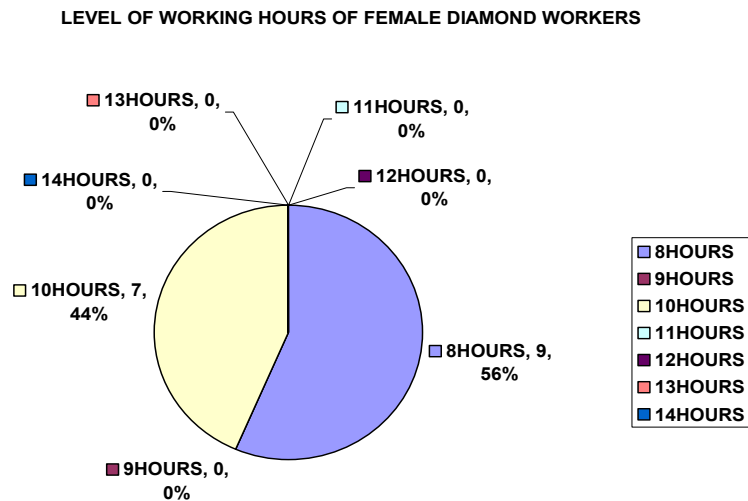
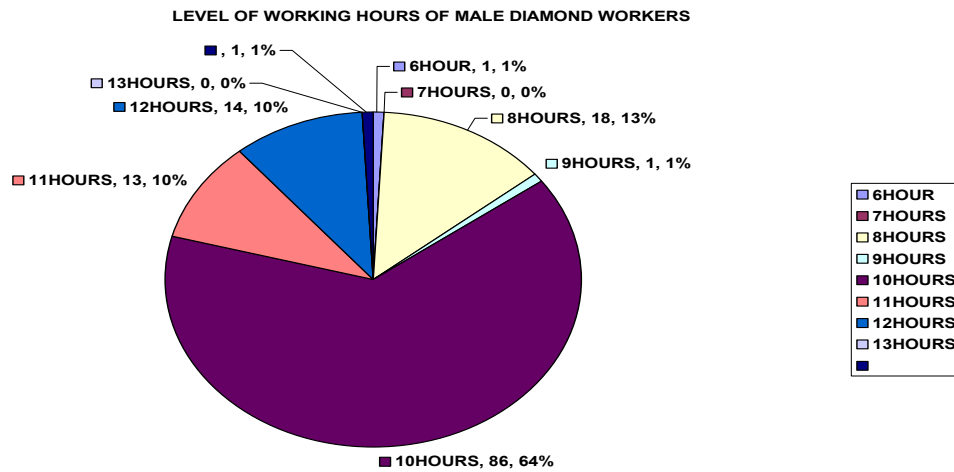
Table No 4.15 shows distribution of the diamond workers on the basis of rough they get for their diamond cutting and polishing work. Out of the total number of studied diamond workers 59 diamond workers are saying that they are getting fat diamonds for their work.

On the basis of thick rough 48 male and 3 female of our study say that they are getting thick rough during their work, they are able to do their work very easily with thick type of rough. In this type of rough they can prepare more and more diamonds. So that they can earn more in compare to other types of rough, where as in fat diamond 36.65% male of our study are saying that they are not doing their work very easily with fat rough on expected satisfaction.

There are 20.1% male and 6.3 % female are found as per our study that they are getting weak and 7.5% male and 12.5% female are found who are getting hard rough. As per their opinion. In weak rough they can do their work easily but with hard rough, it becomes hard to made more pieces of diamond.

Sometimes diamond workers feel tolerance due to the rough but in relation to this I have checked the timing of working hours per day of the labor.

CHART NO.: -16



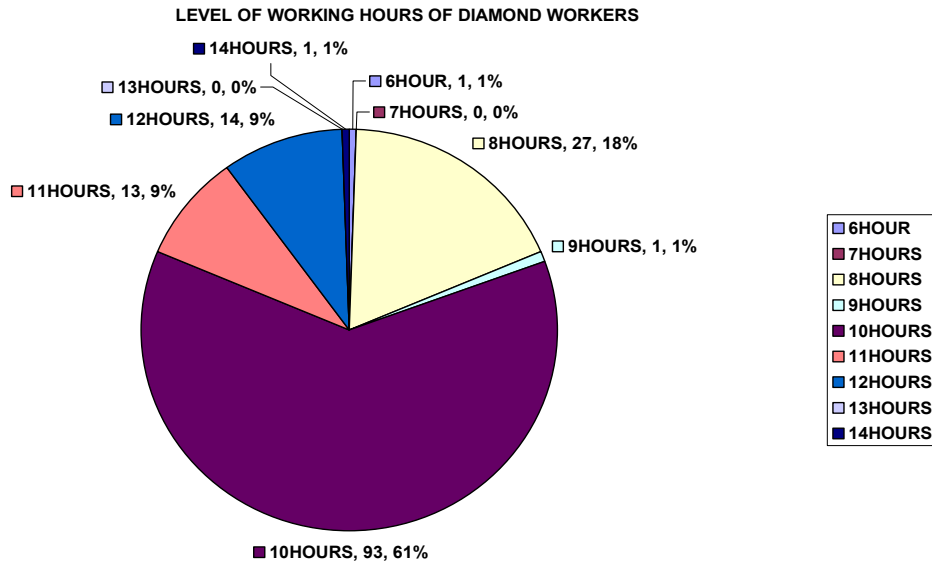


TABLE – 4.16

Distribution of the diamond workers on the basis of working hours in a day

WORKING HOURS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
6	1	0.75%	-	-	1
7	-	-	-	-	-
8	18	13.4%	9	56.2%	27
9	1	0.75%	-	-	1
10	86	64.2%	7	43.8%	93
11	13	9.7%	-	-	13
12	14	10.4%	-	-	14
13	-	-	-	-	-
14	1	0.75%	-	-	1
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected.

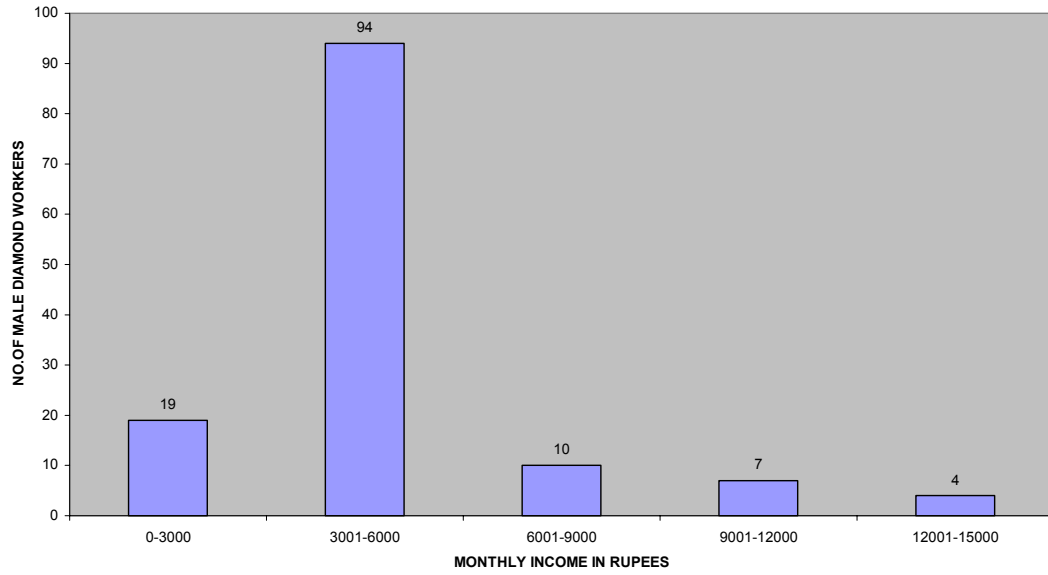
Table no. 4.16 reveals that out of the total no of diamond workers 62% diamond workers are working 10 hours per day. It shows that most of the diamond workers are working 10 hours per day. As par the study only single diamond worker is found part time diamond worker means we can say that this is the business in which workers can get part time job also, out of the total female 56.2% females are working 8 hours per day and 43.8% females and 64.2% male diamond workers are working 10 hours per day and 13.4% male diamond labors are working 8 hours per day. Only one male diamond workers is found that he works 14 hours per day.

This study also reveals that presently diamond business is running averagely 10 hours per day. So, it is clear that diamond workers are working as same as other workers of other industries are working per day.

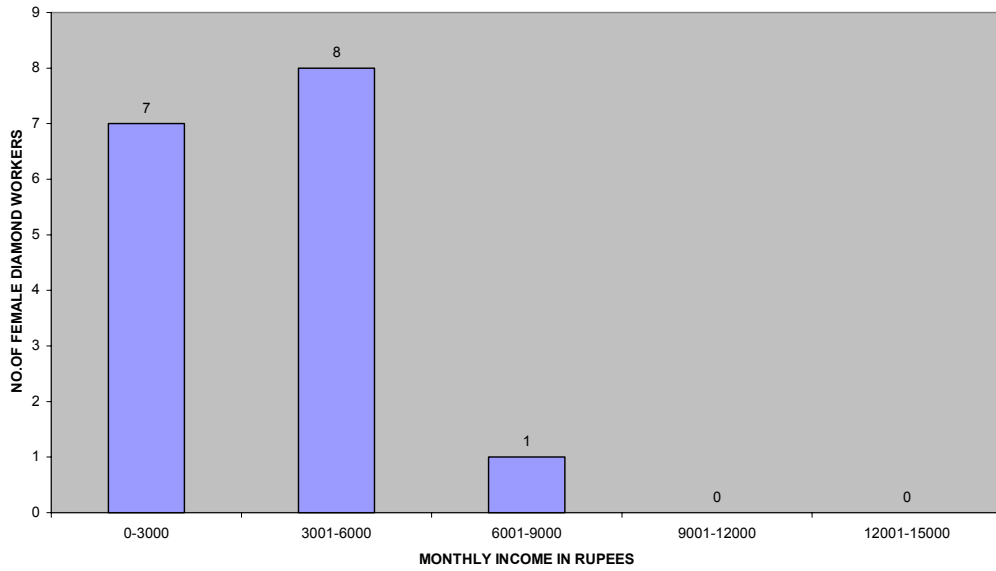
If the diamond workers are working more hours per day than their income should be high so in relation to this hypothesis I have tried to be aware about the monthly income of the diamond labor.

CHART NO.: -17

LEVEL OF MONTHLY INCOME OF MALE DIAMOND WORKERS



LEVEL OF MONTHLY INCOME OF FEMALE DIAMOND WORKERS



LEVEL OF MONTHLY INCOME OF DIAMOND WORKERS

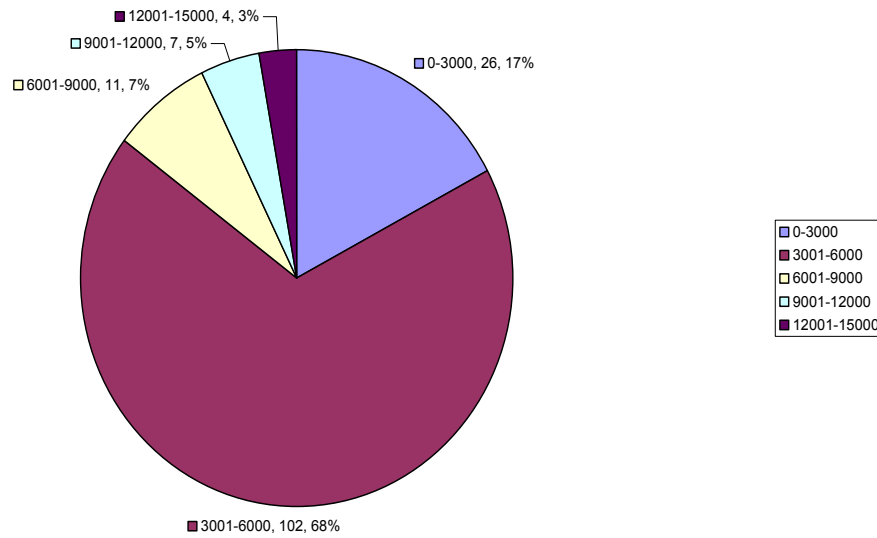


TABLE – 4.17

Distribution of the diamond workers on the basis of monthly income

MONTHLY INCOME	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
0-3000	19	14.18	7	42.7	26
3001-6000	94	70.15	8	50	102
6001-9000	10	7.46	1	6.3	11
9001-12000	7	5.22	-	-	7
12001-15000	4	2.99	-	-	4
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected.

Table No: - 4.17 Show that out of the studied diamond workers 60.80% workers earning is between 3001 to 6000 Rs per month and 1.72% diamond workers earning is between up to 3000 Rs. Out of the total studied male 70.15% diamond workers have their earning between Rs 3001 to 6000. This study shows that women cannot earn more than 9000 Rs. 11 diamond workers are found whose earning is between Rs 6001 to 9000. The diamond workers whose earning is between Rs 9001 to Rs 12000 are only 7 workers and 4 workers are found having income as Rs 12001 to 15000. Here an interesting result comes is that workers are hardly able to earn more than 9000 Rs. As far as the income of the diamond workers is concern a wage different is found between male and female diamond worker.

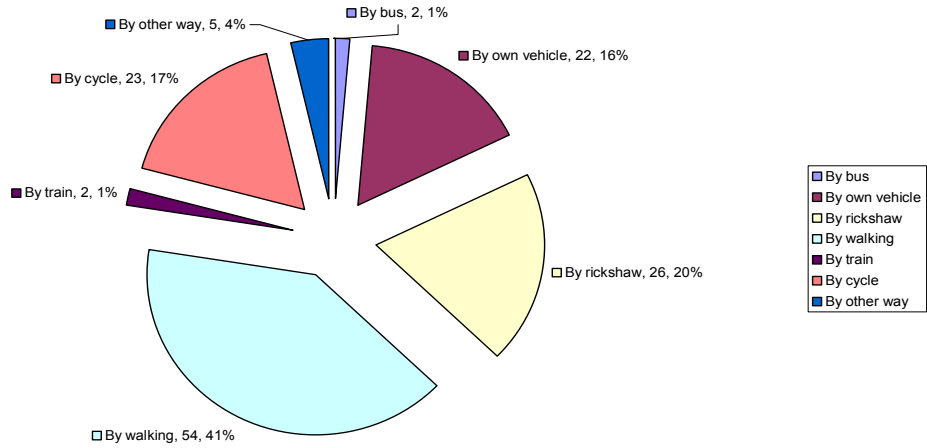
Average male diamond workers are earning more than average female diamond workers in the diamond business. Wage is paid on piece wage system. So female are hardly preparing more pieces of diamond due to their family problem, social problem and due to their personnel problems. Thus female's average income is found to be lower than male.

As per this study it is found that in the some type of work there isn't any difference is found between male and female diamond workers earning. Owners of the factory are paying the same remunerations on a piece made by the diamond workers. Male diamond laborers work more hours per day as compared to female diamond workers. Thus, there is higher income of male diamond workers is identified.

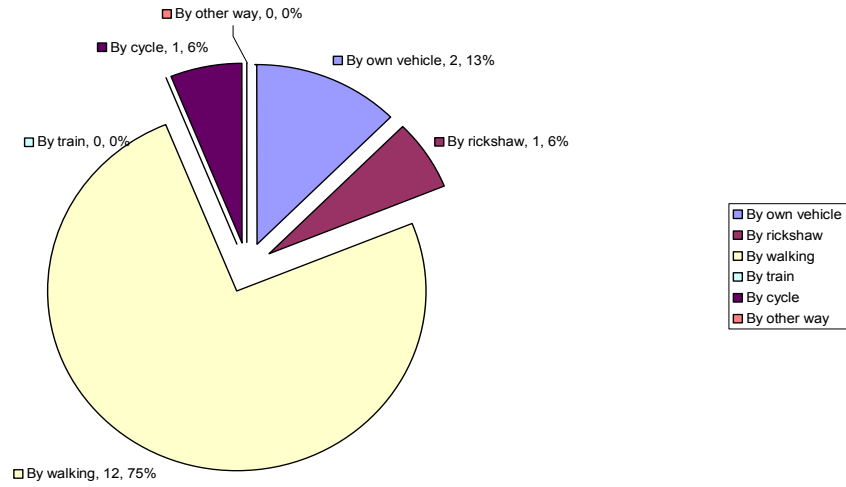
With the above table we became aware about the income of the diamond workers but it is also much important to know that if they are getting more wages or earning from this business than how they go to their working place. Are they having their own vehicle? Or go to their working place by another way. Answer of this question is given in the following table.

CHART NO.: -18

REACHING MODE OF MALE DIAMOND WORKERS TO THEIR WORKING PLACE



REACHING MODE OF FEMALE DIAMOND WORKERS TO THEIR WORKING PLACE



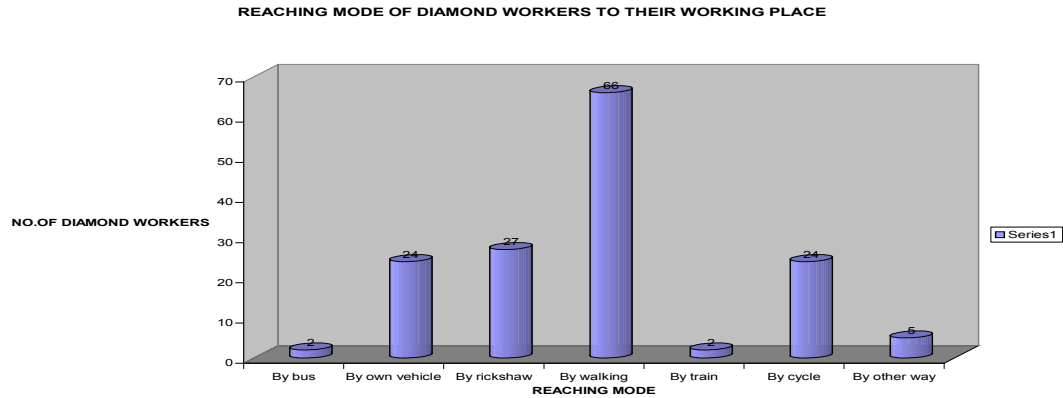


TABLE - 4.18

Distribution of the diamond workers on the basis of reaching mode to their working place

REACHING MODE TO THEIR WORKING PLACE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
By bus	2	1.5%	-	-	2
By own vehicle	22	16.4%	2	12.5%	24
By rickshaw	26	19.4%	1	6.3%	27
By walking	54	40.3%	12	75%	66
By train	2	1.5%	-	-	2
By cycle	23	17.2%	1	6.3%	24
By other way	5	3.7%	-	-	5
TOTAL	134	100	16	100	150

From table 4.18 we can aware about the pattern that how diamond worker goes to their working place from their residential place. Out of the total studied diamond workers 44 % diamond workers go to their working place by walking, only 24 diamond workers are found to have their own vehicle and they daily go to their working place on their own vehicle.

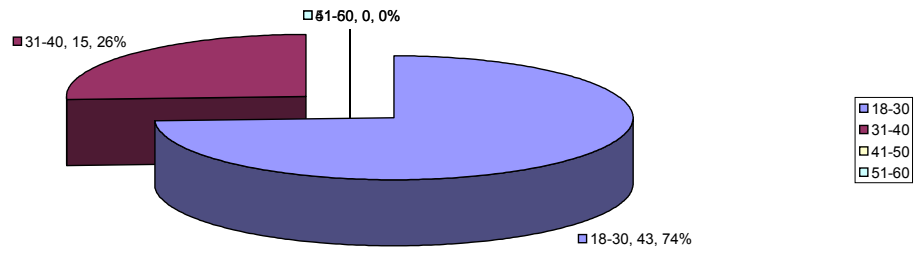
The most important result comes in this study is that I haven't found any female diamond workers who go to their working place by bus or by train.

But out of the total sampled diamond worker 5 workers go to their working place by other way means by taking a lift from his friend or they live in to the factory. According to them due to their weak family economical condition they have save their earning so that they can send their saved earning to their native.

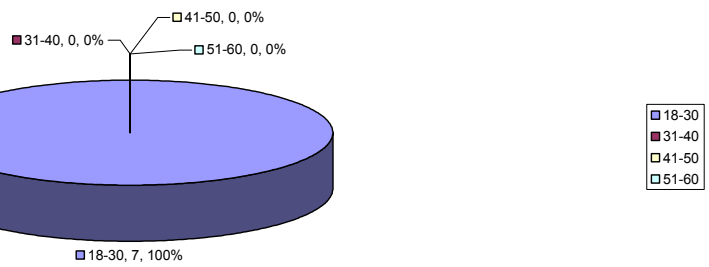
In the following table I have tried to discuss about the labors residential status. My aim to know analyze this type of question is to be aware that diamond industrialists are providing them housing fidelities or not.

CHART NO.: -19

AGE OF DIAMOND WORKERS WHO ARE LIVING IN HIS OWN HOUSES



AGE OF DIAMOND WORKERS WHO ARE LIVING IN THE FACTORY



LEVEL OF THE AGE OF THE DIAMOND WORKERS WHO ARE LIVING IN THE RENTAL HOUSES

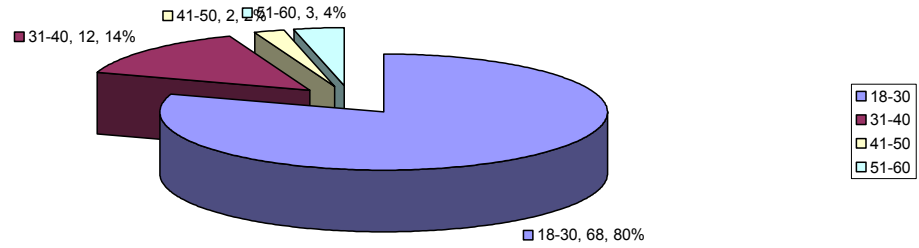


TABLE - 4.19

Distribution of the diamond workers by their residential status vis-à-vis age group

AGE	RENTAL HOUSE		OWN HOUSE		IN THE FACTORY		TOTAL
	NO.	PER CENTAGE	NO.	PER CENTAGE	NO.	PER CENTAGE	
18-30	68	80%	43	74.14%	7	100%	118
31-40	12	14.12%	15	25.86%	-	-	27
41-50	2	2.35%	-	-	-	-	2
51-60	3	3.53%	-	-	-	-	3
TOTAL	85	100	58	100	7	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis is accepted and alternative hypothesis is rejected.

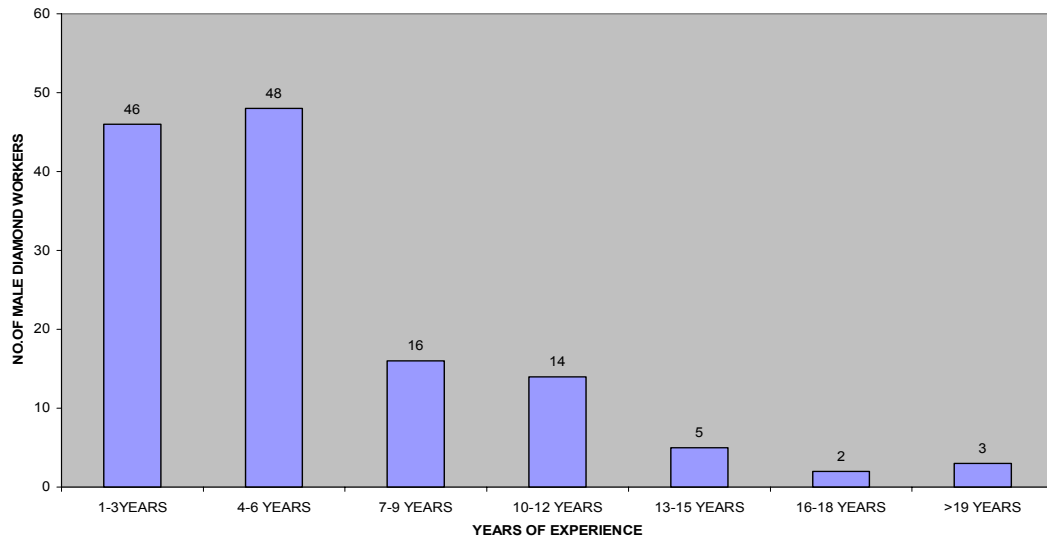
Table no. 4.19 implies that out of the total diamond workers 85 are living in the rental houses and 58 are living in their own houses. Where as only 7 labors are living in the factory. Out of the total no. of the diamond workers whose age is between 18 to 40 years are living into the rental house are 80. It shows that most of the diamond workers are young and unmarried. So they have not purchased their own house. We have seen earlier that most of the diamond workers are migrated and till the day their family members are living in their villages. So they are not giving preferences to buy the house at the city where they are working. At Native place they are getting only seasonable crops in their farm. So, they required sending some of there saving to their native also. That's why sometimes due to their weak economical condition they do not prefer to purchase their own houses.

The earlier studies reveals that more than 30% of the diamond workers are living in to the factory, but this study shows that only 5.9% diamond workers are living into their factory. In this point our study is perfectly contrarily to other study.

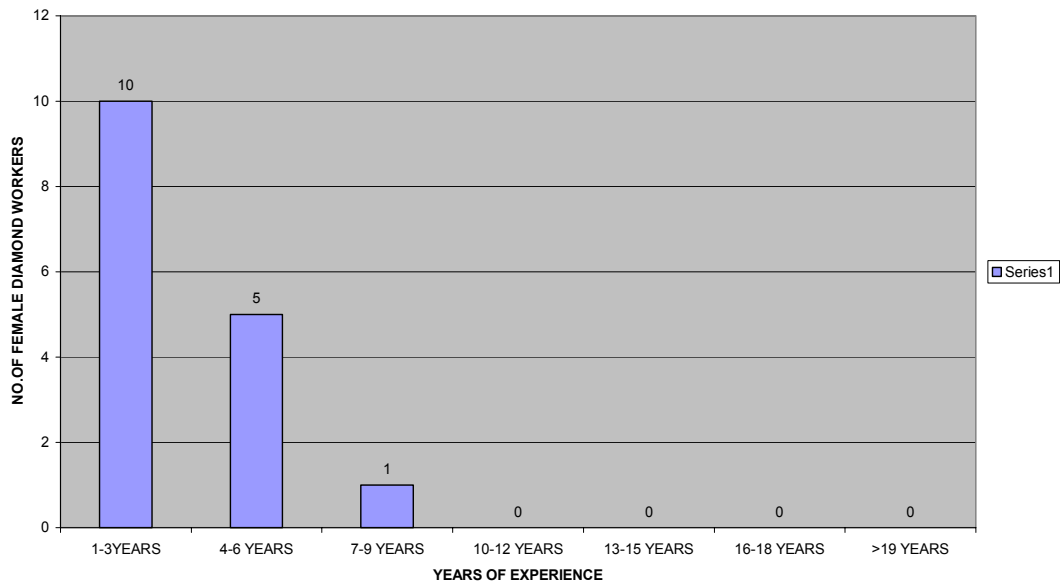
In the following table I have described the information related to the experience of the labor. In any types of the business experience is very necessary because by the experience one can get the perfection and ability to do his work. By the experience we can increase the productivity, increase the speed of work etc. So I have tried to know the professional experience of my studied labor.

CHART NO.: -20

LEVEL OF EXPERIENCE OF MALE DIAMOND WORKERS



LEVEL OF EXPERIENCE OF FEMALE DIAMOND WORKERS



LEVEL OF EXPERIENCE OF DIAMOND WORKERS

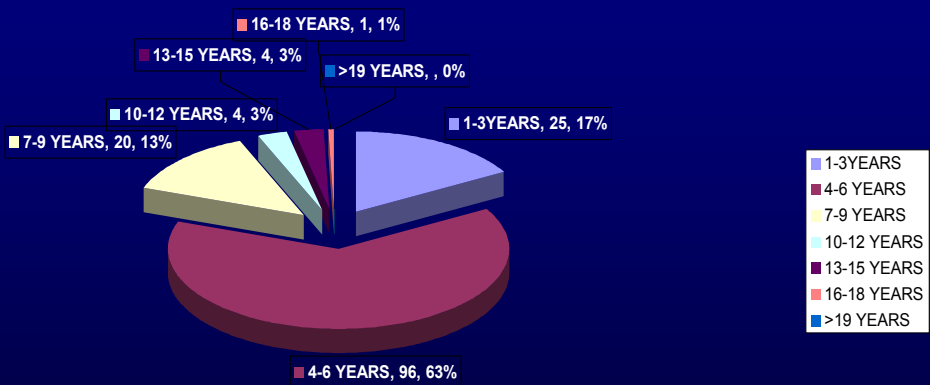


TABLE – 4.20

Distribution of the diamond workers as per their experiences

YEARS OF EXPERIENCE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
1-3	46	34.33%	10	62.5%	25
4-6	48	35.82%	5	31.25%	96
7-9	16	11.94%	1	6.25%	20
10-12	14	10.45%	-	-	4
13-15	5	3.73%	-	-	4
16-18	2	1.49%	-	-	1
>19	3	2.23%	-	-	
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis is accepted and alternative hypothesis is rejected.

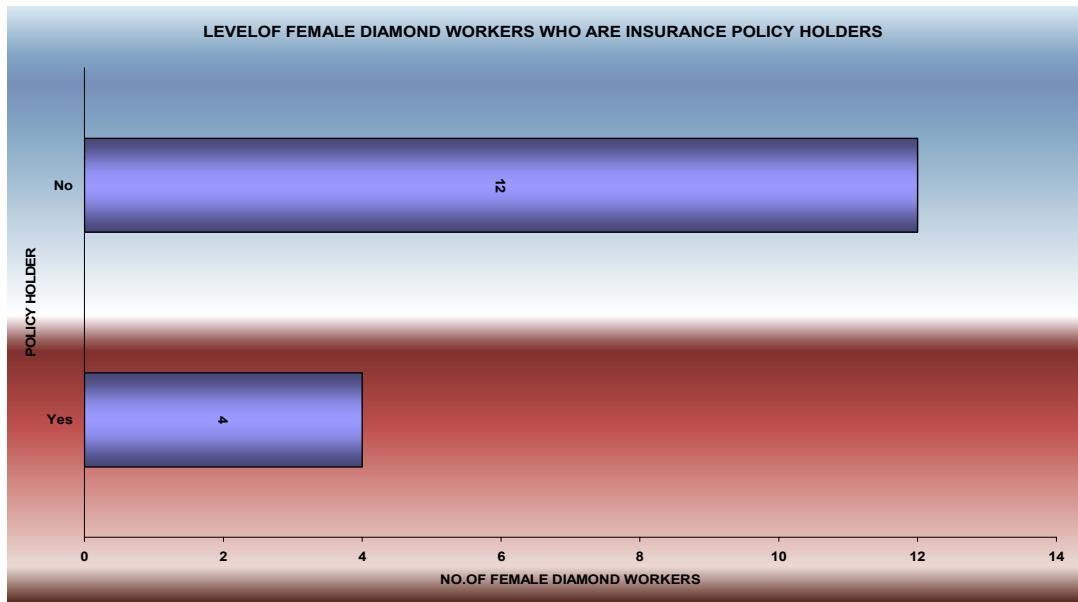
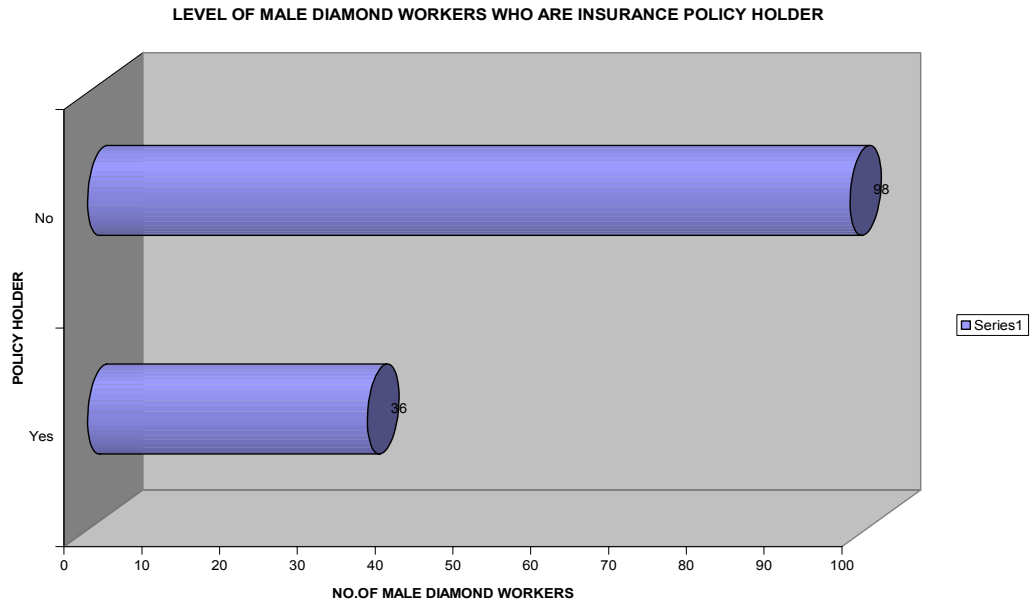
On the basis of the distribution of the diamond workers as per their professional experiences. Out of the total 150 diamond workers, 25 workers having less than one and up to 3 years experience. Male diamond workers are identified 34.33% -who have near about 1 to 3 years experienced and in that ratio female is 62.5%. It is clear

that due to the training on semi automatic ghanti, they become fully aware about their work. Most of the female workers have less than 3 years experiences, so it shows that women are earlier entered in this business.

In this study females are identified up to 9 years experienced also. More than 9 years experience nothing any female in found. Thus, it says that women who are working in the diamond industry are less experienced. By the study of female diamond workers we can say that females are entered in this business before 3 to 4 years. The reason behind it is semi automatic Ghanties on which female can do their work very easily. Thus, as per the analyses of the professional experiences of diamond workers, average diamond workers are less experienced.

After discussing about the experience of the diamond workers I have received the information about the awareness of insurance among my studied diamond workers.

CHART NO.: -21



LEVEL OF DIAMOND WORKERS WHO ARE INSURANCE POLICY HOLDER



TABLE - 4.21

Distribution of the diamond workers having insurance policy

POLICY HOLDER	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	36	26.9%	4	25%	40
No	98	73.1%	12	75%	110
TOTAL	134	100	16	100	150

At present Gujarat diamond industrialists have imposed a new policy related to the insurance. As per the view of Surat diamond association's president diamond workers become habituate to take insurance policy, but as

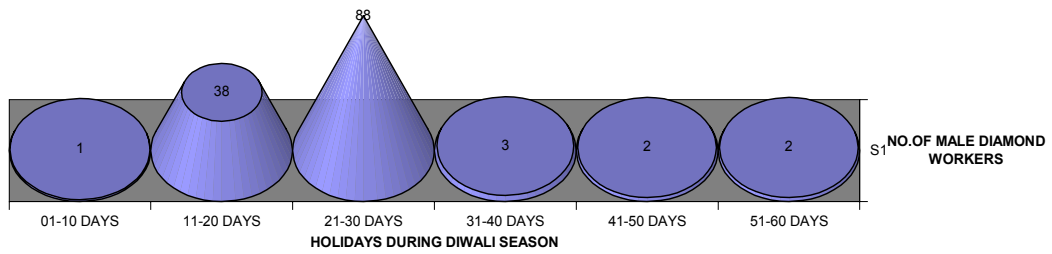
per the study only 26.67% diamond workers are found who have fully insured life and rest 73.33% have not insurance policy. The proportion of female diamond workers is 25% who have insured their life and rest 75% have not insured their life where as 26.9% male have taken insurance policy and 73% have till not insured their life.

Due to the globalization and liberalization policy of Indian government, many overseas companies have started their insurance business in India but till the date they are also not succeed to cover more than 26.67% diamond workers to make policy holders.

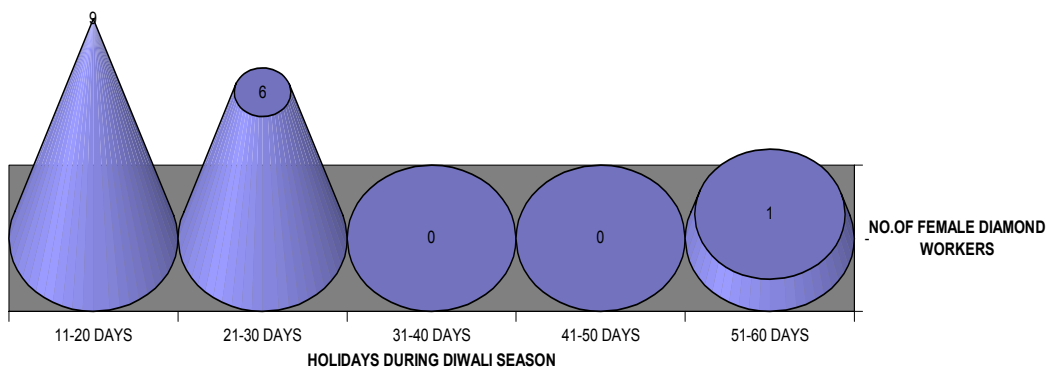
Earlier in the chapter no-2, I have given the opinion of the experts who have made studied in relation to this topic. As per most of the experts view Diamond business is mostly spreader in to the unorganized sector. In this unorganized sector my studied labor are getting Diwali leaves? The information related to this question is analyzed in the bellowed table.

CHART NO.: -22

LEVEL OF HOLIDAYS DURING DIWALI SEASON OF MALE DIAMOND WORKERS



LEVEL OF HOLIDAYS DURING DIWALI SEASON OF FEMALE DIAMOND WORKERS



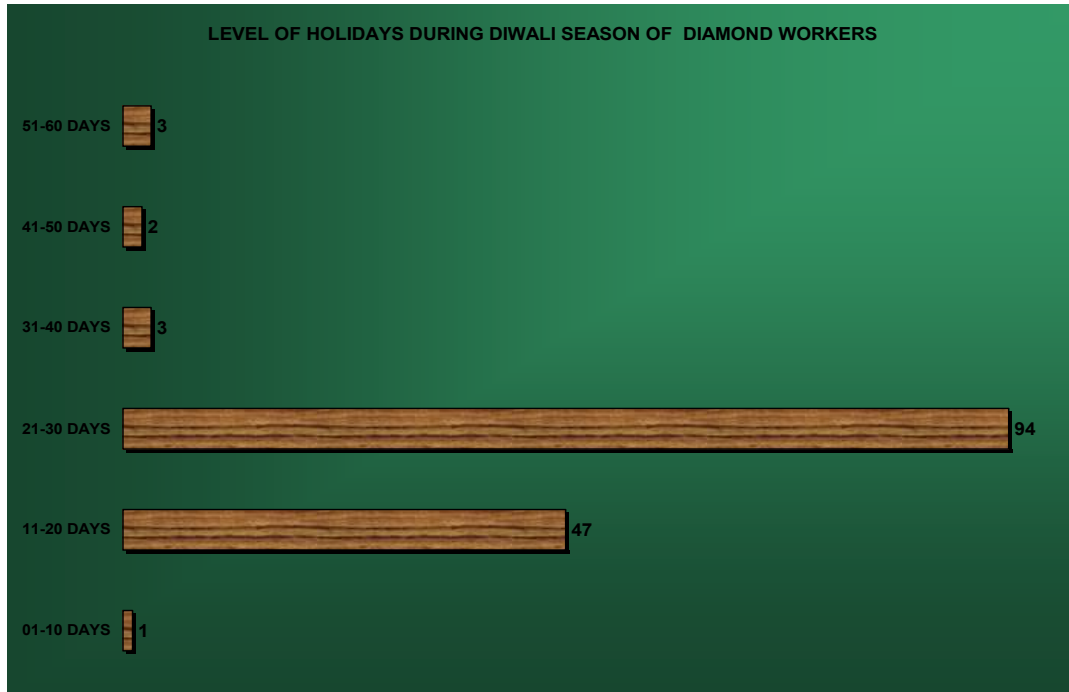


TABLE – 4.22

Distribution of the diamond workers by their Diwali Holidays

NO. OF HOLIDAYS	MALE	PER CENTAGE	FEMALE	PER CENTAG	TOTAL
01-10	1	0.75%	-	-	1
11-20	38	28.36%	9	56.25%	47
21-30	88	65.47%	6	37.5%	94
31-40	3	2.24%	-	-	3
41-50	2	1.49%	-	-	2
51-60	2	1.49%	1	6.25%	3
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_1) is accepted and alternative hypothesis (H_0) is rejected.

Table No.: 4.22 described that 62.66% diamond workers put up their work for 20-30 days during Diwali holidays. Diamond workers of Bhavnagar, Amareli and Navasari are leaving their job only 10-20 days but in Surat and Ahmedabad its proportion is near about a month.

During Diwali holiday's industrialists closed their work. So each and every diamond workers have to take some leave by hook and crook.

From the total no. of male diamond workers are getting 31 to 40 days leave and 37.5% female are getting leave during the Diwali holidays.

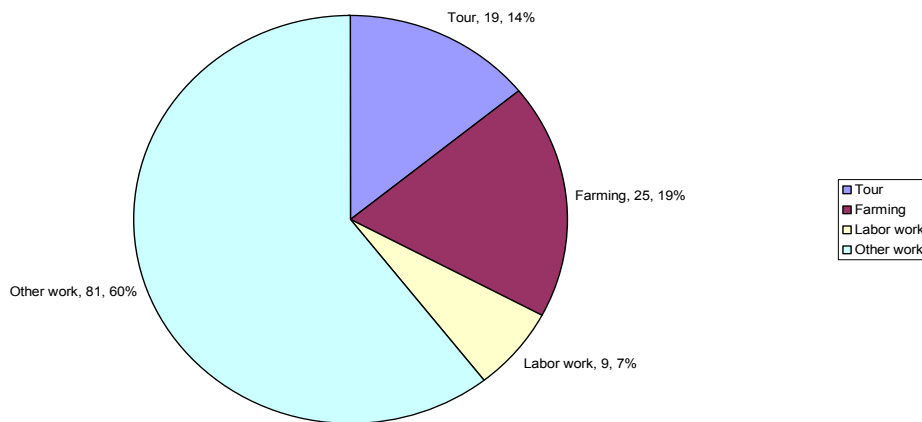
In the organized sectors diamond workers are getting more benefits of the non-finance facilities from the owners of their factory. In other country diamond workers are getting 25% to 50% other benefits rather than financial benefits also, but in India the diamond business is mostly spread in unorganized business so that workers are not getting the benefits like dearness allowances, traveling allowances, delivery benefits and other types of social facilities as organized sector's workers are getting. They are

not entitled to get bonus also but some of the factory owners of the organized sectors of this business are providing non-financial facilities to their workers. As per the view of the diamond workers during their visit some of the diamond workers told that they get the financial and non-financial benefits from their owner every year. Thus we can say that diamond workers are also getting financial and non-financial benefits.

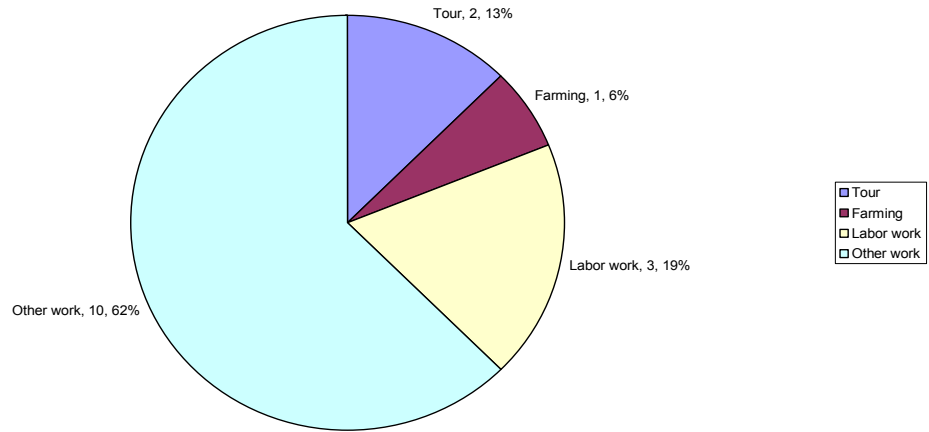
In relation to the information presented in the above table my studied labor are getting Diwali leave but the next question arise here is that During the Diwali holidays How they pass their time or What they do during the Diwali leave? Following table gives us clear idea about this question.

CHART NO.: -23

LEVEL OF ACTIVITIES (EXTRA WORK) DURING DIWALI HOLIDAYS OF MALE DIAMOND WORKERS



LEVEL OF ACTIVITIES(EXTRA WORK) DURING DIWALI HOLIDAYS OF FEMALE DIAMOND WORKERS



LEVEL OF ACTIVITIES(EXTRA WORK) DURING DIWALI HOLIDAYS OF DIAMOND WORKERS

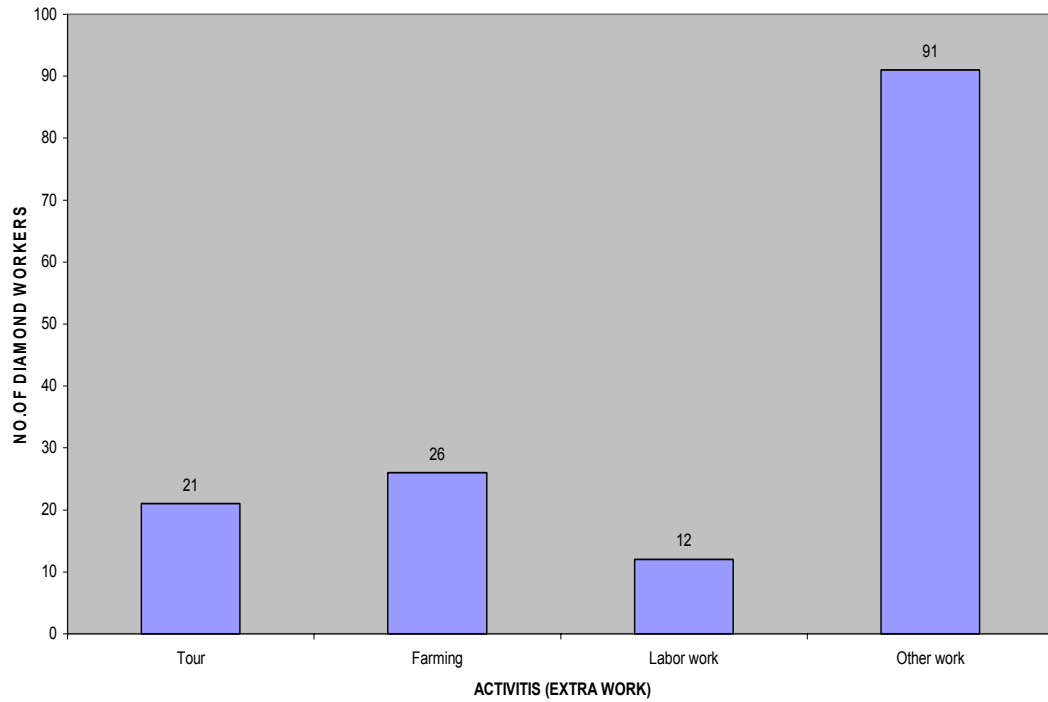


TABLE – 4.23

Distribution of the diamond workers by what they do at Diwali

ACTIVITIES DURING DIWALI	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Tour	19	14.2%	2	12.5%	21
Farming	25	18.7%	1	6.3%	26
Labor work	9	6.7%	3	18.8%	12
Other work	81	60.4%	10	62.5%	91
TOTAL	134	100	16	100	150

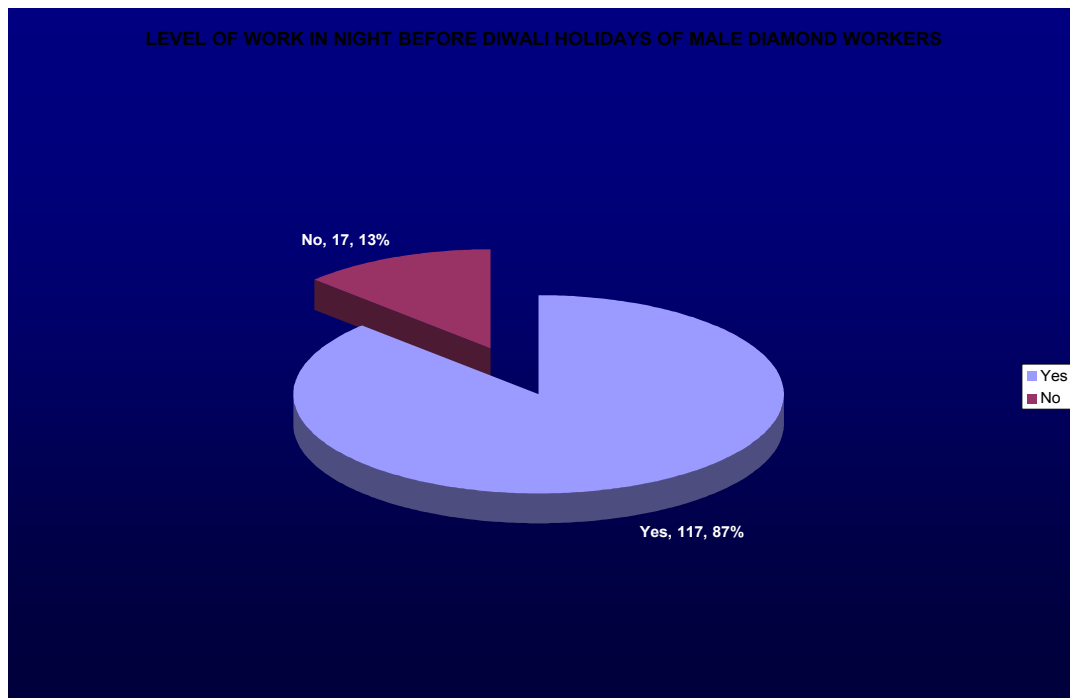
As suggested in the table no. 4.23 14% studied sample diamond workers are joining tour packages during Diwali holidays, 17.33% diamond workers are helping their family members in farming and 8% diamond workers are doing labor work. In male 14.2% and in female 12.5% diamond workers are found of tour but 60.4% males and 62.5% females are doing other types of work during Diwali holidays.

Female diamond workers who are doing other worker are helping their family in household activities and

meet their relatives and male diamond workers take care of their parents and meet their relatives and take rest.

But 18.7 % studied male and 6.3% studied female workers are doing farming work during Diwali holidays and 6.7% studied male and 18.8% studied female male are doing labor work due to their weak economical condition.

CHART NO.: -24



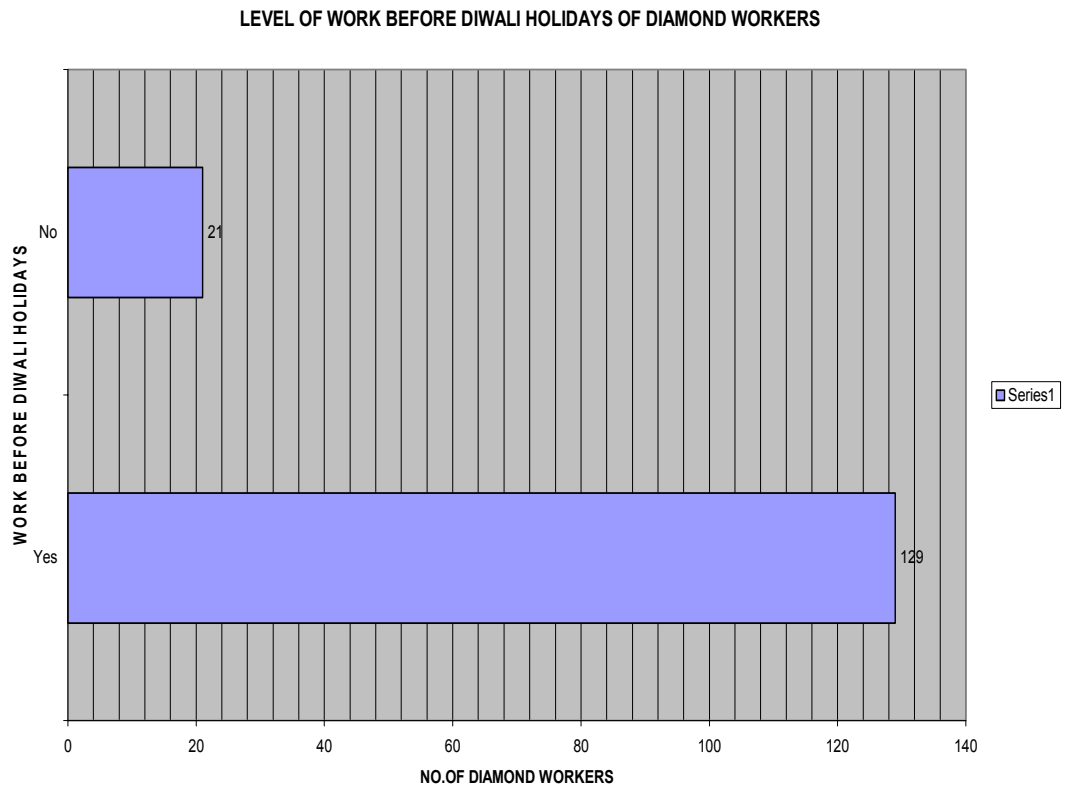
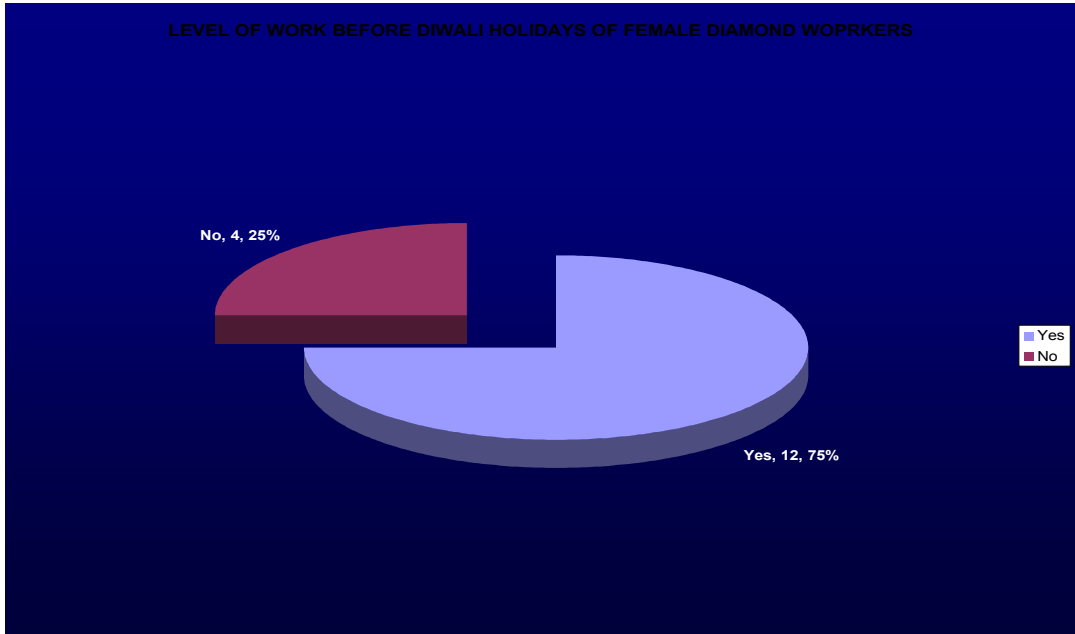


TABLE – 4.24

Distribution of the diamond workers on the basis of night work before Diwali leaves

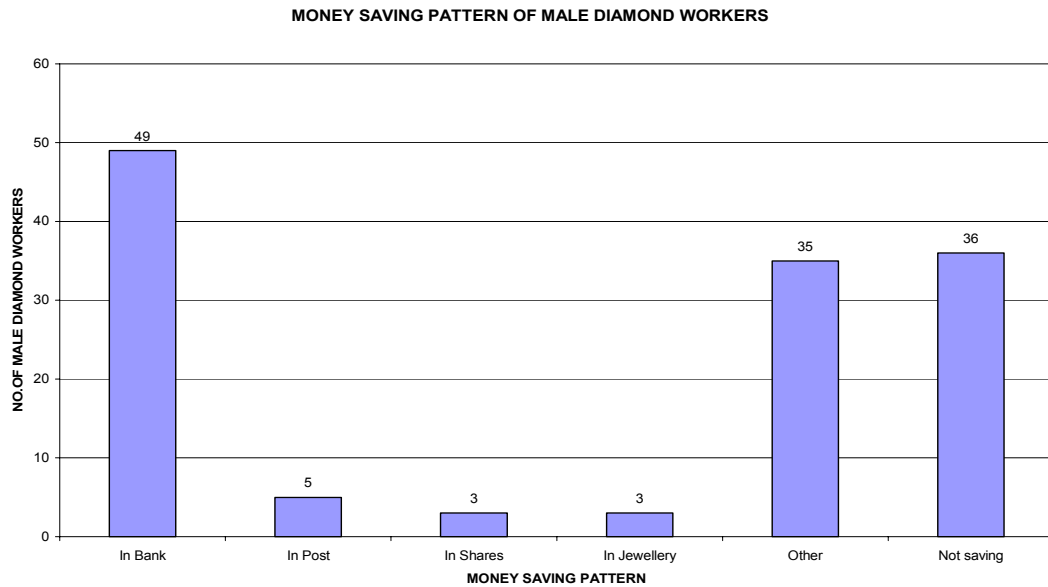
WORK IN NIGHT BEFORE DIWALI HOLIDAYS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	117	87.3%	12	75%	129
No	17	12.7%	4	25%	21
TOTAL	134	100	16	100	150

In this table I have described the information related to the condition of diamond labor of the Gujarat state whether they are to work at night before Diwali holidays? Most of the people say that before Diwali holidays, industrialists take more work from workers and call them to work at night also, but as per the statistics presented in the table, out of the total sampled labor 86% are in favor of this question. They tell that before the Diwali they have to work at night also but industrialists give them wage for that extra work. Rest 14% labors are not getting night work before Diwali by the industrialists because in

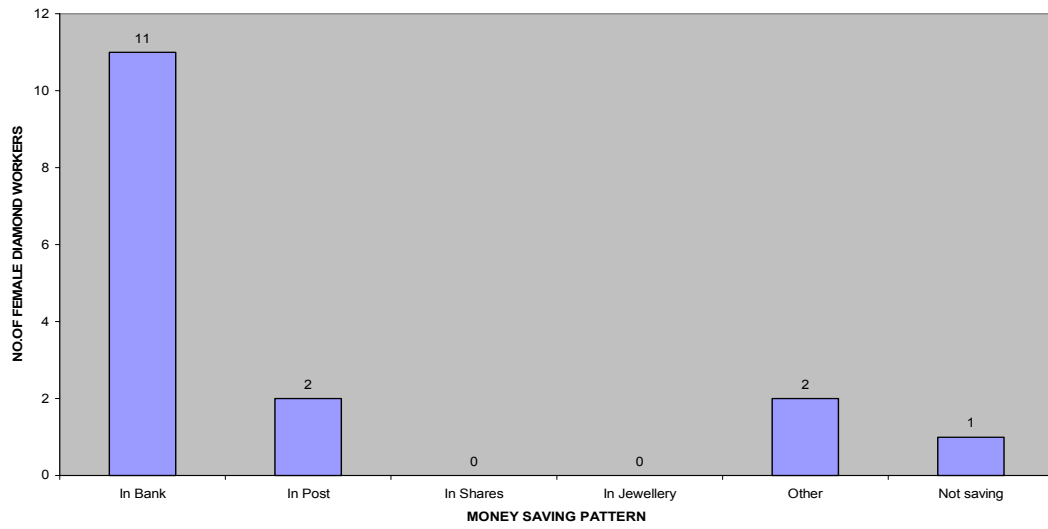
organized sector industrialist run their factory as per routine timetable.

Thus from the details presented in this table that diamond labour are doing night work also before Diwali holidays.

CHART NO.: -25



MONEY SAVING PATTERN OF FEMALE DIAMOND WORKERS



MONEY SAVING PATTERN OF DIAMOND WORKERS

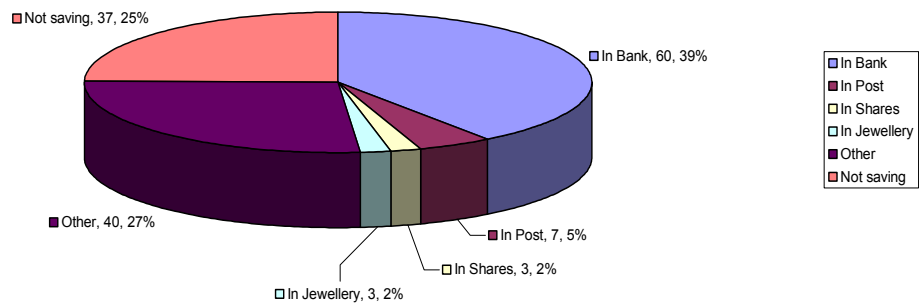


TABLE – 4.25

Distribution of the diamond workers on the basis of money saving pattern

TYPES OF SAVING	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
In Bank	49	36.6%	11	68.5%	60
In Post	5	3.7%	2	12.5%	7
In Shares	3	2.2%	-	-	3
In Jewellery	3	2.2%	-	-	3
Other	35	28.4%	2	12.5%	40
Not saving	36	26.4%	1	6.3%	37
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_1) is accepted and alternative hypothesis (H_0) is rejected.

Table no. 4.25 shows that out of the total no. of sampled diamond workers 37 diamond workers are not habituate to save their earned income. Where rest 75.33% diamond workers are saving their income. Among them 40% are saving in Bank, 4.67% are saving in post, 2% are saving

in Shares, 2% are saving in Jewellery and rest 26.66% are saving their earned income on other way.

Out of the total male 36.6% are saving in Bank, 32.7% are saving in post, and 2.2% in shares, 2.2% in Jewellery and 28.4% are saving in other way. Where as in female 68.5% are saving in bank, 12.5% in post and 12.5% in other way. But no one female is found who is habituate to save her income in Saris and jewellery.

We have studied earlier that most of the diamond workers working in the different types of districts of Gujarat are migrated and more ever they are migrated due to their weak economic condition. Thus, they need to send their most of the earning to their native. Females are also regularly sending their income at their native.

The study of Kiran Desai shows that diamond workers are not saving their income on shares and jewellery but as per this study they are aware about to invest and save their money in shares and jewellery.

As per the discussion made earlier about develop countries. Most of the industries are running on the basis of organized sectors but India is a developing country and here the diamond business is speeded into unorganized sectors. That's why workers are not getting non-financial benefits

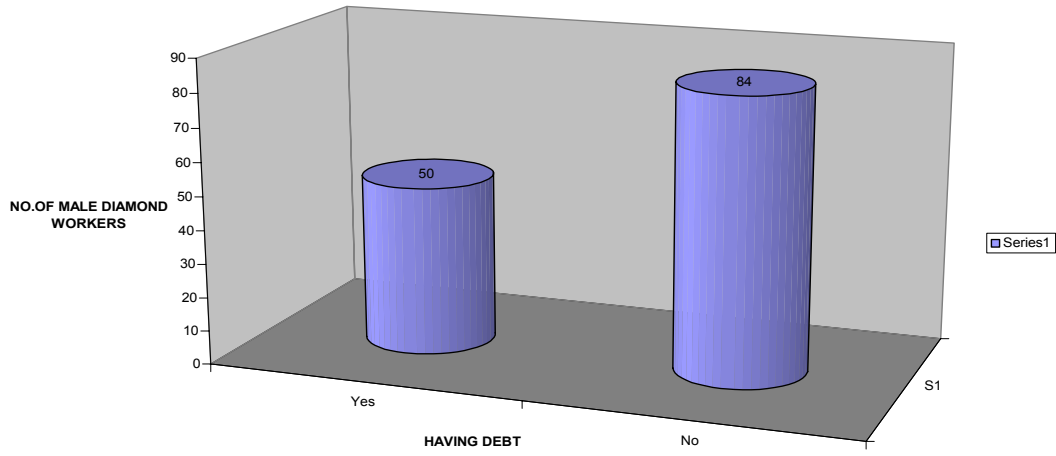
and other types of benefits. Even they are not getting job security also. As far as the social securities are concern insurance is a vital factor. But till the date due to the more and more guidance of government and diamond worker's union they are not prefer to insure their life.

It is an important matter that there are few industrialists is providing insurance to the diamond workers. In this study most of the diamond workers are presenting their opinion that government and industrialists have confoundedly provide insurance securities to the diamond workers. They have to plan out any type of policy regarding insurance and compulsory saving.

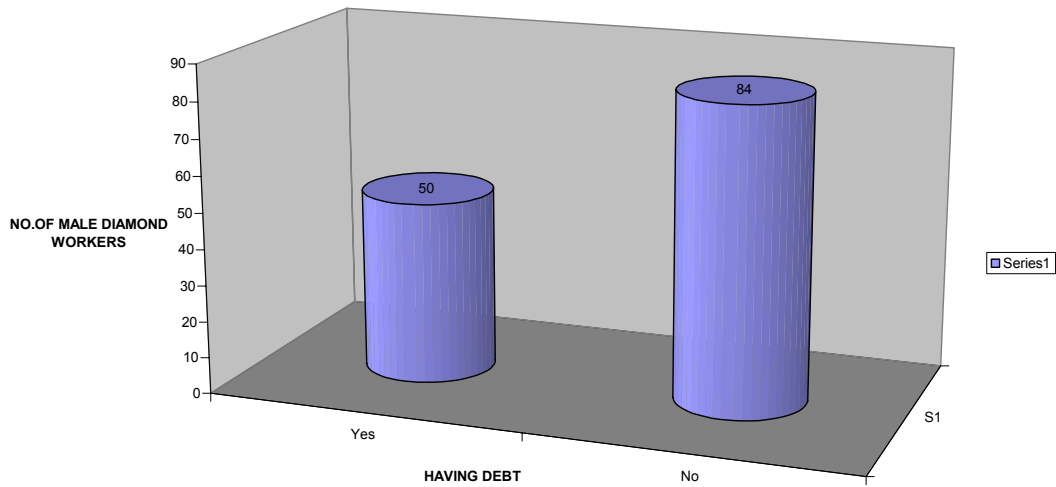
Earlier I have described that in this business labors are getting more wages but some semi skilled workers are not getting much wages to fulfill their primary necessities so they have to take required money on debt. Thus I have tried to know the debt to my studied diamond labor.

CHART NO.: -26

DEBT CONDITION OF MALE DIAMOND WORKERS



DEBT CONDITION OF MALE DIAMOND WORKERS



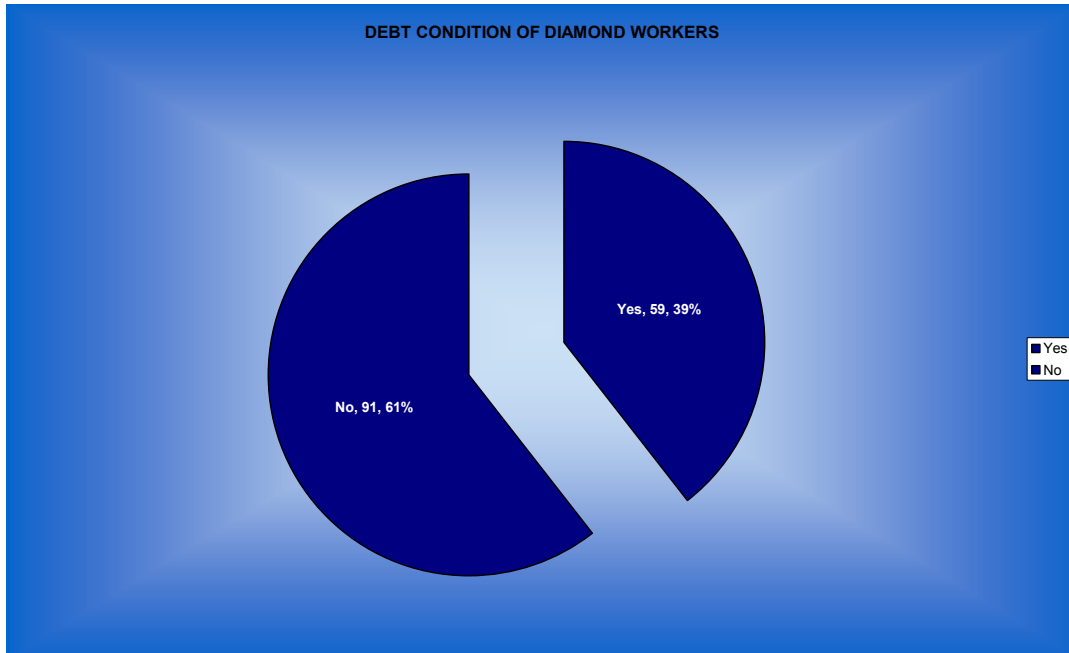


TABLE – 4.26

Distribution of the diamond workers on the basis of debt

DEBT CONDITION	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	50	37.3%	9	56.3%	59
No	84	62.7%	7	43.7%	91
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis (H_1) is accepted and alternative hypothesis (H_0) is rejected.

Table No. 4.26 implies that out of the total numbers of diamond workers 60.67% diamond workers haven't debt. And 39.33% diamond workers having debt. In that male having debts are found 37.3% and without debts are found 62.7% and in female having debts 43.7%.

It clarifies that from the heritage work their economic condition is considered weak. That's why to full fill their primary necessities they required to take money on debt.

It thus finds that the new entrants to the industry are primarily aliens who joined the industry by discontinuing their education or farming business. There is non-evidence that the expansion of the industry would reverse this trend. Even though at the time of the initial entry caste and kinship play an important role and they are not getting financial benefits.

As a traditional, people are habituated to incur debt for fulfilling their primary requirements. At native due to draught they have to sent money at their by incurring debt also but opinion of the diamond workers says that they

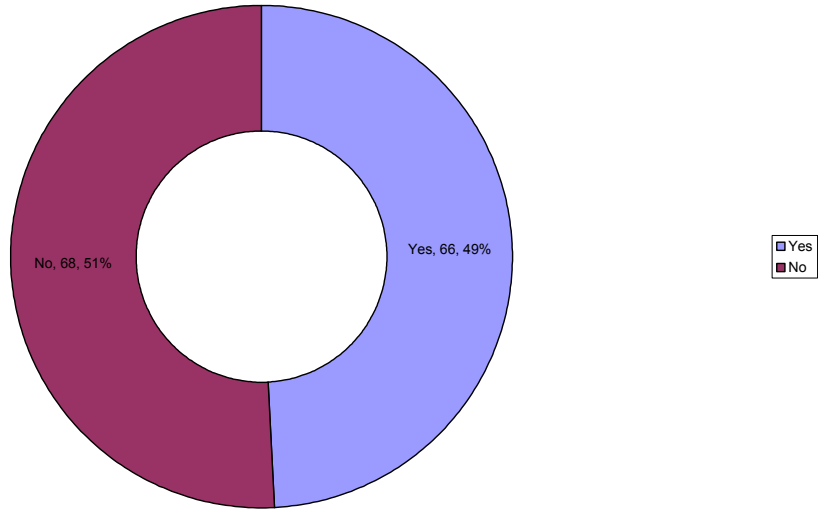
have incurred debt without mortgage and by their relatives, friends and sometimes by owners. They tell that they can get easily debts, from their relatives and friends on interest. Where as in Bank, they have to pass from the legal processors. It's like hesitate to them. That's why they prefer to take debts from their relatives, friends and owners. Whenever owner gives them, they called it **Baki**. Means **Baki** system is also available in this business as per their minor ratio.

It should be added that loan facility is not as widely taken advantages of, as it is available. Majority of the workers are indebted for small sums, not exceeding Rs. 1000 is found.

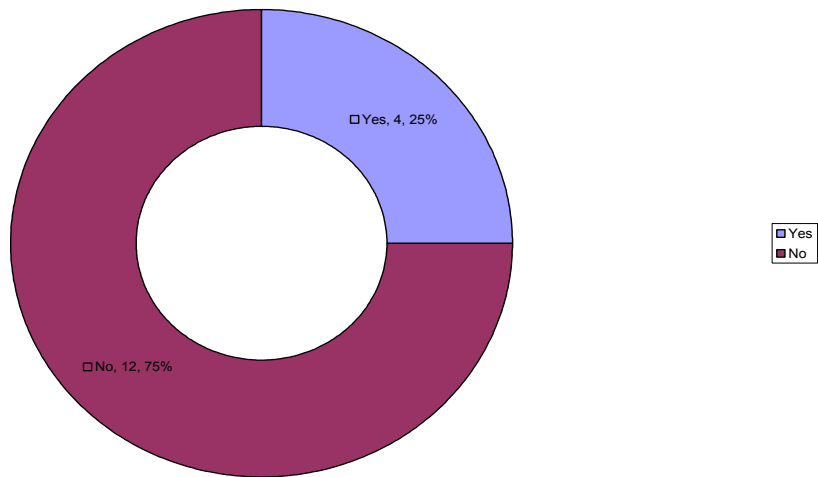
As per the belief, Gujarati people are more enthusiastic. Diamond workers always want to start their own factory in which they must be the owner. So in the under given table I have tried to know the desire of the diamond labor to start their own diamond factory.

CHART NO.: -27

LEVEL OF DESIRE OF MALE DIAMOND WORKERS TO START A FACTORY



LEVEL OF DESIRE OF FEMALE DIAMOND WORKERS TO START A FACTORY



LEVEL OF DESIRE OF DIAMOND WORKERS TO START A FACTORY

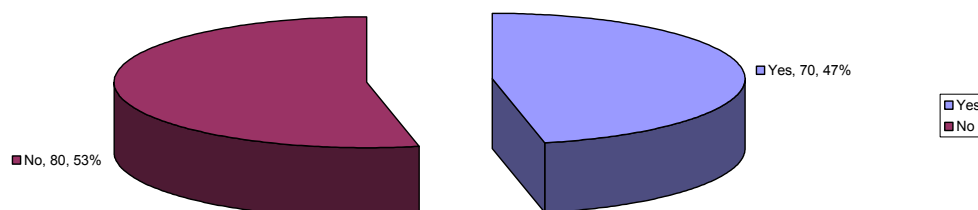


TABLE - 4.27

Distribution of the diamond workers on the basis of their desire of establishing their own diamond factory

	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	66	49.3%	4	25%	70
No	68	50.7%	12	75%	80
TOTAL	134	100	16	100	150

From the above table we can be aware about the desire of establishing own diamond factory of the diamond workers. By the total numbers of sampled diamond workers

46.67% diamond workers have desire to establish their own diamond factory in future. It shows that diamond workers are not much enthusiastic to start their own diamond factory in future. Out of the total sampled male diamond worker 49.3% are thinking to start their own factory and 50.7% are not thinking to be an owner of the factory. Where as in female diamond workers only 25% females are thinking to be an owner of the factory and rest 75% haven't any types of desired to start her own diamond cutting and polishing factory.

The statistics of the table shows that only 46.67% workers of the diamond industry of Gujarat state are found entrepreneur. It is tell that Gujarati people are highly enthusiastic in the business sector and they are known as higher entrepreneur. This statement is going to be proved here in this study.

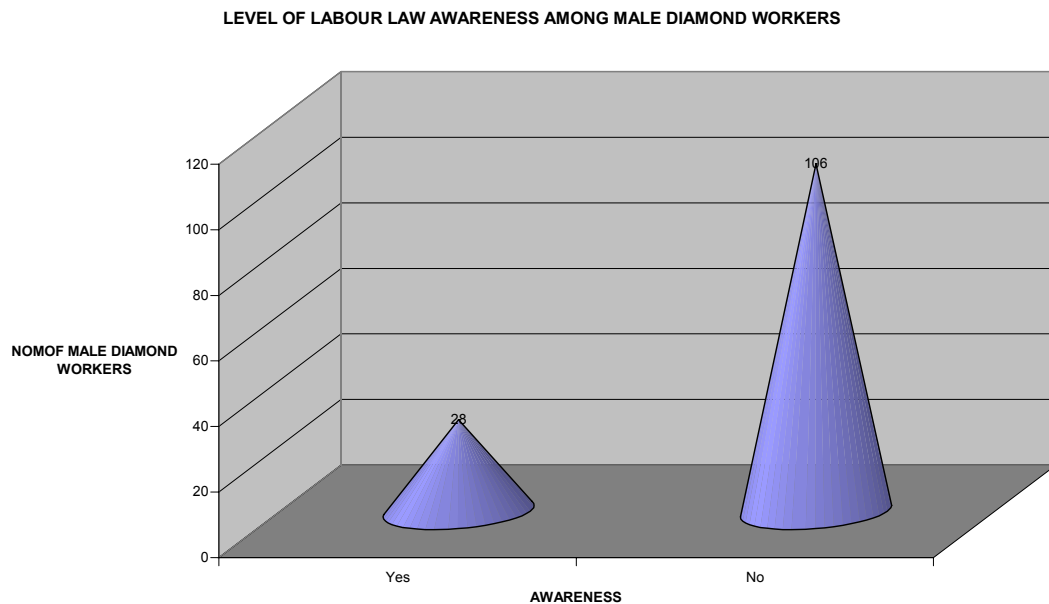
Diamond industrialists are earning more and more from this business and they are fulfilling some how social responsibility also and famous in their reason. Thus, diamond workers are also wants to be like them.

Government is also very interesting to create new entrepreneurs in this business. Banks are also providing financial facilities to them. So, it becomes very easy for the entrepreneur to start his own factory in this business. There

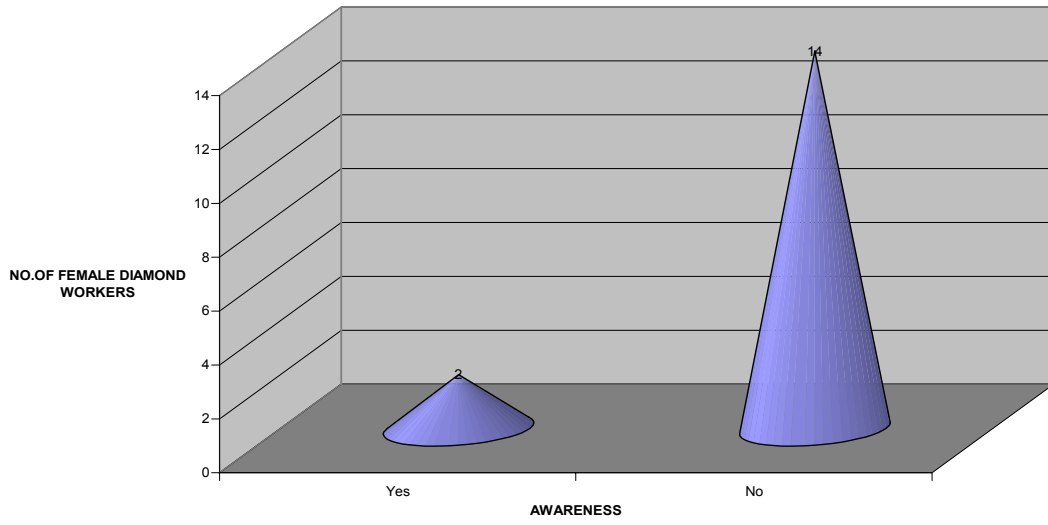
are near about 30000 to 40000 diamond units are running in Gujarat state without any types of registration. In this direction, it shows that government is also imposing open trade policy in this business to make this business-organized business.

In the following table I have described an important matter about the labor law. With that table I have tried to know the awareness among the studied labor about the labor law.

CHART NO.: -28



LEVEL OF LABOUR LAW AWARENESS AMONG FEMALE DIAMOND WORKERS



LEVEL OF LABOUR LAW AWARENESS AMONG DIAMOND WORKERS

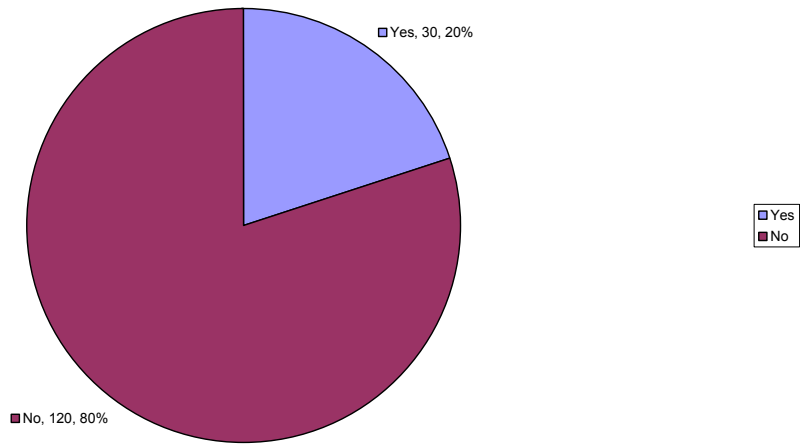


TABLE – 4.28

Distributions of the diamond workers on the basis of the awareness about the labor law

LABOR LAW AWARENENESS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	28	20.9%	2	12.5%	30
No	106	79.1%	14	87.5%	120
TOTAL	134	100%	16	100%	150

Table no. 4.28 gives important information related to the awareness about the labor laws among the diamond labors of the Gujarat state. Weather diamond workers are known the rules and regulations of the labor law or not. As per the statistic 80% diamond workers haven't any types of knowledge about the labor law. Their opinions say that no one is providing them information related to the labor law. They are fully unaware about this law. Where as 20% diamond workers are identified having knowledge of labor law. As per their opinion, they could be aware about the labor law from their owners in the organized sectors by seminars and tell that their owners are sight holders of the DTC and as per the ruler of that institute owners should have to give them knowledge about

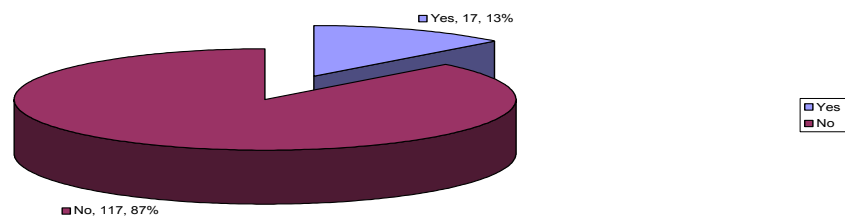
the labor law thus they are somehow aware about the labor law.

Here, in this study according to their opinion diamond industrialist who entitled the sightholdership of diamond trading company are mostly proceeding the information regarding labor law to their workers, Industrialists are organizing seminars and programmed regularly and providing them knowledge about life style, labor law and some socialize rules also.

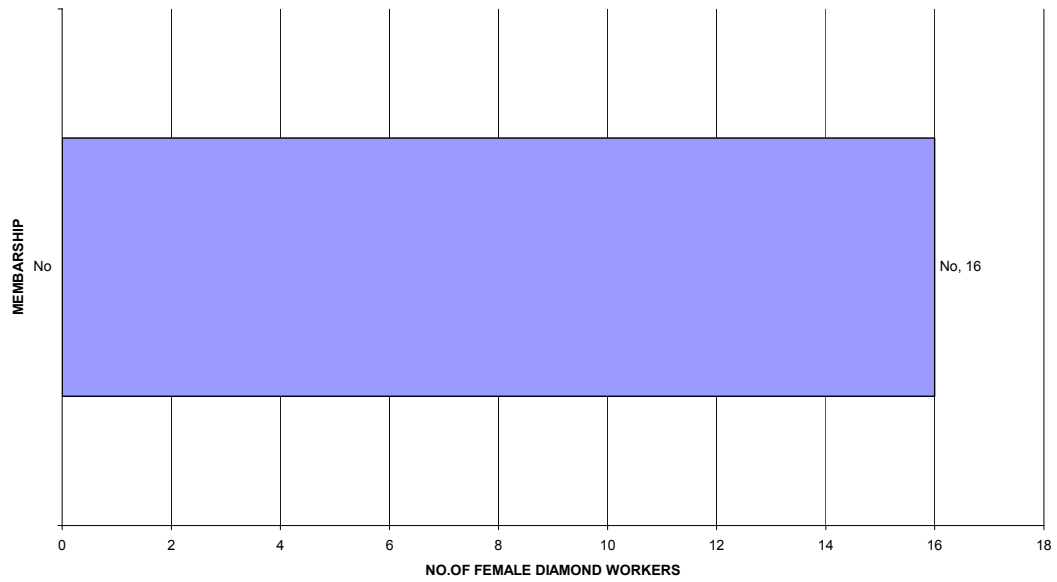
By the awareness about the labor law among the diamond labor, I came to the point that most of the workers are found unknown about the labor law but question is that Are they member of any labor union or not? The answer about this question is presented in the bellowed table.

CHART NO.: -29

LEVEL OF MEMBERSHIP IN LABOUR UNION OF MALE DIAMOND WORKERS



LEVEL OF MEMBARSHIP IN LABOUR UNION OF FEMALE DIAMOND WORKERS



LEVEL OF MEMBARSHIP IN LABOUR UNION OF DIAMOND WORKERS

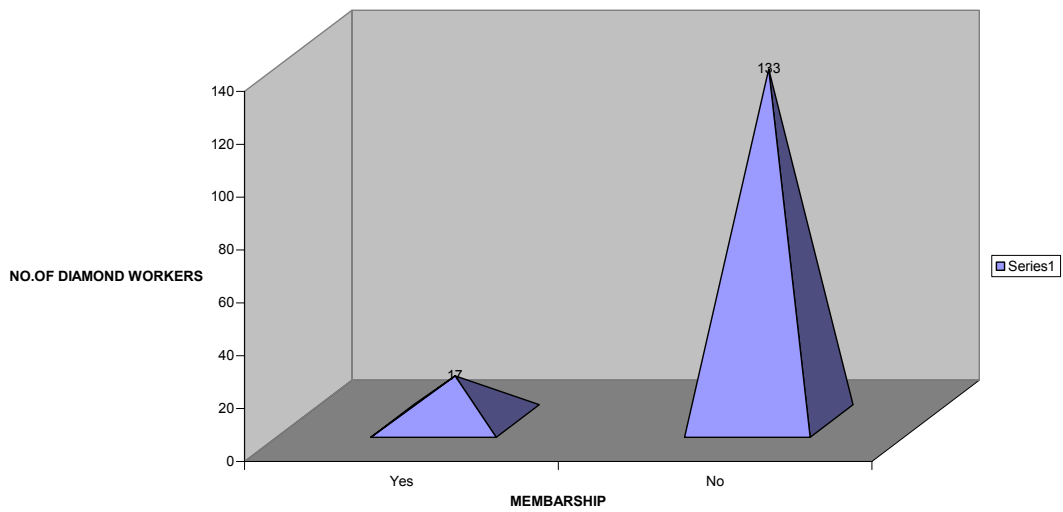


TABLE – 4.29

Distribution of the diamond workers on the basis membership in labor union

MEMBER	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	17	12.7%	-	-	17
No	117	87.3%	16	100%	133
TOTAL	134	100	16	100	150

This table specifies the details regarding the membership in labor union of the diamond workers.

In this presented statistics 88.07% diamond workers have not joint any labor union and they are not a member of any labor union and 11.33% diamond workers are found to be a member of labor union.

By the statistics not a single woman in found with a membership in the labor union. According to their opinion labor unions are helping us to solve our problems where as out of studied male diamond workers 12.7% diamond workers are giving their positive answers about

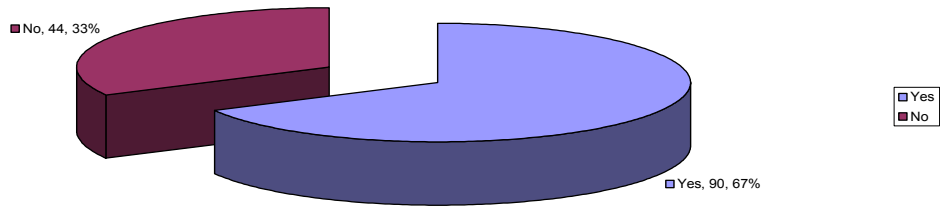
labor union. As per their opinion, many times they are benefited from the labor unions.

Gujarat having the diamond sector to provide more and more employment to unemployed people has many labor unions in this sector like Ratnakalakar Sangh, Navasari diamond association, Surat diamond association, Bhavnagar diamond association, Amareli diamond association, Ahmedabad diamond Association etc. but workers are not ready to join more and more to take the support of the labor union and don't want to make strengthen their labor union.

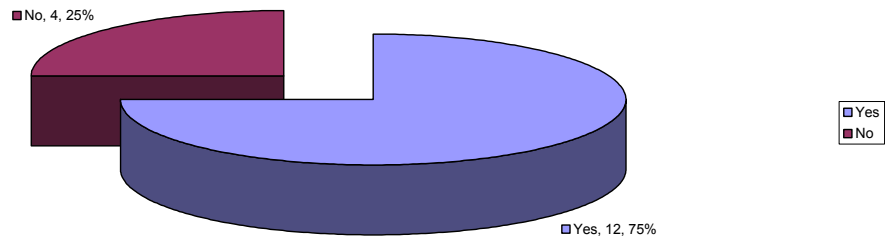
In unorganized sector labor are not getting the benefits as received by the organized sector's labor. It is clear as per the human resource is concern, when employers are not getting extra benefits from their owner at that time they feel dissatisfaction during their work so their interest with their work decreased. Diamond workers are doing hard work so there should be some personal problems among them. Thus in the following few tables I have presented their problems.

CHART NO.: -30

REST AND SLEEP CONDITION OF MALE DIAMOND WORKERS



REST AND SLEEP CONDITION OF FEMALE DIAMOND WORKERS



REST AND SLEEP CONDITION OF DIAMOND WORKERS

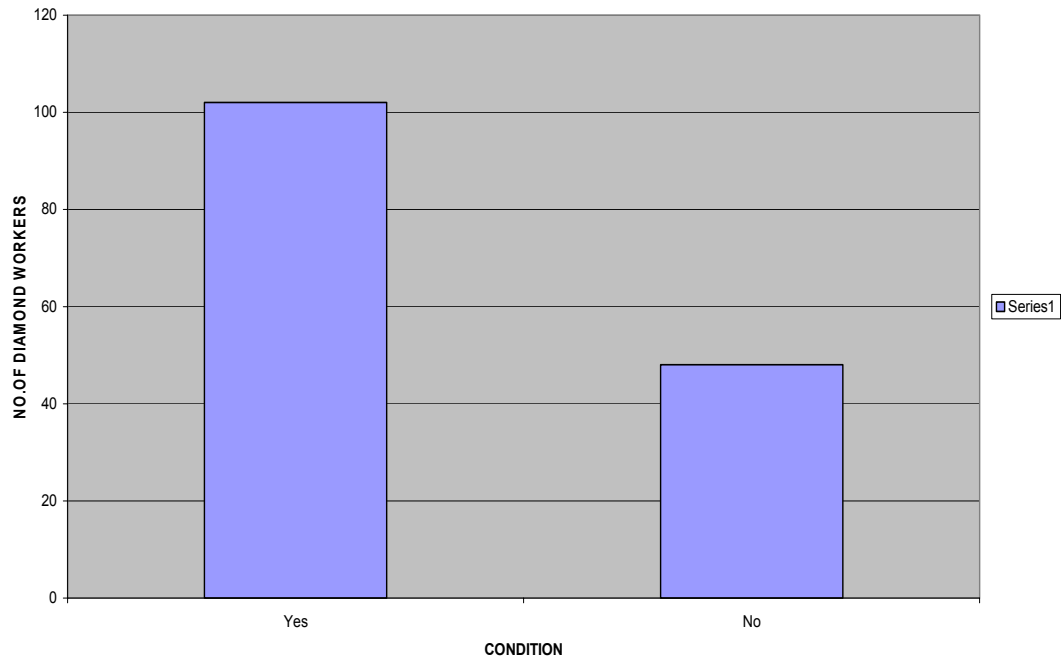


TABLE – 4.30

Distributions of the diamond workers on the basis of less sleep and rest during the work

REST AND SLEEP CONDITION	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	90	67.2%	12	75%	102
No	44	32.8%	4	25%	48
TOTAL	134	100	16	100	150

Above table clarify that out of total diamond workers 68% diamond workers are feeling less sleep and less rest due to working in this business. In that 67.2% male diamond workers 75% female diamond workers are included. More ever in the female diamond workers 25% female are getting proper sleep and rest by working in this industry and 32.8% male diamond workers are also getting proper sleep and rest.

We have been already aware about the time of work in which diamond workers are working. Most of the diamond workers are doing 10 hours work per day that's why they feel tolerance at the end of the day and due to the continuous work burden they are mentally feel tiredness. So, sometimes they feel dissatisfaction in relation to these types of work.

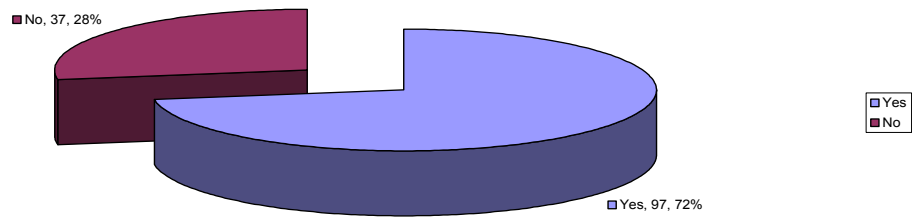
Due to the modernization in the diamond industry, Industrialists do not require more than 10 working hours per day. Some of the factories are running only 8 hours per day. As far as the question of less sleep and less rest is concern, government has to put up some measures regarding this problem.

Some times diamond workers are feeling suffocation due to the arrangement of the many Ghanties in a room so here another problem is required to discuss about

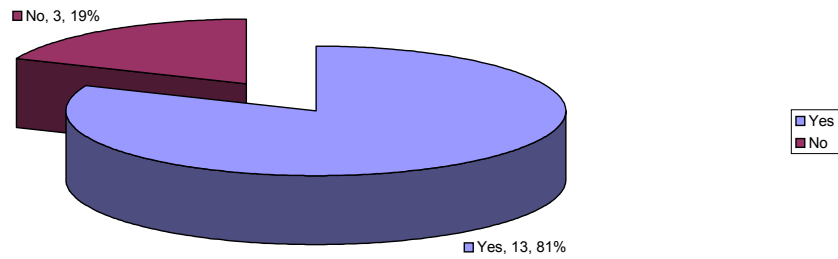
that. The bellowed table gives us information about those types of problems in the studied labor.

CHART NO.: -31

LEVEL OF SUFFOCATION PROBLEM DURING THE WORK OF MALE DIAMOND WORKERS



LEVEL OF SUFFOCATION PROBLEM DURING THE WORK OF FEMALE DIAMOND WORKERS



LEVEL OF SUFFOCATION PROBLEM DURING THE WORK OF DIAMOND WORKERS

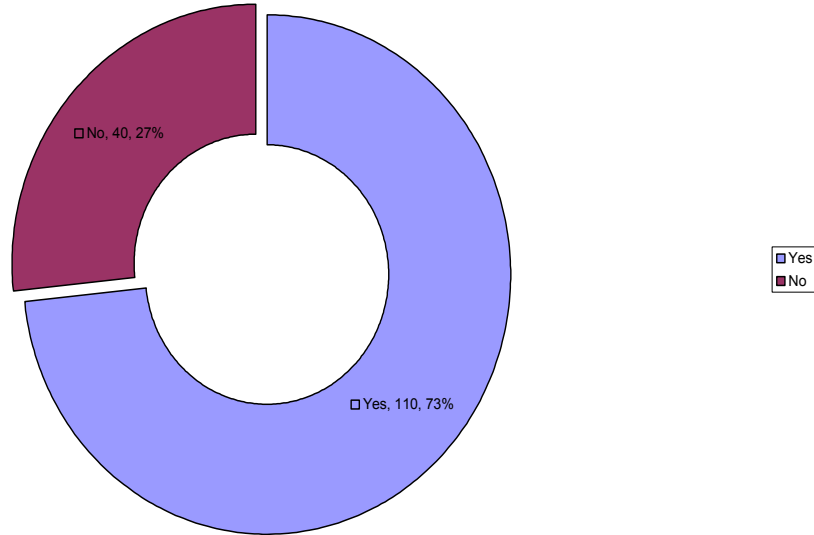


TABLE - 4.31

Distributions of the diamond workers on the basis of the suffocation due to the arrangement of many *Ghanties* in a working room

SUFFOCATION	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	97	72.4%	13	81.3%	110
No	37	27.6%	3	18.7%	40
TOTAL	134	100	16	100	150

As mentioned in table no. 4.31, 73.33% diamond workers are feeling the problem of suffocation due to the

arrangement of many *Ghanties* in a room and 26.67% diamond workers are not feeling suffocation due to the arrangement of many *Ghanties* in a working room.

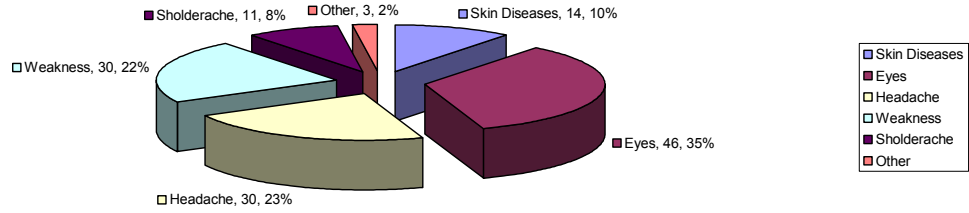
This study shows that there are arrangement of many *Ghanties* in a single room that's why they are getting less sleep and rest and also feeling the problem of suffocation. This affects directly on the productivity of the business. There are 73.33% workers feeling suffocation problem where as 26.67% diamond workers are found without suffocation problem. They are not feeling any types of problems during their work about the arrangement of *Ghanties* in a single room. As per their view they have wide space between two *Ghanties* but they are found to be working in the organized industry. It shows that suffocation problem is experiences only to those workers who are working in the unorganized industry only.

This is the only problem, which can be solved due to the government policy. If Government implies the policy regarding plant layout, this problem will be automatically solved.

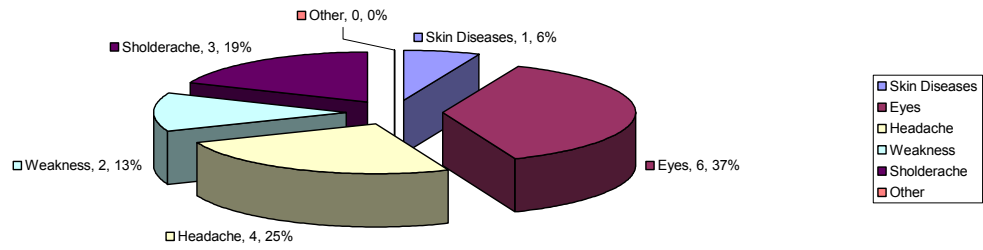
The following table gives the information related to the individual problems of the diamond workers on the job and out of the job.

CHART NO.: -32

HEALTH PROBLEMS TO MALE DIAMOND WORKERS



HEALTH PROBLEMS TO FEMALE DIAMOND WORKERS



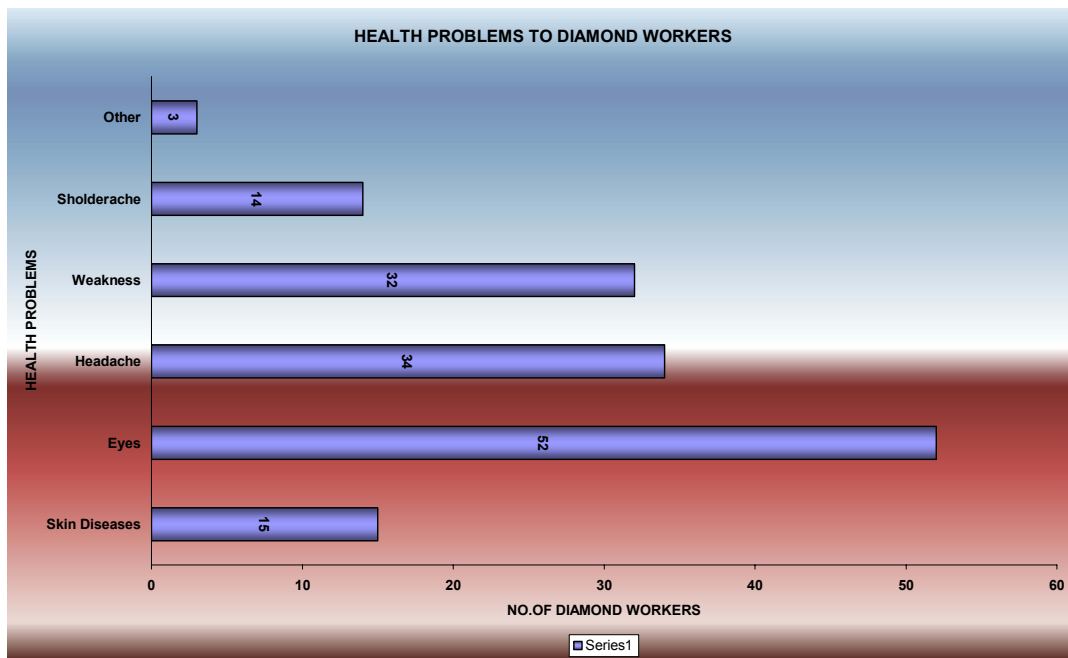


TABLE – 4.32

Distributions of the diamond workers on the basis of the health problems

PROBLEMS	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Skin Diseases	14	10.4%	1	6.3%	15
Eyes	46	34.3%	6	37.5%	52
Headache	30	22.4%	4	25%	34
Weakness	30	22.4%	2	12.5%	32
Shoulder ache	11	8.2%	3	18.8%	14
Other	3	2.2%	-	-	3
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis is accepted and alternative hypothesis is rejected.

As per the details presented in the above table no. 4.32 diamond workers are feeling many types of problems in this business. 10% diamond workers are suffering by skin disease and 34.67% diamond workers are feeling eyes problems. They are suffering with eye problems because they are doing very hard work of cutting and polishing of diamond. When they are cutting and polishing the diamond at that time diamond dust escaped and it affect to their health most. Probably it affects to their eyes, 22.67% diamond workers are suffering with the problem of headache, 21.33% diamond worked are feeling weakness problem, 9.33% diamond workers have Shoulder ache and 2% haven't declared their problems.

As per this study, all the studied female workers are feeling health problems. Male diamond workers are found to young that's why they are much healthier than female diamond workers.

In the other problems they are feeling the problems in relation to the provident fund, lack of unionism, leave against illness and delivery case etc. Most of the diamond units are running on the basis of unorganized

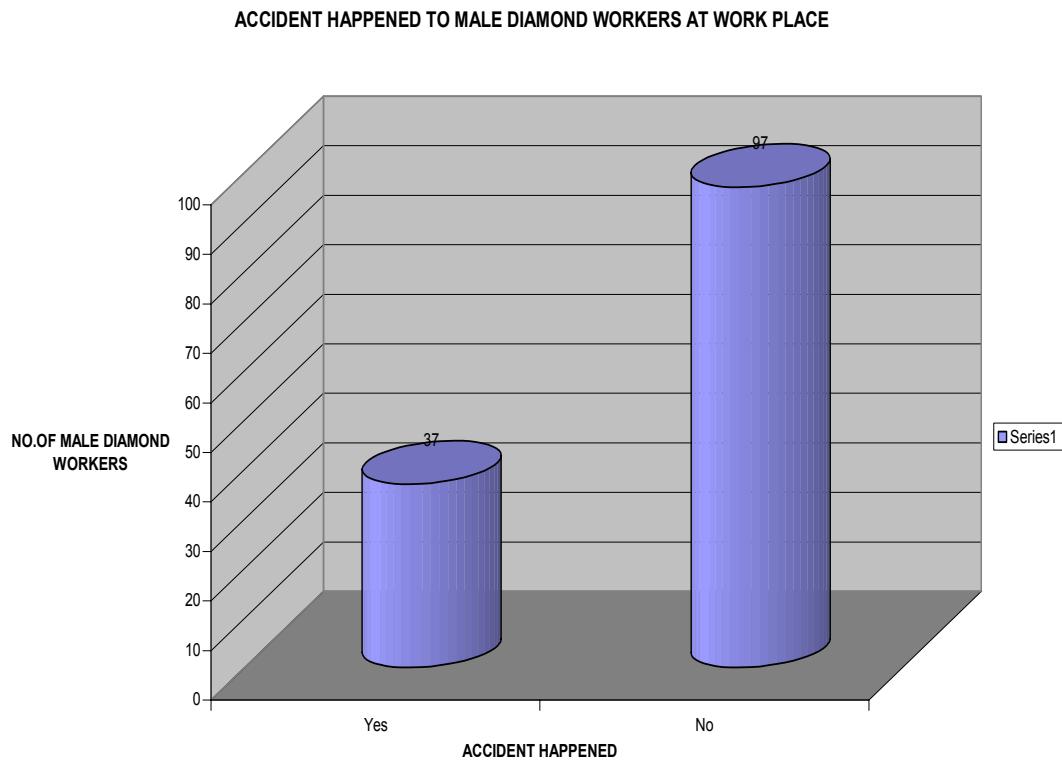
sectors. That's why diamond workers are not getting the benefits of social safety, provident fund, illness and delivery leaves. Henceforth, most of the diamond workers want such types of facilities. If government takes some measures regarding these types of problems then diamond workers can get their desired facilities.

In other problems most of the diamond workers are getting hard diamond in their work that's why productivity is decreased. If government implies a new policy of qualitatively diamond they can get soft diamond for cut and polish.

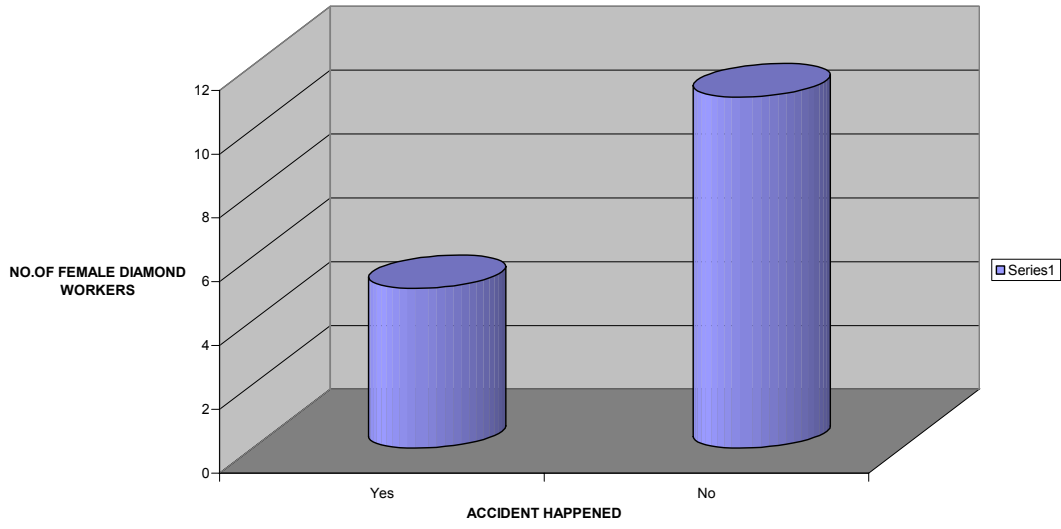
Out of the total male diamond workers 8.2% male diamond workers have declare job security problem and 18.8% female diamond workers have also told about the job security problems. They are not getting security of services in this business. Whenever owner wants to kick out them at that time they can kick out. That's why they every feel this types of problems. Weakness is also considered as problems because they have told me that due to the whole day's hard work, they feel weakness at the end of the day and told that they feel somehow good also because of the end of the day. They are feeling pollution problems also because there are many numbers of the diamond factory, which produces the noise pollution, and in some of the factory workers have parking problem also.

After getting the knowledge, it's important to know that is their any accident happened at their working place or not? Bellowed table provides the information related to the accident happened during the work into the factor.

CHART NO.: -33



ACCIDENT HAPPENED TO FEMALE DIAMOND WORKERS AT WORK PLACE



ACCIDENT HAPPENED TO DIAMOND WORKERS AT WORK PLACE

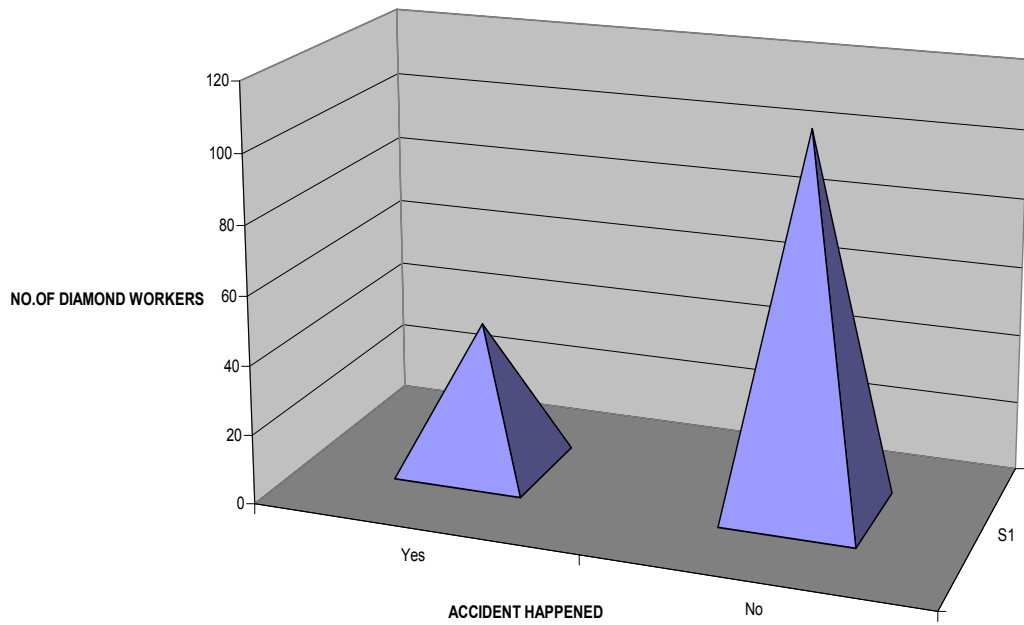


TABLE – 4.33

Distribution of the diamond workers on the basis of an accident happened at their working place

HAPPENING OF AN ACCIDENT	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	37	27.6%	5	31.3%	42
No	97	72.4%	11	68.7%	108
TOTAL	134	100	16	100	150

Table no. 4.33 shows that 72% diamond workers have not experienced any accident at the working place whereas 28% diamond workers have experienced an/the accident/s at the working place.

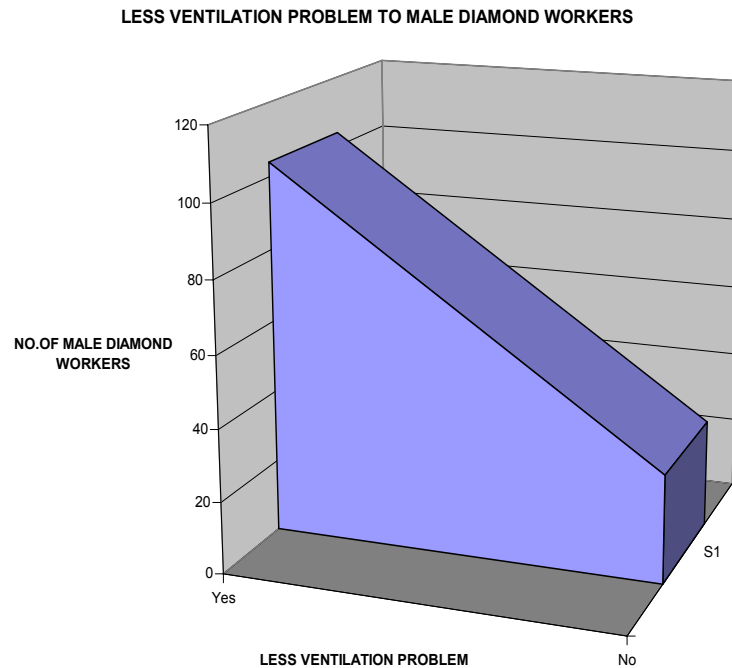
Now from this table it becomes clear that due to the modernization of this business, workers are not experiences about an accident at their working place.

Out of the total sampled male diamond workers 27.6% are in favor of an accident happened at their factory and 72.4% are against where as 31.3% females are giving

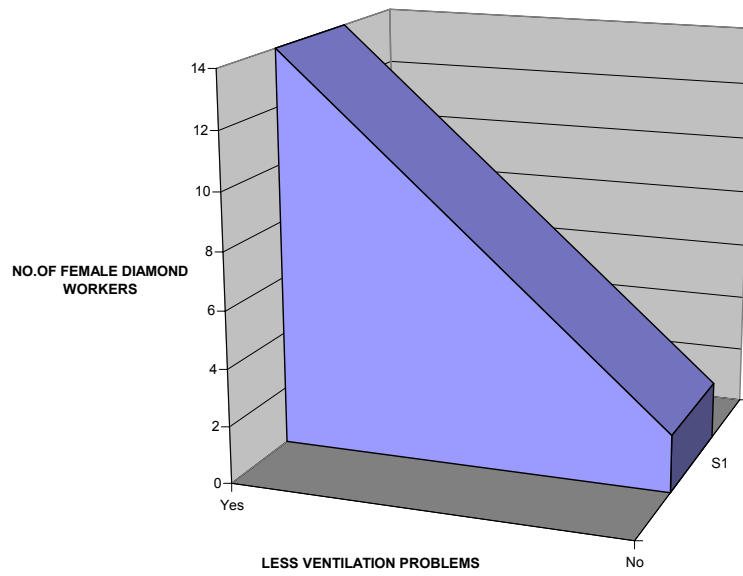
favorable opinion and 68.7% females are also saying that they don't think any accident take place at work place.

Earlier discussion is made about the feeling of suffocation problem due to the arrangement of many Ghanties in single room, but it is also become vital to be aware that due to the this types of problem they are getting proper ventilation or not.

CHART NO.: -34



LESS VENTILATION PROBLEMS TO FEMALE DIAMOND WORKERS



LESS VENTILATION PROBLEMS TO DIAMOND WORKERS

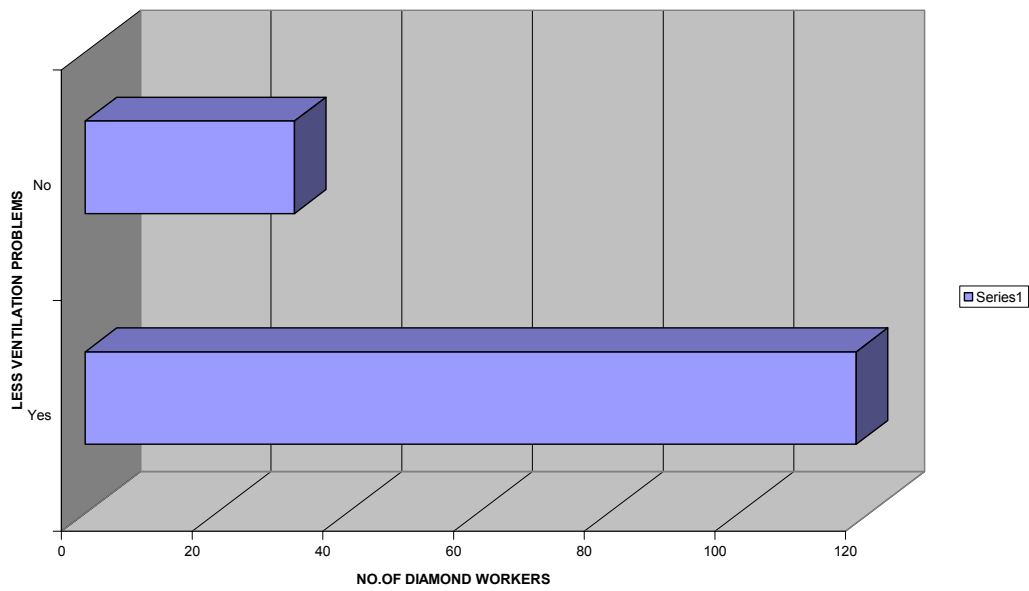


TABLE – 4.34

Distribution of the diamond workers on the basis of less ventilation

LESS VENTILATION	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	104	77.6%	14	87.5%	118
No	30	22.4%	2	12.5%	32
TOTAL	134	100	16	100	150

Information related to the less ventilation at work place is known from the table no. 4.34. Out of the total sampled diamond workers 76.67% diamond workers one feeling the problem of less ventilation and 21.33% diamond worker are working in those types' factories in which they get full ventilation. Out of the total sampled male diamond workers 77.6% diamond workers are getting less ventilation and 22.4% male diamond workers are getting fully ventilation where as in female diamond workers 87.5% found less ventilation and 12.5% found fully ventilation.

As far as the question of less ventilation is concerned it is due to the arrangement of many Ghanties in a room. According to Pratimaben Vyas's study 46% diamond

workers were not getting proper air and light and 80% were feeling the problem of suffocation. This statement is proved as per the opinion of our studied male and female diamond workers.

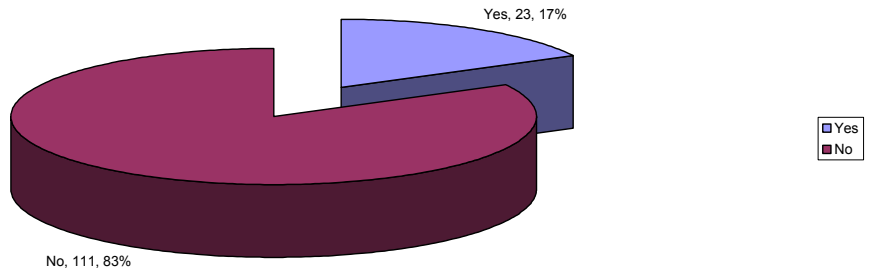
Most of the diamond workers are complaining about proper working condition. They have less toilet facilities; they feel tolerance due to the density of working in a single room. They are telling that they want separate working room for male and female diamond workers.

It is to be said from our study whether government can solve their problems like separate toilet facilities, separate working room for male and female workers, proper air and lighting facilities, distance between two Ghanties etc. we absolutely grow our business and provide satisfaction to the diamond workers and productivity will also increase.

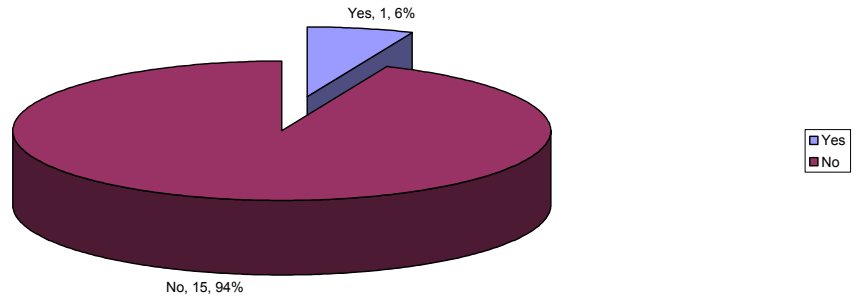
As far as the personal problem is concern it is also important to know their behavior. I have tried to know their behavior by negative point of view that they quarrel with their work partner? The solution about this question is analyzed in the following table.

CHART NO.: -35

LEVEL OF MALE DIAMOND WORKERS QUARRELED WITH WORK PARTNER



LEVEL OF FEMALE DIAMOND WORKERS QUARRELED WITH WORK PARTNER



LEVEL OF DIAMOND WORKERS QUARRELED WITH WORK PARTNER

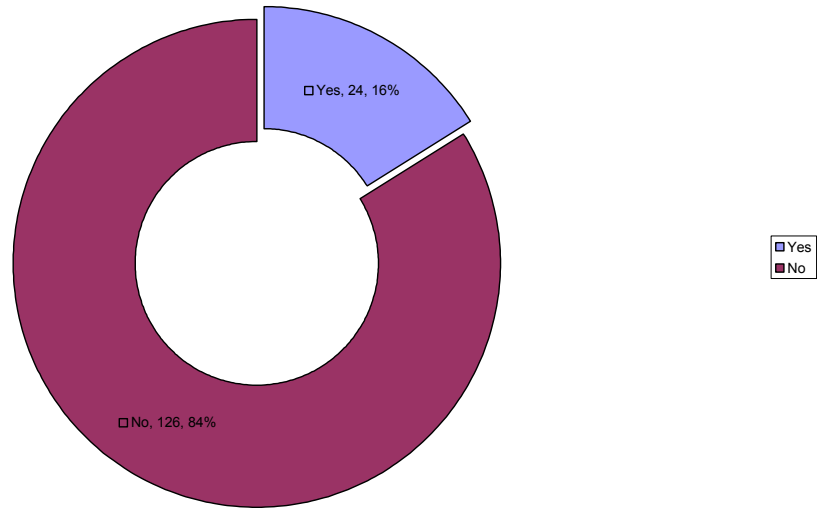


TABLE – 4.35

Distribution of the diamond workers on the basis of quarrel with work partner

QUARREL WITH WORK PARTNER	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	23	17.2%	1	6.3%	24
No	111	82.8%	15	93.8%	126
TOTAL	134	100	16	100	150

Table No. 4.35 specify that out of the total studied diamond workers 84% diamond workers are not quarrelling with their work partner and 16% diamond workers are quarrelling with their work partner. Among them 17.2% male diamond workers are quarrelling and 82.8% diamond workers are not quarrelling with their job partner. Whereas in female diamond workers 6.3% are quarrelling and 93.8% are not quarrelling with their work partner.

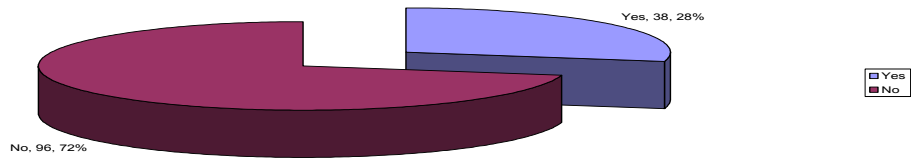
It shows that the behavior and attitude of the diamond workers is found good. 84% are not quarrelling with their job partner. At the time of the personal interview most of the diamond workers have answered very satisfactory but some have not responded much satisfactorily.

It is clear that they sometimes quarrelling with their work partner but more over I have found that they care about their behaviors and attitudes are good. Are they taking care about their health?

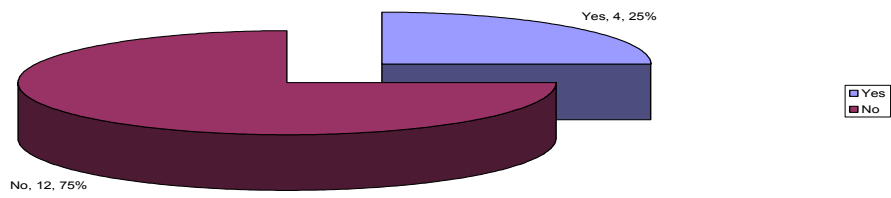
I have tried to be aware about their health problem especially in stomach.

CHART NO.: -36

LEVEL OF STOMACH PROBLEM TO MALE DIAMOND WORKER



LEVEL OF STOMACH PROBLEM TO FEMALE DIAMOND WORKERS



LEVEL OF STOMACH PROBLEM TO DIAMOND WORKERS

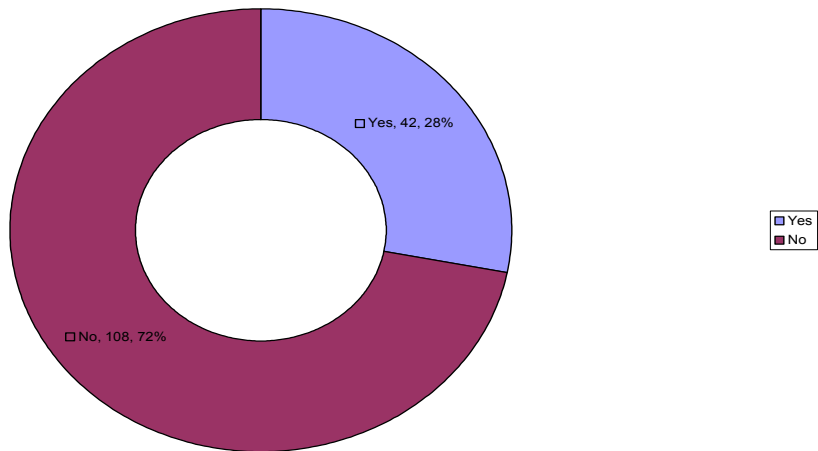


TABLE – 4.36

Distributions of the diamond workers on the basis of stomachache

STOMACHACHE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	38	28.4%	4	25%	42
No	96	31.6%	12	75%	108
TOTAL	134	100	16	100	150

Table no. 4.36 gives the details regarding the stomach problems felled by the studied diamond workers.

Out of the total studied diamond workers 72% are not feeling stomach problem. And 28% have felt stomach problem many times. Out of the male diamond workers 28.4% and female diamond workers 25% have felled stomach problem whereas out of male diamond workers 31.6% and female diamond workers 75% have not felled stomach problem.

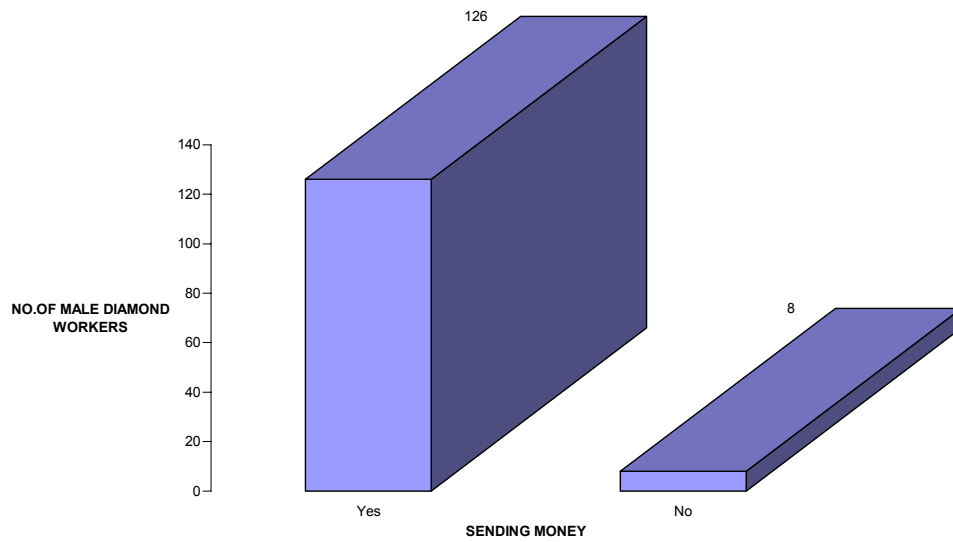
On the basis of this table the result comes that most of the diamond workers are taking purely care about their health. So, they are saying that the health of the

diamond worker is looking good but social safety what they are getting is not satisfactory.

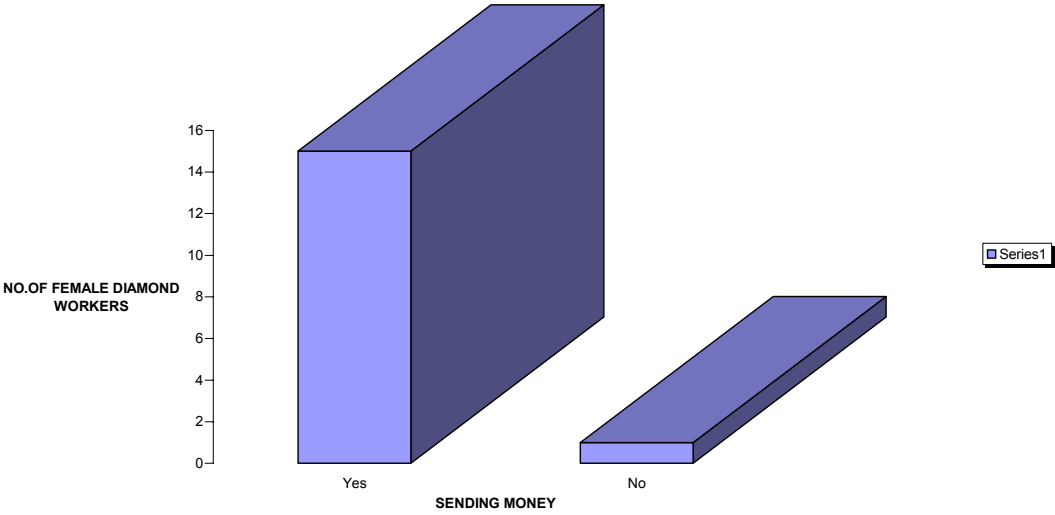
Majority of the workers are come from the rural areas having their roots mainly in the farming. New entrants in the industry are primarily aliens who joint the industry by discontinuing their education and or farming business. So at native due to their families' weak financial position sometimes they have to send their earning to their family members at their native.

CHART NO.: -37

MALE DIAMOND WORKERS WHO ARE SENDING MONEY AT NATIVE



FEMALE DIAMOND WORKERS WHO ARE SENDING MONEY AT NATIVE



DIAMOND WORKERS WHO ARE SENDING MONEY AT NATIVE

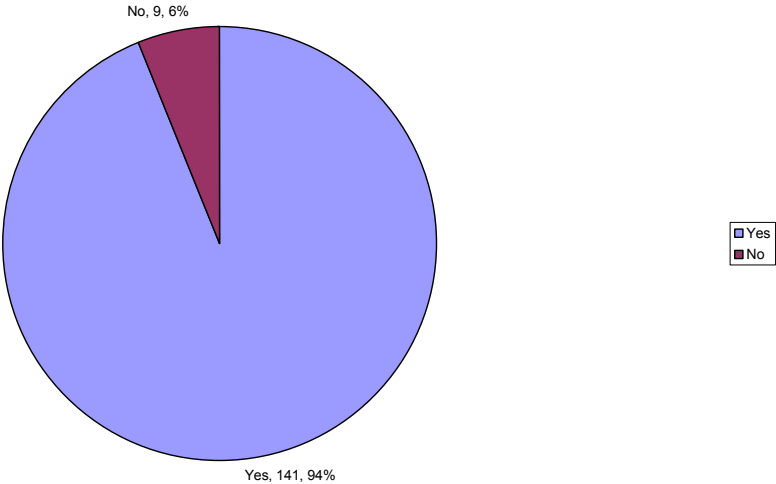


TABLE – 4.37

Distributions of the diamond workers on the basis of sending money at native

SENDING MONEY AT NATIVE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	126	94%	15	93.8%	141
No	8	6%	1	6.2%	9
TOTAL	134	100	16	100	150

As mentioned in the statistics of table no. 4.37, 94% diamond workers are sending their income to their native place and 6% diamond workers are not sending their income at their native in that 94% male and sending their earning to their native and 6% and not sending where as in female diamond worker 93.8% are sending their earning to their native and 6.2% are not sending.

It is significant to mention that poverty as defined usually dose not appear to be a function of income only. Almost two-fifth of the diamond workers are identified poor have income considerably above the poverty line and one

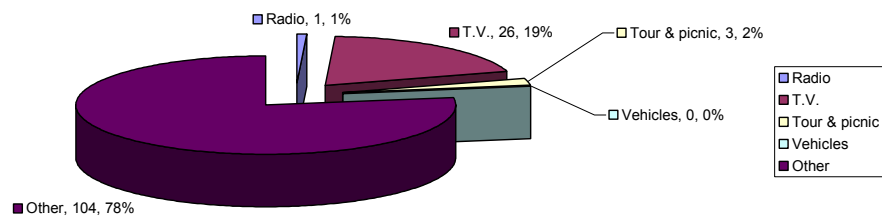
third of studied workers are not spending much as they earn.

Most of the diamond workers are found to be migrated whose economic condition is found weak so that they have to take the decision of migration for more earning. At native sometimes they have to feel draught situation, irrigation problems, lack of labor work etc. Thus they have to send their earning at their native even incurring debt also.

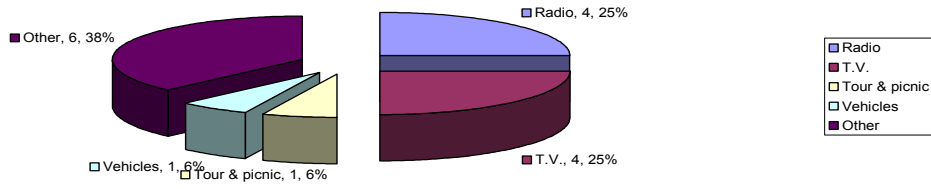
Here in the following table I have described their expense pattern on entertainment expenses.

CHART NO.: -38

LEVEL OF ENTERTAINMENT EXPENCES INCURED BY MALE DIAMOND WORKERS



LEVEL OF ENTERTAINMENT EXPENCES INCURED BY FEMALE DIAMOND WORKERS



LEVEL OF ENTERTAINMENT EXPENCES INCURED BY DIAMOND WORKERS

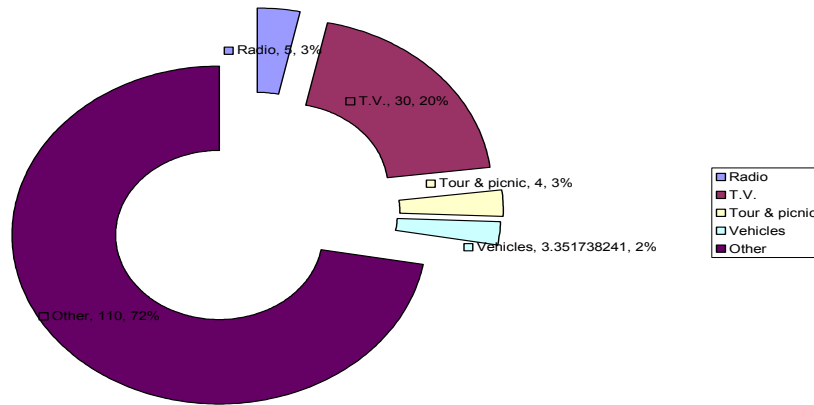


TABLE – 4.38

Distribution of the diamond workers on the basis of entertainment expenses

ENTERTAINMENT EXPENSES	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Radio	1	0.7%	4	25%	5
T.V.	26	19.4%	4	25%	30
Tour & picnic	3	2.2%	1	6.3%	4
Vehicles	-	-	1	6.3%	1
Other	104	77.6%	6	37.5%	110
TOTAL	134	100	16	100	150

Table no. 4.38 described the expenses made by the diamond workers on entertainment from the studied diamond workers 20% diamond workers entitled TV in their houses. They are found of to watch TV regularly. According to them they can be aware about the national and international events. Sometimes they watch English channels also. They say that they don't understand English in an English movie but by the body languages and actions they can be knew the story of the movie. In my study 2.67% diamond workers are expensing on tour and picnic. Only 3.33% have radio and 0.67% have vehicle. Whereas the rest

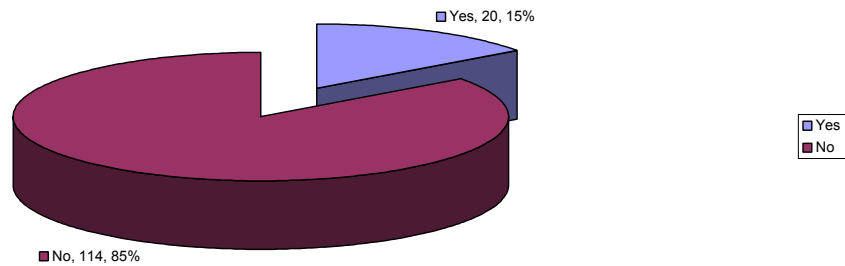
73.33% diamond workers are not found incurring expenses on entertainment.

It shows that most of the studied diamond workers not incurring entertainment expenses because they have to send their saving at their native.

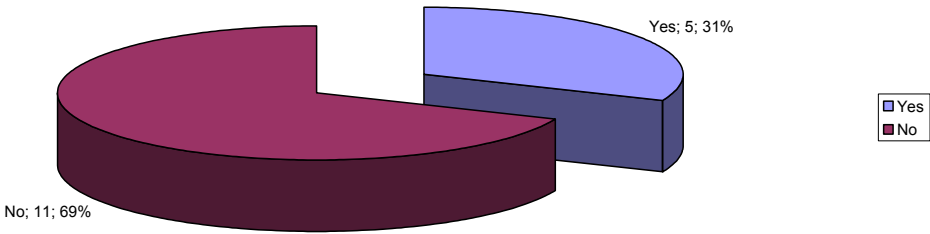
It is fact that to earn more one should work extra or should have another source of income. Here I have declared the other source of income of the studied diamond workers.

CHART NO.: -39

LEVEL OF OTHER SOURCE OF INCOME OF MALE DIAMOND WORKERS



LEVEL OF OTHER SOURCE OF INCOME TO FEMALE DIAMOND WORKERS



LEVEL OF OTHER SOURCE OF INCOME TO DIAMOND WORKERS

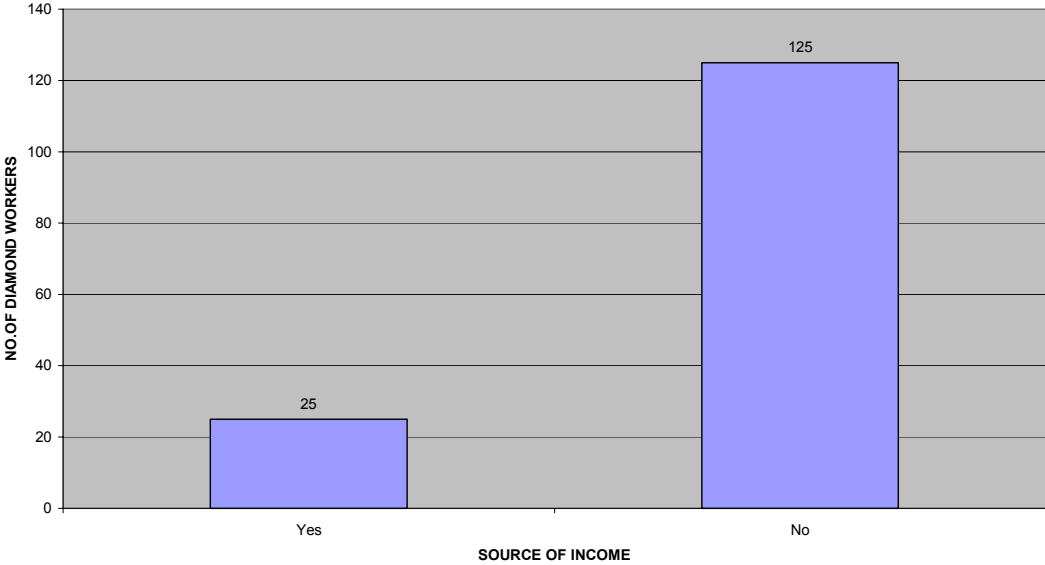


TABLE – 4.39

Distribution of the diamond workers on the basis of other source of income

OTHER SOURCE OF INCOME	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	20	14.9%	5	31.3%	25
No	114	85.1%	11	68.8%	125
TOTAL	134	100	16	100	150

Table no. 4.45 provides the knowledge about the other source of income of the workers. In this study 83.33 % diamond workers haven't any other source of Income; they are working only in this field. Due to the hard work and more working hours, they feel tolerance and tiredness, that's why they do not want to do other job rather than this. Whereas 16.67% diamond workers have other source of income with this business. Most of the diamond workers are doing diamond trading work after completion of their daily work and some diamond workers are getting extra income by rented their houses part and rest of the diamond workers are getting extra income from agriculture from their native.

The above table shows that most of the diamond workers, who are engaged with the diamond cutting and polishing work, have not any other source of Income. Out of the total studied workers 16.67% diamond workers are found to have other source of income and 83.33% diamond workers have diamond work is the only source of income. From about the total studied male 85.1% and 31.3% female haven't any source of income and 14.9% male and 31.3% female have other source of income.

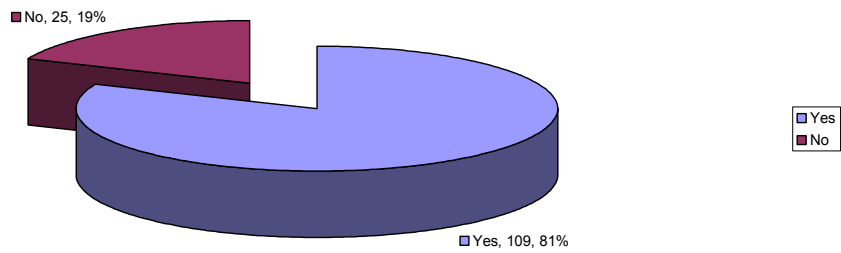
As mentioned earlier. There are great no. of diamond workers are migrated in the Gujarat region from Saurashtra region and they have joint this business due to their weak economical condition, uncertainly of rain, uncertain labor work etc. so, that those workers who have farming land at native and whose family have small shops and other types of small business have another source of income.

Presently diamond business is growing more and more day-by-day. Due to the modernization of this business, this business takes some technological changes also. Now a day modern technology is used in this business. So here I have asked one more question to the sampled workers that are they like to work on semi-automatic Ghanties rather than old types of Ghanties? Their view

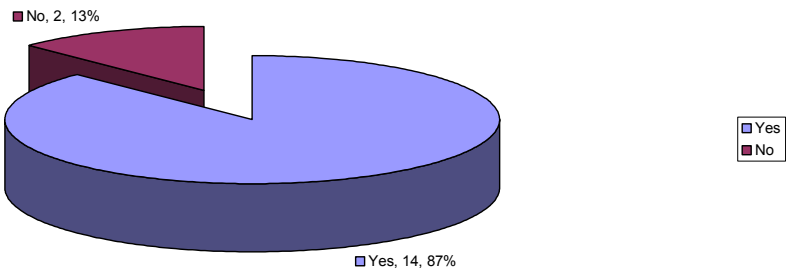
regarding these types of the question is presented in the following table.

CHART NO.: -40

VIEWS OF MALE DIAMOND WORKERS ABOUT SEMI AUTOMATIC GHANTIES



VIEWS OF FEMALE DIAMOND WORKERS ABOUT SEMI AUTOMATIC GHANTIES



IEWS OF DIAMOND WORKERS ABOUT SEMI AUTOMATIC GHANTIES

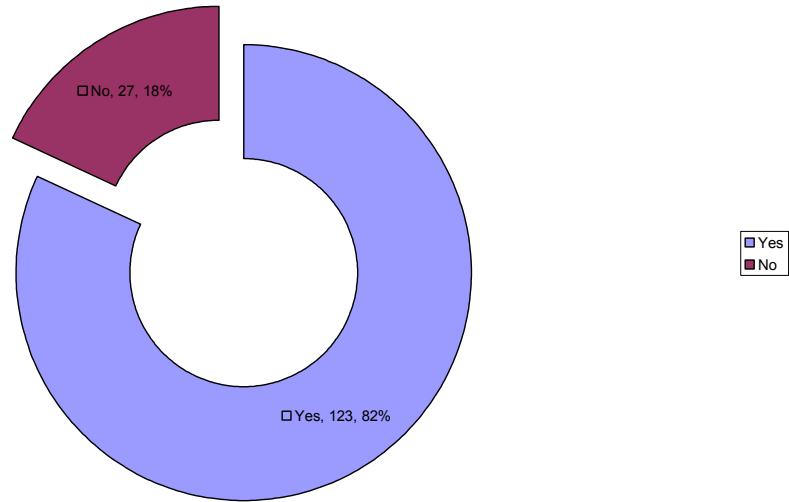


TABLE – 4.40

Distribution of the diamond workers on the basis of their view about semi-automatic *Ghanties*

LIKING	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	109	81.3%	14	87.5%	123
No	25	18.7%	2	12.5%	27
TOTAL	134	100	16	100	150

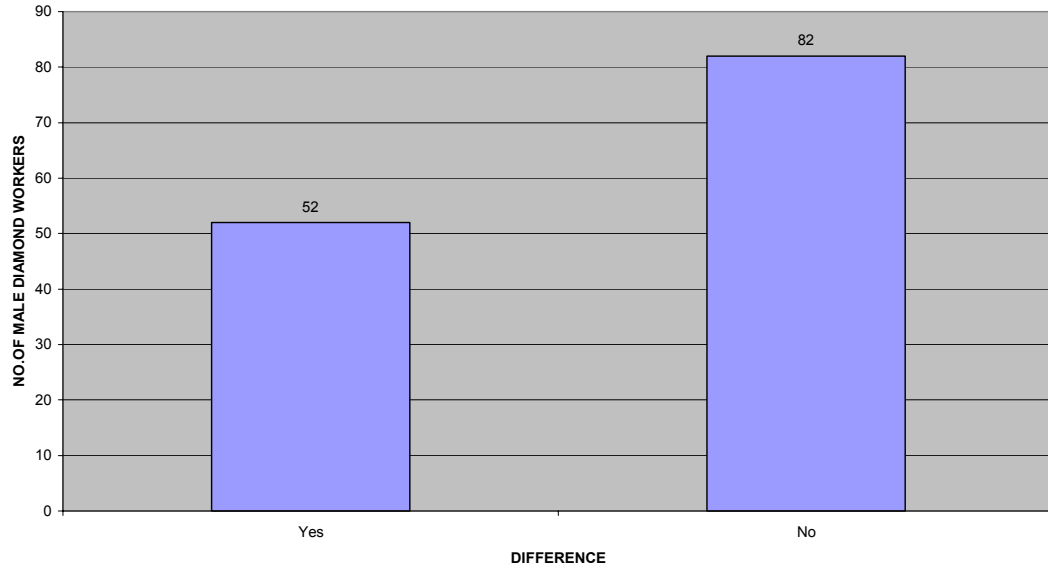
It's not only enough to know which type of rough they are getting but also it is very necessary to know that they are getting easy work with semi automatic *Ghanties* or not. To know about this type of question we found that 82% studied diamond worked gives their opinion that they can get very easy and speedy work on semi automatic *Ghanties*. Out of total studied male 81.3% and out of total studied female 87.5% say that they likes to work on semi automatic *Ghanties*. Where as 18.7% studied male and 12.5% studied female are against this question. They don't like to work on semi automatic *Ghanties*.

Finally the result comes here is that females can easily work on semi automatic *Ghanties* rather than male. But most of the diamond workers are giving their opinion that to work on semi automatic *Ghanties* is depends on the types of rough they are getting.

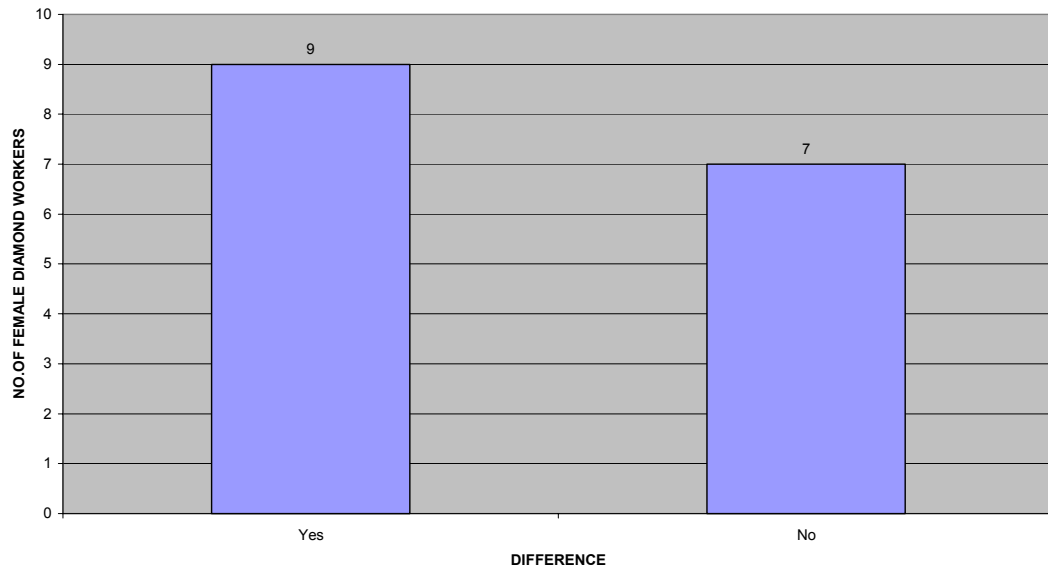
If government tries to interference in this business with exim policy India can get qualitative rough diamond and they can get the best reward in cutting and polishing of the diamonds.

In the following table I have described the information related to the wage difference among the male and female diamond workers.

WAGE DIFFERENCE AMONG THE MALE DIAMOND WORKERS



WAGE DIFFERENCE AMONG FEMALE DIAMOND WORKERS



WAGE DIFFERENCE AMONG DIAMOND WORKERS

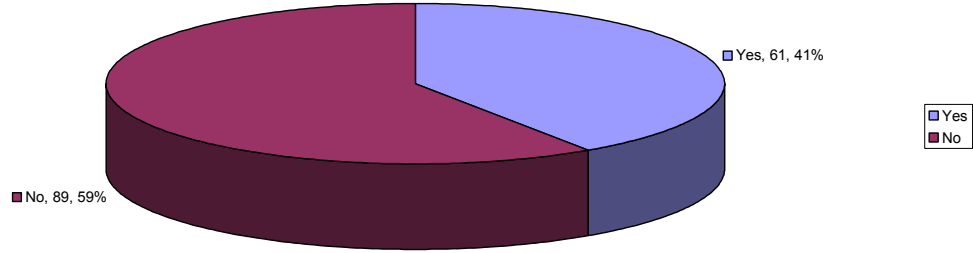


TABLE - 4.41

Distribution of the diamond workers on the basis of wage difference

WAGE DIFFERENCE	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	52	38.5%	9	56.3%	61
No	82	61.2%	7	43.8%	89
TOTAL	134	100	16	100	150

As per the calculation given in the appendix (hypothesis testing) null hypothesis is accepted and alternative hypothesis is rejected.

Earlier we became aware that which types of rough they are getting and know that they are working easily and speedy on semi automatic *Ghanties* or nor. As far as this question is it is also vital to be aware are about the wage differentiation among male and female diamond workers who are working in this field. In relation to this question 59.33% diamond workers say that there isn't any wage differences in the wage system among male and female diamond workers. Where as 30.67% diamond workers are in favor that they have found wage differences among the male diamond workers and female diamond workers out of the total studied male 38.5% and out of total studied female 56.3% female are giving their opinion that there is a wage differences among the male and female diamond workers. During their opinion 61.2% male and 43.8% female diamond workers were saying that there isn't any wage differences among the male and female diamond workers.

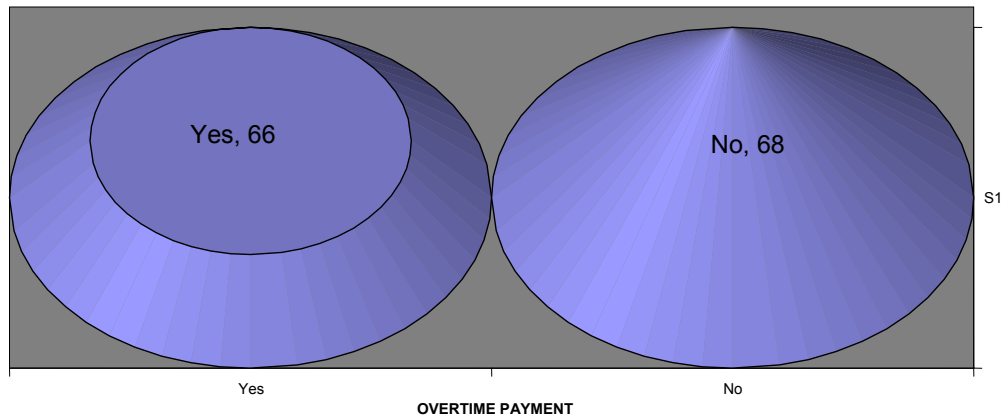
There is not any wage different found among male and female diamond workers, so more and more female workers are entering in this business to get their employment and Government has also imposed some free

industrial policy on which unemployed female can be attracted by this business.

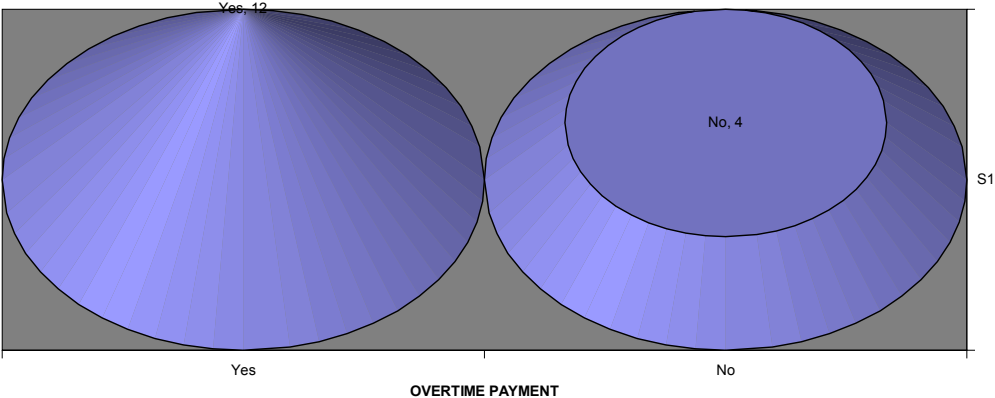
Earlier I have given the information that before Diwali they have to work at night also and for these types of work they get the wages also but here the question arise is that Except Diwali when owner takes some more work from them at that time Are owners provide them over time payment? Description in response to this question is given under.

CHART NO.: -42

LEVEL OF OVERTIME PAYMENT TO MALE DIAMOND WORKERS



LEVEL OF OVERTIME PAYMENT TO FEMALE DIAMOND WORKERS



LEVEL OF OVERTIME PAYMENT TO DIAMOND WORKERS

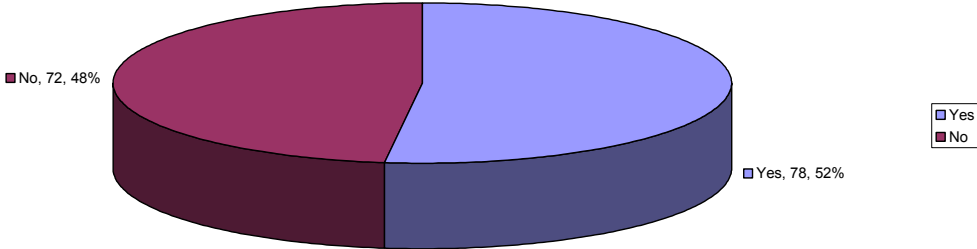


TABLE – 4.42

Distribution of the diamond workers on the basis of over time payment

OVER TIME PAYMENT	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	66	49.3%	12	75%	78
No	68	50.7%	4	25%	72
TOTAL	134	100	16	100	150

Table no. 4.48 shows the description on the basis of over time payment. 75% of the diamond workers of our study say that they are getting over time payment and 25% diamond workers say that they are not getting overtime payment.

In this random sampling statistic method I have studied 150 diamond workers among them 52% diamond workers are getting overtime payment and rest 48% diamond workers are not getting over time payment.

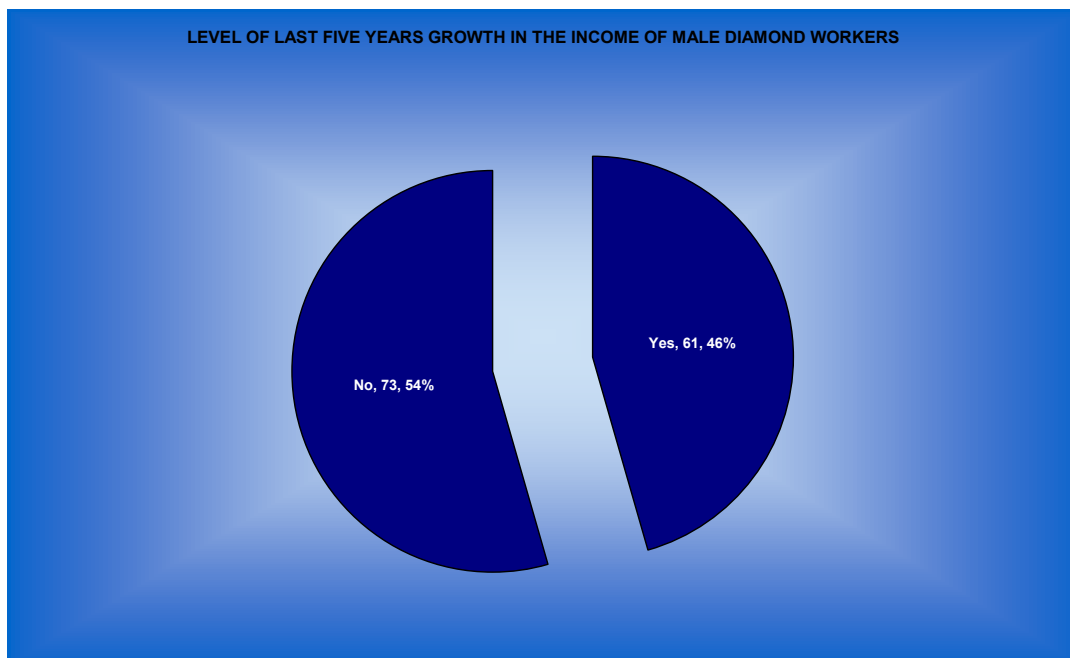
Diamond workers who are getting overtime payment are working in that factory which is the member's

of DTC sight holders where as rest 48% are found to be of unorganized sectors.

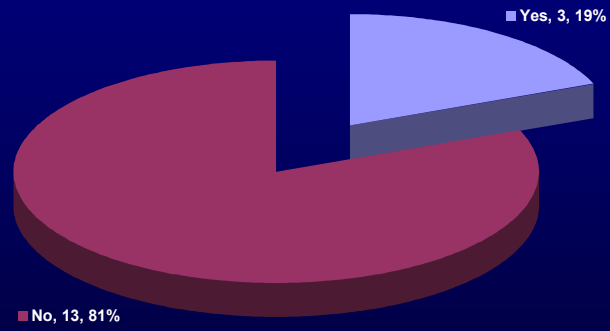
This business is a business in which workers are getting wages on piece wage system. They earn on the pieces prepared of diamonds but after the completion of time of the work at the end of the day sometimes owner gives them faulty diamonds for cut and polish, By this way overtime work is taken from the workers and for that overtime, they are not paying wage for that types of over time work.

Last table of our study presents the analyses on the basis of income increased in last five years.

CHART NO.: -43



LEVEL OF LAST FIVE YEARS GROWTH IN THE INCOME OF FEMALE DIAMOND WORKERS



LEVEL OF LAST FIVE YEARS GROWTH IN THE INCOME OF DIAMOND WORKERS

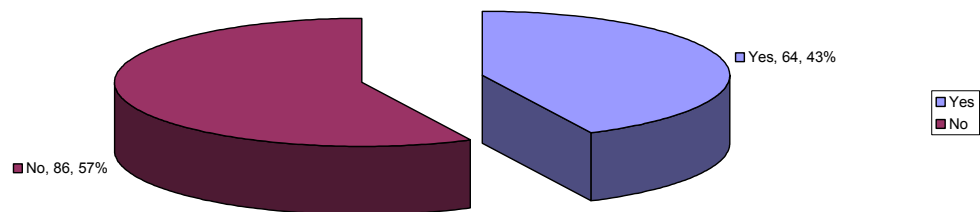


TABLE – 4.43

Distribution of the diamond workers on the basis of income increased in last five years

INCOME INCREASED	MALE	PER CENTAGE	FEMALE	PER CENTAGE	TOTAL
Yes	61	45.5%	3	18.8%	64
No	73	54.5%	13	81.2%	86
TOTAL	134	100	16	100	150

It is very important to know that in last five year their earning increased or not but most of the diamond workers are found having the same earning as per the starting. Out of the total sampled diamond workers 64 are in favor that their income increased during last five year but 86 are in against. It shows that diamond workers are not much experience and same have earlier joint the factory same have earlier completed their training so their income do not found increasingly but other who have found to be experience having increased income rather than starting of their work.

Out of the total male 45.5% and total female 18.8% workers are found whose income as 54.5% male and 81.2% female are found whose income is the same as before at starting period.

MAJOR FINDINGS OF THIS STUDY

- 1.1 Diamonds are fascinating, both in their ability to catch the light, and in their ability to fetch high prices.
- 1.2 The international trade in diamonds and gemstones has for decades provided vast profits for the companies, which mine, process and market these precious stones.
- 1.3 The industry has three main stages.
 - I Mining,
 - II Cutting and polishing of raw or "rough" diamonds;
 - III Trading and retailing
- 1.4 There are 19 countries where diamonds are mined the major producers are Australia, Zaire, Botswana, Russia, South Africa, Angola and Namibia, and a number of lesser producers such as Sierra Leone and Zimbabwe.
- 1.5 The 'big four' diamond cutting centers are Antwerp, (Belgium), New York, (US), Ramat Gan (Israel) and Mumbai (India).

- 1.6 The majority of the world's diamonds are traded through the Central Selling Organization (CSO), the marketing arm of De Beers, based in London. De Beers is the biggest player in the world diamond trade controlling the sale of most of the world's diamonds. The CSO traces its origins to efforts by De Beers in the 1920's to organize and regulate the diamond trade, and it has since that time lived up to its name, virtually controlling the trade in diamonds.
- 1.7 The Indian diamond trade has good cause to worry: over 40 percent of De Beers exports to India, accounting for nearly \$400 million, are composed of Argyle roughs and more than half of India's 5500 diamond manufacturers depend on this business for their livelihood.
- 1.8 The Diamond industry is one of the major industries of India. Its contribution is significant in the economy from employment and exports point of view. The Gujarat state and Surat city in particular has contributed a great deal in the development of diamond industry. The growth of diamond industry has helped the economy of India, Gujarat.

- 1.9 The present exports of diamond industry are worth Rs. 40000 Crores and are likely to touch Rs. 45000 Crores within sometime.
- 1.10 About 15 lakhs workers are employed in this industry in Gujarat. About 15 lakhs workers are employed in this industry in Gujarat.
- 1.11 Out of ten rough diamonds nine are polished in Gujarat.
- 1.12 This industry is pollution free, noiseless and takes no subsidies from the government are some of the major points in favor of this industry.
- 1.13 The diamond industry of Gujarat is mainly unorganized. Hence most of the units in Gujarat are in the unorganized sector while very few are in the organized sector.
- 1.14 Most of its workers and entrepreneurs are from Saurashtra region of the Gujarat state. Such migration has taken place because of lot of economic opportunities in this industry.
- 2.1 Diamond workers are expecting more out of his income without any types of future planning.

- 2.2 Some how behavioral and social weaknesses among them.
- 2.3 There is a relation between education and profession. If the education is high, there is higher profession with higher income.
- 2.4 There isn't any necessarily of education in this business, even illiterate can also do this business by training, although 95% females are found educated which is very interesting point to know.
- 2.5 Diamond workers are not saving their income because of their economical condition they have to expense all their earning to fulfill their primary requirements.
- 2.6 Due to the non-organized sectors, unionism is not successes in this business. Not a single studied female is found a member of any labor union. The main problems of studied females are lack of provident fund facility, leave of illness and delivery, lack of labor union, housing allowances, lack of qualitative diamond, medical allowances etc.

- 2.7 As per the hypothesis of sociology and economics, higher-class people not entered into these types of lower class business.
- 2.8 The Saurashtra *Patels* are giving the shape to the diamond and the shape is giving them life style and food, shelter and clothes also.
- 2.9 Diamond factories were started in 1950 in Surat and Navasari. In the initial period of this business the trading side of this business was in the hands of Palanpur Jain *Vanik*.
- 2.10 First of all Saurastrian Patel come into Surat in 1962 and started this business. They were come from the Gariyadhar of Bhavanagar district and different villages of Amareli district of Gujarat state.
- 2.11 Most of the diamond workers are male but earlier female have also joint this business near about 15 to 25 years.
- 2.12 Before independence Saurashtra Patels were working in to the farms of Darbar and Kathi Rajaput as a labor work at their native. Darabar community was the owner of the agriculture at that time.

- 2.13 In the Patel community some of the educated Leuva Patel's young have established 'Saurashtra Patel Samaj'. A main objective of this institute was to provide educational facilities, to maintain unity, etc.
- 2.14 An average proportion of machinery per unit was six machinery where as average number of lathe was 4 and average number of electric motor was also 4.
- 2.15 Commission agents are the main source of getting rough diamonds. Exporting units have more *Ghanties* and workers so they purchase rough by their own way. He has found only one unit which purchased rough from the Hindustan diamond company (H.D.C.). Where as other four units were purchasing rough from these units. The main local centre to get rough is Surat. Rough is distributed in to the various districts of the Gujarat state.
- 2.16 Rate of wages in diamond industry to cut and polished diamond is found Rs. 5.70 to 10.50 per piece of diamond.
- 2.17 Most of the transaction are made on cash in this business payment on cash is now a days common method in diamond industry.

- 2.18 The reasons of their migration were found that they have migrated due to their weak economical condition, uncertainty of rain, draught etc. Female diamond workers have migrated due to their marriage and weak economical condition of their family.
- 2.19 Most of the diamond workers who were engaged with the work of diamond cutting, **Ghat** work and fancy work were earning more from their work.
- 2.20 Education and cast has not direct co-relation between them due to the government's education policy, most of the diamond workers have concentrate on study but due to their weak economical condition, they have to joint this business.
- 2.21 The diamond business was in the hand of the Palanpur Jain in the starting period and only the Leuva Patel made cutting work before 1965.
- 2.22 To prepare a perfect cut and polished diamond only one should have trust, skill, clarity, ability and working style to be stabilized against world competition.
- 2.23 To run this business manufactures should have good experience of cutting and polishing work of diamond.

There were minor numbers of manufacturers who have higher experienced.

2.24 Backward community people and out states people were not putting trust on this business and they have thought to left this business.

2.25 Workers who left this business are not showing their desire to re joint this business because they felt that they have lost their faith against the manager who was taking work from them.

2.26 A description of diamond unit is that diamond workers are feeling suffocation due to the arrangement of many Ghanties in room, lack of satisfaction, lack of toilet facilities, lack of proper ventilation, where as owner chamber haven't this types problems, they have free space to be work, proper ventilation, and personal toilet.

2.27 Despite apparent high job mobility in the industry quite a few workers stick to the initial entry points. Keenness of firm to retain their skilled workers by loans and advance payment of wages and the fact that even the better paid jobs can grow only in relation to the overall majority of workers also have no intention of leaving the industry.

- 3.1.1 the word itself, “Diamond”, comes from the old French, “diamante”. But diamond is derived from Latin and also from Greek. The Greeks had a word, “adamas”, which means “unconquerable”.
- 3.1.2 Diamond- A word, which awakens beauty, mystery, and romance, a gem, revered for centuries and credited as both poison and miracle drug-is a natural paradox.
- 3.1.3 Natural diamonds are unique because of their specific characteristics. Chemically it is carbon (the same material that makes up soot or graphite in a lead pencil.)
- 3.1.4 A diamond is a crystallized carbon, usually transparent with occasional color variation, with a relative hardness of 10 (Mohs’ scale), a specific gravity of 3.52 and 2.42.
- 3.1.5 when measuring diamonds, the term carat is used. This is measure of weight and it is a determining factor in assessing value. One metric is $\frac{1}{2}$,268 of a pound, or $\frac{1}{142}$ of an ounce, or $\frac{1}{5}$ of a gram.
- 3.1.6 Diamond is a strange and wonderful material. For over 5,000 years the small pieces of rock called diamonds

have excited the wonder, interest and envy of man, from the richest prince downwards. Diamonds are unique little crystals, and being the hardest material known to man they are also of considerable significance both to the modern scientist and the modern technologist.

3.1.7 Diamond has aroused intense interest in the historian and the folk-lorist, the industrialist and the man of wealth, the scientist and the technologist, the speculator and the investor, the craftsman and the aesthete.

3.1.8 many diamonds are linked to a strange history, often a history of theft and murder, and it is certainly the costliest of all natural minerals.

3.1.9 in the early middle Ages the diamond was a rare, highly valued object, which was worn not as a decoration or as an object of beauty, but as a magical amulet. Indeed, since only natural unpolished stones were at first available and as these only occasionally have, an attractive shape.

3.1.10 In the National Portrait Gallery in London is a portrait of Henry IV painted about A.D. 1400,'and on the

monarch's sleeves are two enormous octahedral bluish stones, recognizably natural diamonds.

3.1.11 a diamond has the curious power, of breaking out into a 'sweat' and becoming damp when brought near to poison.

3.1.12 for many centuries the adopted working carat was a little different parts of Europe, but always more or less then same, i.e. something near to a fifth part of a gram, or 1/140th part of an ounce.

3.1.13 the carat is quite a small measure, yet so costly is the diamond that the carat is subdivided still further, especially in the United States, where it is divided into one hundred points. Thus a stone weighing one and a quarter carats is written 1.25 carats and this particular diamond would be described as being of weight one carat and twenty-five points.

3.1.14 a natural octahedron of height about 1 / 10th of an inch could weigh 1 / 10th of a carat. An octahedron of height one quartered an inch could weigh about 1 carat.

3.1.15 in diamond the carbon atoms are locked into a very tight, regular pattern, whereas in graphite the pattern

is looser and less symmetrical. The close packing of the carbon atoms in diamond makes it a relatively dense and heavy mineral.

3.1.16 the diamond crystal can be found in a variety of related shapes, although the shape is often highly irregular.

3.1.17 Diamond is not always found as a single crystal, and, especially in Brazil, conglomerate masses of small, impure diamond crystals, locked together and lying in different directions, are found.

3.1.18 it is only infrequently that diamond is found in a highly pure condition, for usually a small amount of impurity is trapped in the crystal during its growth. Such impurity can vary from a minute amount up to perhaps ten or even twenty per cent and is responsible for giving the crystal either a color or opacity.

3.1.19 the value of a diamond is determined by its size, color, shape, and freedom from flaws.

3.1.20 the two particularly outstanding physical properties of the diamond are: (1) the hardness (2) its optical characteristics.

3.1.21 the softest, talc, was graded 1, and next came gypsum, graded 2, and so on. Towards the top of this scale

topaz was placed at 8, corundum (sapphire) at 9, and finally, at the very top, diamond, at 10.

3.1.22 the real difference in hardness between diamond (10) and corundum (9) is very much bigger than the real difference between corundum (9) and topaz (8).

3.1.23 the history of the origin of the knowledge of cleavage is wrapped in obscurity. This cleavage facility is, of course, a most unexpected property of so hard a material and when first discovered must have seemed amazing.

3.1.24 Diamond has very special optical properties, which are responsible for the brilliant adamantine luster, and fire, which makes the well, cut diamond gem such an object of beauty and attractions.

3.1.25 the reflectivity of a transparent solid surface is closely related to the refractive index and the higher the index the greater the reflectivity.

Certain hot oxidizing compounds relatively easily attack 3.1.26 Diamond. It is found that if a diamond be heated to only 550°C in molten potassium nitrate, which is an active oxidizing agent, it begins to be eaten away, due of course to oxidation conversion to carbon dioxide.

- 3.1.27 in the absence of air, oil oxygen, strong heating of diamond produces a strange, disconcerting effect.
- 3.1.28 of the atoms in graphite. For graphite and diamond are related an according to the pressure and temperature, they have a tendency to transform one to the other.
- 3.1.29 diamond, when heated sufficiently, melts, and that the melting temperature is 3,700'C. Such melting can only occur if the pressure is high enough to prevent graphitization. Graphite itself melts at perhaps 3,500 C so that whether a diamond does graphitize or not, its melting point is still something at least as high as 3,500C.
- 3.1.30 the diamond is amazingly resistant to most chemical attack other than hot oxidation.
- 3.1.31 a very useful property of diamond is its transparency to X-rays. Heavy atoms only absorb X-rays, and carbon, the constituent of diamond, is one of the lighter atoms.
- 3.1.32 Diamonds, apart from some late blue types, do not conduct electricity.

- 3.1.33 most natural diamonds exhibit a certain amount of internal physical strain. A simple device called a polar meter can easily reveal this.
- 3.1.34 sonic diamonds can give out Light in the dark after being illuminated by daylight. There has actually been much traditional confusion about this property.
- 3.1.35 some diamonds when rubbed in the dark will-emit a glow, and this, too, is very closely related to phosphorescence.
- 3.1.36 Clear diamonds are transparent to ultra-violet light, but it has been discovered that there exist two kinds of diamond which are conveniently called type I and type II.
- 3.1.37 All diamonds, whatever their type, transmit infra-red heat radiation (up to a wavelength of about 40000 A.U.) and beyond this absorb heat in certain wavelength bands.
- 3.2.1 from the ancient times the market of rough diamond becomes the monopolistic market, whenever India had the monopoly in diamond production at that time there was a monopoly of northern state

3.2.2 the present diamond trade has been started at 18th century. Africa is the legend till the date from the starting.

3.2.3 there were near about 1600 owners but after time is joined venture also established due to the scarcity of labour and high wage and De Beers has taken his own ownership up to 1888. It has given sells right to famous diamond syndicate in 1890 among these sells right has taken only 48% share. For three main branches. Rest 52% has given to other 7 companies on the gain of 2% to 10%.

3.2.4 in the time of 1930 diamond industry was suffering with a depression so to save the diamond industry from the depression, diamond industrialist and producers have established central selling organization (C.S.O).

3.2.5 The C.S.O is a collective name used to describe an international group of associated companies involved with the buying, valuing and selling of about 80 percent of the world's rough diamond production.

3.2.6 Nicholas "Nicky" Oppenheimer is the chairman of the C.S.O. While Sir, Philip Oppenheimer is its president; Its Executive director includes Alec Barbour, Anthony

Oppenheimer. Tim Capon, G. M. Ralf and Jeremy Pudney.

3.2.7 Till the beginning of the early 1930s the diamond industry was in confusion. It was entirely due to the efforts of the late sir Earnest Oppenheimer that the industry was established and organized on its formation.

3.2.8 The Diamond trading co. Ltd (D.T.C.) is a proprietary concern of C.S.O. It was formed in 1934.

3.2.9 All over the world 80% rough diamonds are produced and sell by diamond producer association and C.S.O. in that most of the trade is done by D.T.C. London, is the main center of trading.

3.2.10 India manufactures about 70% of the world's diamonds, most of which cannot be processed in other centers.

3.2.11 the issue of conflict diamond is the most pressing one that confronts the diamond industry today. It is an issue that knows no boundaries and has gripped the global diamond industry.

3.2.12 the origin of conflict diamond is to be found in the strife-torn areas of Angola and Sierra Leone as defined

by the United Nations. These countries are known for their deposits of this valuable commodity.

3.2.13 In India, the Gem & Jewelry Export Promotion Council has reiterated its resolve to keep away from conflict diamond. The council supports the resolutions passed by the UN and strongly condemns any trade in these diamonds.

3.2.14 In India, about one million people directly and indirectly depend on the diamond industry. It is clear that the mainstream diamond industry has played a positive and beneficial role.

3.2.15 The diamonds that are imported into India come from D.T.C. (19%), Israel (7%), Antwerp (73%) and other countries which do not include any African countries (1%).

3.2.16 presently, we have a very complex and long distribution system. The new strategy will bring reforms to this system, so that diamonds will be both effective and speedily sold to the end consumers.

3.2.17 The new identity given by the De Beers to their sight holders and the new hallmark through which

diamonds will be sold to the end consumers will result in increasing consumer confidence.

3.2.18 The total money spent on marketing and advertising may increased, resulting in increasing total sales of diamonds.

3.2.19 Richest persons were the legendary of diamond trade but now the whole scenario is completely changed. A normal person can also buy the diamonds. This is vitally for an Indian diamond industry.

3.2.20 Indian diamond industry stabilized against world diamond trade depression. It is remarkable that in 1993 the whole world is sinking into the depressing but India has saved the world.

3.2.21 The Indian diamond industry has cornered a 55 per cent share of the world market by value.

3.2.22 it is the important to note that the Indian manufacturing centre is now capable of producing the entire range of goods required by the market.

3.2.23 the strong support of financial institutions in the country has been a corner stone of our business.

3.2.24 In India diamonds are mined only in M.P., Andhra Pradesh and Orissa but it is very low.

3.2.25 In India the no. of diamond workers are more than the world's other countries. Most of the workers are villagers. In 1989 the total no. of workers in India was near about 8,00,000 but it is depends on the market situation in 1995 It was near about 6,00,000 due to the market depression, presently it is expected to near about 15,00,000.

3.2.26 it was only from 1966 onwards that Indians started to capture the Belgium business in eight cut manufacturing and the country regained its position as a centre of the cutting and polishing industry.

3.2.27 When India became independent in 1947; foreign exchange requirements for numerous industrial developments were projected. And priority over all other demands was considered restricting, which placed on the import of cut and polished diamonds into the country. By 1952 only 1.5 % of the peak import of cut and polished diamonds was granted to established importers.

3.2.28 the major supplier of diamonds into the Indian market is the Rio Tinto controlled Argyle mine in Western Australia, followed by De Beers/CSO diamonds and a small but growing illicit trade in diamonds smuggled out of Russia.

3.2.29 Diamond cutting and polishing is concentrated in Western India - in Mumbai, Surat, Navasari, Bhavnagar, Ahmedabad, and has recently spread to parts of Southern India.

3.2.30 in 1995, India imported 92 million carats worth of diamonds to be cut. India cuts and polishes 70% and 40% of the global diamond yield in terms of weight and value, and because of this has the world's largest workforce involved in the trade, with about 800,000 people engaged in diamond cutting and polishing, and as many as 700,000 involved in other aspects of the diamond trade.

3.2.31 In the last quarter (January-March) of 2003-04 exports of cut and polished diamonds from the country reached US\$ 2,746.58 million, from US\$ 2,172.79 million in the same quarter a year ago. In terms of cartage also, shipments for the quarter were higher at 110.47 lakhs carats, compared with 91.50 lakhs carats in the same period of the earlier year.

- 3.2.32 the shortage of rough diamonds in the open market has increased with the result that prices of rough have hardened.
- 3.2.33 Gujarat is exporting most of the cutting and polishing in Hong Kong, Japan & U.S.A.
- 3.2.34 Gujarat has been initiated diamond business after world war-II.
- 3.2.35 Gujarat is manufacturing 70 % diamonds in all over the world Surat, Palanpur, Amareli, Bhavnagar and Ahmedabad are the main centers of manufacturing, cutting and polishing of diamond.
- 3.2.36 despite a decline of 3.19 per cent in the diamonds, gems and jewellery exports from India in 2001-02 compared to previous financial year, the overall performance considering the global trend is an indication of brighter days ahead for the diamond, gems and jewellery industry here.
- 3.2.37 the gems and jewellery exports registered a turnover of over \$ 7.53 bn in 2001-02 as against \$ 7.77 bn in 2000-01. Though there has been a decline, but considering the global slowdown due to recession in

the first half of the last financial year and then the post September 11 impact on trade, the recovery in exports from India has been remarkable.

3.2.38 this business is progressing very speedy since 1967. International market ever makes its policy depending on Surat.

3.2.39 Now days near about 15, 00,000 people are, near about 25000 factories running in Gujarat. Diamond Industrialists are doing their diamond business by near about 2000 to 2500 offices. In Surat near about 2 lakhs people are getting employment in near about 10000 factories. In Gujarat most of the rough diamonds are cutting in Surat. Surat is manufacturing 4 lakhs diamonds daily, there are three big diamond trade markets in Surat.

3.2.40 Bhavnagar diamond business is widened in all the taluka's and in all the villages. There are 5000 diamond factories, providing employment to 5, 00,000 lacks people. Internally and externally out of the total unit, only 60% are in Bhavnagar and rest 40% are spreader in Botad savarkundla, Gariyadhar and in palitana.

3.2.41 Amareli near about 84% villagers are getting employment through agriculture. Out of the total population near about 30% to 40% people are engaged in diamond business. Out of the 10 talukas diamond business is developed fully in 7 talukas In Amreli, chital, babara, Damnagar, lathi, lilya, varsada, Ishwariya and Dhari are much developed. There are 12000 factories providing employment to 30,000 people. There are 1000 women workers also working in this sector.

4.2.1 Most of the workers are young. An average age of the male diamond workers is between 18 to 25 years. While that of female workers is also between 18 to 25 years.

4.2.2 Majority of workers are Hindus (98.5%). It is worth noting that people from minority community are also seen in this industry.

4.2.3 The family background of workers is found poor. The income, education and occupation status of parents is low. This has certainly affected the status of diamond workers.

- 4.2.4 The position of workers engaged in the units of the organized sector is better than the workers of unorganized sector.
- 4.2.5 The hypothesis of specific migration is not proved in this study. Because most of the workers have migrated from Saurashtra to south Gujarat and Gujarat. Most of the diamond workers of Bhavnagar, Amareli and other districts have not migrated; they are living in those cities from the heritage. But one point needs to be mentioned here is that hardly people from other states are found in the industry. This is bit surprising because in the last few years Gujarat has experienced phenomenal migration from other states viz. Punjab, Rajasthan, U.P., Orissa, Maharashtra and Bihar.
- 4.2.6 It is a good point to be noted that very less numbers of workers are illiterate some workers are graduates. But overall education of these workers is up to primary. This cannot be considered satisfactory.
- 4.2.7 In the diamond industry the education level does not carry any weight. It is the experience that matters. Hence, I found that there are many workers who have high income but do not have high education. The correlation between educations. The correlation

between education and income is found to be positive and significant. The absenteeism of workers in this industry is very low. This is a satisfactory point.

4.2.8 It is worth noting that diamond workers of Surat city are living better life in compare to the diamond workers of other cities of Gujarat state is found and another important result comes is that workers of Surat city get more that minimum wages rather than other cities. So diamond business is dominated to Surat city only in Gujarat state.

4.2.9 the diamond industry of Gujarat state is male dominated. The women workers in this industry are found very less.

4.2.10 Most of the workers are of Patel community. Thus it becomes clear that the diamond industry of Gujarat state in cut and polished work is highly dominated to the Patel community, Thus, It is clear that Patel's are the legendary of the diamond industry of the Gujarat state.

4.2.11 In the last few years the standard of living of diamond workers seems to have improved. The things that are seen in their homes prove this.

- 4.2.12 Education of the diamond worker's parents is low. And their profession is also low.
- 4.2.13 Average monthly income of the diamond workers family is very low.
- 4.2.14 in analysis of total no. of family member's shows medium size of family. Average family members are identified small. Thus it becomes clear that they have adopted the idea of family planning.
- 4.2.15 Present Economical condition of the diamond workers is found better in compare to part studies.
- 4.2.16 the living standard of the diamond workers is medium. Till some of the diamond workers are living in the factory.
- 4.2.17 Training is very vital factor in this industry. All the diamond workers are fully trained. Private factory of training centers are good, now a days, there is a scarcity of diamond workers is found in the diamond industry. To fulfill of scarcity of diamond factors, presently industrialists are providing free training to the unemployment people. In Surat government institute is also providing training to the workers institute.

- 4.2.18 In Gujarat most of the diamond workers prefer to work in Surat. Surat is high earner city for workers.
- 4.2.19 Analyses of the types of rough says that with weak type of work, they can do work very easily but in hard types of rough, they feel hard work.
- 4.2.20 Diamond workers are working average 10 hours per day.
- 4.2.21 Very few diamond working having insurance policy but most of the diamond workers having debt to their family.
- 4.2.22 Diwali holidays have more important in this business. 60% migrants are visiting their native. Most of the workers help their parent's in their businesses during the leave. They are talking 21 to 30 days leave. Female are talking more leaves in compare to made workers.
- 4.2.23 Rate of wages in diamond industry to cut and polished diamond is found Rs.5.70 to 10.50 per piece of a diamond. There isn't any much difference in the wages on the types of work. Most of the transactions of wages made on cash in this business.

- 4.2.24 Average expenses on pan-masala, tobacco, perfumes, cosmetic etc is found Rs 400 to Rs 500.
- 4.2.25 Most of the diamond workers are feeling suffocation and less ventilation at work place due to the arrangement of many Ghanties in a room.
- 4.2.26 Diamond workers have not separate male and female working rooms and even they are not getting pure water and air.
- 4.2.27 they have problems of toilet also. In health most of the diamond workers having eye problems.

CHAPTER-5

SECTION-1

MAJOR FINDINGS OF THE STUDY



SECTION-2

SUGGESTIONS

SECTION-2

SUGGESTIONS

During this research work, I have come to know that workers have some problems, which need urgent attention. If not solved, they can hamper the growth of the diamond industry. And this will not be in the interest of Gujarat and Indian economy.

- 1) The workers must have benefits like P.F., Pension, Life insurance, Health insurance, and Housing etc. This will increase their productivity.
- 2) The government concerned should ensure that labour laws, in line with international labor standards are fully applied and enforced and should ensure that companies in this sector pay their fair share of tax.
- 3) There should be separate workrooms for male and female diamond workers.
- 4) Workers should be educated if they are not educated. There should be arrangement about workers education.

- 5) To give them training, government has to start more and more training centers.
- 6) Diamond industrialist have to make techno researches to reduce health problems among the diamond workers like eye problems, sholderach etc.
- 7) The diamond industry of Gujarat is male dominated. The women workers in this industry of Gujarat are found 10%. It is interesting to note that in the entire diamond industry of Gujarat, there is only 10% woman diamond worker is found. All these data clearly prove that this industry is highly male dominated. Thus, government has to take some measure stapes regarding this problem to make easy, safe and proper entry for women in this industry.
- 8) Expenditure pattern of the workforce shown that the per capita expenditure on pan, tobacco, smoking and other such items are high. Thus owner should provide Them regarding their personal expenditure.
- 9) A description of diamond unit is that diamond workers are feeling suffocation due to the arrangement of many Ghanties in room, lack of satisfaction, lack of toilet facilities, lack of proper ventilation, toilet etc. in the un organized diamond units. Thus, government has

imposed some rules and regulations to improve the working conditions and environment for the workers who are working in the unorganized diamond industry.

10) Most of the diamond units of Gujarat state are working 8 to 10 months per year. There should be a policy regarding the time of work for the whole year. That's why workers can get exact timetable of a year about their work to make plan of expenditure for a year.

11) There should be efforts at all levels for developing jewellery design centers in the country, aiming for more production of diamonds in the near future and also to keep the international market share intact, particularly in the wake of China and other countries, trying desperately to grab the global share.

12) Banks should provide loan to improve the diamond business.

13) Due to the non-organized sectors, unionism is not succeeding in this business. There should be a labor union to solve the problems of the workers.

- 14) The main problems of females are lack of provident fund facility, leave of illness and delivery, lack of labor union, housing allowances, lack of qualitative diamond, medical allowances etc. Thus government has to try to solve these types of problems of the female diamond workers to make them satisfied by this industry.
- 15) Due to the high job mobility in the industry quite a few workers stick to the initial entry points. Thus, keenness of firm to retain their skilled workers by loans and advance payment of wages and the fact that even the better paid jobs can grow only in relation to the overall majority of workers also have no intention of leaving the industry.
- 16) It must be understood that the reward for labor are ultimately determined by the institutional arrangement of sharing gains in the industry. It has been possible to study the industry over-time; we could have gained a proper prospective of changes in wage Level and its structure.
- 17) To prepare a perfect cut and polished diamond only one should have trust, skill, clarity, ability and working style to be stabilized against world

competition. Business strategy is must, although they must have the knowledge about government policy, high investment capacity, high risk, export-import policy knowledge, awareness of banking rules and regulations etc.

- 18) It is worth noting that diamond workers of Surat city get more than minimum wages. This has worked as a pull factor for many young persons from Saurashtra region to join this industry of Surat city. There should be average wage payment system at all places of Gujarat.

QUESTIONNAIRE



QUESTIONNAIRE FOR THE STUDY OF

The State of labour in diamond industry in India:
With special reference to Gujarat state

By Gautam P. Kanani (Lecturer) J. D. Gabani Commerce college. Varachha, (Surat)	With guidance, Dr. A.K. Chakrwal (Asso. professor) Dept. of. Commerce. Saurashtra University, Rajkot.
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1. Personal Information

1.1 Name:

1.2 Resi. Add. : -

1.3 Factory Add: -

1.4 Age: - _____ years

1.5 Sex: - Male / Female

1.6 Religion: - Hindu/Muslim/Sikh/Any Other

1.7 Cast: - _____.

1.8 Mother _____ tongue: -

1.9 When did you come in this city: --

1.10 Name of the native place: - _____

1.11 Marital Status: - Single/ Married/ widow/ divorce

2. Family Information: -

2.1 Weather you are living in Joint / Nuclear family?

2.2 No. of family members: - _____

2.3 Information related to workers family: -

No.	Relation with member	Age	Education	Occu.	Income (p.m.)
1					
2					
3					
4					
5					

2.4 Do you have agriculture land at your Native? Yes/No

If yes, How much?

2.5 Are you migrated? Yes/No

If yes, Name of your native: -.....

2.6 What was the Reason of your Migration?

For Marriage/ by other's call/ by force/ Due to Economic Condition/
Any other.

2.7 What is your Family income including your income? Rs
(p.m.).....

2.8 What were you doing before migration/this business: -
.....

- 2.9 Where are you living in? : - Rented house/own house/ factory/ other place
- 2.10 Total area of your house: -
- 2.11 Is there electrical facilities? Yes/No
- 2.12 Is there water facilities? Yes/No
- 2.13 Is there facility of 1.Bathroom: - Yes/No
2 Toilets: - Yes/No
- 2.14 If the answer of 2.12 & 2.13 is yes, weather it is joint/separate
If joint, how many members/ families have to share the same facilities?
- 2.15 Do you think that diamond workers should have housing plan? Y/N
- 2.16 How far you're working place from your residence?
- 2.17 How do you accommodate?
By train/Bus/Auto rickshaw /two wheeler/cycle/walking
- 2.18 Are you regularly visiting your native? Y/N
If yes, for what reasons? 1 To meet family members
2. At the time of cultivation season
3. Due to illness.
4 For Festivals
5 Any Other.
- 2.19 How many times you visit your native in a year?
1. Once in a year
2. Twice in a year
3. Thrice in a year
4. More than thrice in a year

3. Educational information

- 3.1 What is your education? : -
1. Illiterate 2.Up to S.S.C. 3 Up to.H.S.C.
4. Graduate 5. Post graduate

- 3.2 Medium of education: - Gujarati/ Hindi/ English/ other.
- 3.3 Place of education?
- 3.4 Why did you leave study?
- 3.5 Type of education: - illiterate/ writing & reading /can not write and read
- 3.6 How many languages do you speak, read & write: -.....

4. Working condition & present employment.

- 4.1 Total working hours in a day?
- 4.2 Do you think that you over work, if yes due to the long working hours in the unit, your eye Sight are affected? Yes/No.
If yes, please tells us. Your yearly medical expense on eyes treatment? Rs.....
- 4.3 Employment Position of workers in diamond unit during the last one year.

Sr No	Season	Average working hours per day	Average earning per day	No. of working days in a month	Monthly earning	*Reason for remaining unemployed	Total
1.	Winter						
2.	Summer						
3.	Monsoon						

* 1.No. Work 2.Sickness 3. Fatigue 4. Others

- 4.4 In case your employer's fails to provide you work, does he pay any wages for that day? Y/N
 It yes, How much do you get? Rs.....
- 4.5 Have your earning increased during the last 5 years? Y/N
 It yes, Wages 5 years back Rs.....
 Wages 3 years back Rs.....
 Wages at present.....
- 4.6 Do you get your wage regularly? Y/N Rs. (P.M).....
- 4.7 Is there any system of fixed wages in the diamond cutting & polishing industry? Y/N
 It yes, please tells us the minimum amount of wages Rs. (P.M).....
- 4.8 What was your past occupation?
- 4.9 How much time did you spent on that occupation?
- 4.10 Why have you jointed this business?
 Due to: - 1 economic condition
 2 Higher earning
 3. Heritage businesses.
 4. Friends & relatives advise.
 5. Higher life style.
 6. Children's brightened future.
 7. Training.
 8. Other.
- 4.11 Have you got training before entering in this business? Y/N.
- 4.12 How much time has you spent for training? Years.....Months...
- 4.13 By whom did you get training?
 Friends/ relatives/ institute/ owner/ other.
- 4.14 Do you think that training is very vital for entering in this business?
 Y/N.
- 4.15 How did you get training?

Paying fees / on remuneration condition/ other.

16 Please tell us about your job history: -

Name of Native	No. Of Jobs	Duration	Sources of employment *	Wages (p.m) piece rate		Establishment of diamond industry **			Any other unit	Condition of employment		Reason for leaving ***
				Begin ning	Leaving	S	M	L		Paid/ Unpaid	Regular casual	
	1 st job											
	2 st job											
	Present job											

* By Relatives/friends/family members

** S-10 workers

M-10 to 50 workers

L-More than 50 workers

*** 1. For more bright future 2. For more earning

- 3. Due to tolerance of work
- 4. Due to dismissal
- 5. Far from residence
- 6. Other

4.17 Present Job work & wages

Sr. No.	Activities	Job Work done (pieces)	Wages paid for polishing of diamond per rate (In Rs)	Total hours of worked	Total pieces of diamond polishing during work hours
1	Bruiting				
2	Pale polishing				
3	Mathala polishing				
4	Talia polishing				
5	Shape polishing				
6	Any other				

- 4.18 Do you get overtime payment? Y/N
- 4.19 In case you required working part-time, do you get part-time job? Y/N
If yes, Please tell us income you earned in part-time job during a month? Rs.....
- 4.20 Is there any wage difference between male and female workers? Y/N
- 4.21 Do you think that female workers can do the same work as male workers? Y/N
- 4.22 Tell us the initial income of male & female.

Male Rs. (P.M)..... Female Rs. (P.M).....

- 4.23 Are you getting pocket expense? Y/N
If yes, how much times in a month?
- 4.24 Do you get loan? Y/N.
If yes, Why?
- 4.25 How much amount do you get for a loan?
- 4.26 Do you think that you can work very easily and quickly on semi automatic machine? Y/N
- 4.27 Does female workers work on semi automatic machine very easily Y/N
- 4.28 Is there any fear about diamond lost and cheating in exchange of diamond during a work? Y/N
- 4.29 Which type of rough diamonds you are getting?
(1) Hard/soft (2) Thin/wide.
- 4.30 How many days leave you takes during Diwali?Days
- 4.31 Do you work at night before Diwali? Y/N
- 4.32 In rewards of Diwali holidays, do your employers get more work from you? Y/N
- 4.33 What do you do at Diwali holidays?
- 4.34 Are you getting extra wages for nightshift? Y/N
- 4.35 What do you get at Diwali present?
- 4.36 Do you get the benefits like?
Provident fund/ Delivery Leave/ Sickness Leave/ National Leave/
Pension etc.? Y/N.
- 4.37 Have you any others source of income? Y/N
It yes, Give the detail.....

5. Earning Information

- 5.1 How do you expense your earring?
1. For buying primary things, like.....
 2. For buying entertainment things like.....
 3. For paying debts
 4. For buying cosmetic items like.....
 5. By sending at native, how much.....
- 5.2 Do you save your money? Y/N
If yes, how? By Bank/Post Office/ Privet Company/ Shares/
Jewelers/Other.
- 5.3 How much money do you save for pocket expense? (P.M)
Rs.....
- 5.4 How do you incurs your individual expenses?
1. Tea/coffee/cold drinks how much.....
 2. Pan masala how much.....
 3. Chewing of tobacco how much.....
 4. Buying clothes how much.....
 5. Buying toys for children's how much.....
 6. By seeing films how much.....
 7. In hotel how much.....
 8. Drinking for hard drinks how much.....
 9. In gambling how much.....
 10. Prostitution how much.....
 11. Other how much.....
- 5.5. How much total expense (P.M) Rs.....
- 5.6. have you life insurance? Y/N
- 5.7. Is there any insurance facilities given to you by owner? Y/N.
- 5.8. Is there any debt to your family? Y/N
If Yes, How much (Rs.).....
- 5.9 Does your family expenses are more then your family income? Y/N

5.10 By whom do you get money?

6. Important Information

6.1 Would you like to start your own factory in future? Y/N

6.2 How do you feel, when you are working? Enjoying/ Tolerating.

6.3 Do you think that women should struggle in starting her individual diamond business? Y/N

6.4 What are your expectations from owners & government?

Owners.....

Govt.....

6.5 Are you fully aware about diamond business work process? Y/N

Do you get this type of guidance? Y/N

6.6 Are you aware of labour law? Y/N

Do you get this type of guidance? Y/N

6.7 Do you feel that you are getting less rest & sleep? Y/N

6.8 Do you think that it is affected to your family and your nature? Y/N

6.9 Which type of things do you have at your home?

T.V. / Radio/ Scooter/ Sofa Set/cup-board/Freeze/ Gas/Other.

6.10 (1) Do you ever take break fast? Y/N

(2) Do you feel to eat without hungry? Y/N

(3) DO you ever feel to drink tea? Y/N

(4) Do you think that these things may create stomach sometimes?
Y/N

6.11 Do you regularly bath? Y/N

6.12 Do you any time quarrel with your collide? Y/N

6.13 Do you quarrel at home? Y/N

6.14 Are you a member of any labor union? Y/N

6.15 Do you think that there is a less ventilation at your factory? Y/N

6.16 Do you feel density? Y/N

- 6.17 Are you feeling any health problem like?
Skin Disease/ Headache/ Eye's Number/ Job Security/Density/Other.
- 6.18 Do you think, owner should give you facilities for remedies? Y/N
- 6.19 Is there any accident happened at your work place? Y/N
- 6.20 Would your owners give you treatment or reward? Y/N
- 6.21 By whom do you get treatment? Private/ Government/ Other
- 6.22 How much do you spent averagely for medicine? (P.M)
Rs.....
- 6.23 Which type of news papers & magazines do you read?
.....
Languages.....
- 6.24 Do you ever see T.V? Y/N
If, yes, How much hours per day?
- 6.25 Are you getting participation in diamond industrialist's meeting? Y/N
- 6.26 Are they demanding your opinion? Y/N
- 6.27 Do you Know history of diamond or diamond industry in India? Y/N

7. Suggestions

- 7.1 What is your expectation from labor union?
- 7.2 What is your suggestion to improve the working condition of diamond workers?
- 7.3 Any other Suggestions?

APPENDICIES



TABLE-5.1

**DTC Sale of Rough Diamonds & India's
Offtake
Year 1990 to 2004**

SR. NO.	YEAR	DTC'S SALES	INDIA'S OFFTAKE	PERCENTAGE SHARE (%)
		[US \$ IN MILL.]	[US \$ IN MILL.]	
1	1990	4,167.00	633433.00	15.31
2	1991	3,927.00	678.00	17.27
3	1992	3,417.00	566.00	16.56
4	1993	4,366.00	706.00	16.17
5	1994	4,250.00	690.00	16.24
6	1995	4,531.00	747.00	16.49
7	1996	4,834.00	677.00	14.00
8	1997	4,640.00	618.00	13.32
9	1998	3,345.00	483.00	14.44
10	1999	5,240.00	777.00	14.83
11	2000	5,670.00	995.00	17.55
12	2001	4,454.00	989.00	22.20
13	2002	5,154.00	1,127.10	21.87
14	2003	5,518.00	1,469.00	26.62
15	2004	5,695.00	1,607.57	28.23

Source:- www.gjepc.org

TABLE-5.2

Diamond Import / Export Trade of India
Year 1990 to 2005

SR. NO.	YEAR	IMPORT			EXPORT			ADDED VALUE		% OF ADDED VALUE WRT. IMPORT
		CTS. IN LAKHS	RS. IN CRORES	US \$ IN MILLIONS	CTS. IN LAKHS	RS. IN CRORES	US \$ IN MILLIONS	RS. IN CRORES	US\$ IN MILLION	
1.	1990 - 1991	371.26	3,544.00	1,975.00	83.35	4,739.00	2,641.00	1,195.00	666.00	33.72
2.	1991 - 1992	545.93	4,678.00	1,882.00	87.21	6,163.00	2,500.00	1,485.00	618.00	31.74
3.	1992 - 1993	722.86	6,768.00	2,186.00	110.32	8,316.00	2,868.00	1,548.00	682.00	22.87
4.	1993 - 1994	696.09	8,081.00	2,562.00	139.90	11,410.00	3,649.00	3,329.00	1,087.00	41.20
5.	1994 - 1995	729.08	8,810.00	2,792.00	158.07	12,573.00	4,021.00	3,763.00	1,229.00	42.71
6.	1995 - 1996	899.01	10,993.00	3,274.00	192.11	15,501.00	4,662.00	4,508.00	1,388.00	41.01
7.	1996 - 1997	1,029.01	12,038.00	3,382.00	188.83	14,916.00	4,235.00	2,878.00	853.00	23.91
8.	1997 - 1998	1,066.12	11,254.42	3,036.15	205.55	16,579.45	4,492.66	5,325.03	1,456.51	47.32
9.	1998 - 1999	1,526.95	14,127.93	3,343.18	267.99	21,074.12	5,026.11	6,946.19	1,682.93	49.17
10.	1999 - 2000	1,337.02	20,924.77	4,812.30	331.17	28,706.51	6,647.82	7,781.74	1,835.52	37.19
11.	2000 - 2001	1,003.83	19,832.96	4,349.80	299.06	28,041.80	6,186.70	8,208.84	1,836.90	41.39
12.	2001 - 2002	1,292.24	20,098.84	4,205.48	328.86	28,346.49	5,971.91	8,247.65	1,766.43	41.04
13.	2002 - 2003	2,082.43	30,504.17	6,270.99	372.30	34,297.89	7,110.57	3,793.72	839.58	Dec-44
14.	2003 - 2004	1,991.40	33,064.03	7,141.04	376.76	39,550.56	8,627.48	6,486.53	1,486.44	19.62
15.	2004 - 2005 (Provision)	1,762.41	34,241.95	7,595.31	479.43	50,073.60	11,181.53	15,831.65	3,586.22	46.23

Source:- www.gjepc.org

TABLE-5.3

**AVERAGE PRICE OF ROUGH DIAMONDS IMPORTED
INTO INDIA AND POLISHED
DIAMONDS EXPORTED FROM INDIA
YEAR 1990 TO 2004**

SR. NO.	YEAR	IMPORT		EXPORT	
		US\$/C T	RS/CT	US\$/CT	RS/CT
1	1990-1991	531.97	9,545.87	3,168.58	56,853.15
2	1991-1992	344.73	8,568.86	2,866.48	70,664.37
3	1992-1993	302.41	9,362.81	2,599.31	75,382.07
4	1993-1994	368.06	11,609.13	2,608.31	81,557.47
5	1994-1995	382.95	12,083.72	2,530.47	79,127.69
6	1995-1996	364.18	12,227.90	2,426.68	80,688.04
7	1996-1997	328.67	11,698.62	2,242.81	78,994.33
8	1997-1998	284.77	10,556.03	2,185.68	80,658.96
9	1998-1999	218.94	9,252.39	1,875.48	78,637.71
10	1999-2000	359.93	15,650.30	2,007.37	86,682.10
11	2000-2001	433.32	19,757.29	2,068.72	93,766.47
12	2001-2002	325.44	15,553.49	1,815.94	86,196.22
13	2002-2003	301.14	14,648.35	1,909.90	92,124.31
14	2003-2004	358.59	16,603.41	2,289.85	104,972.69

Source:- www.gjpec.org

TABLE-5.4

**World Mine Production of Rough Diamonds
Year 1990 to 1996
[Million Carats]**

SR. NO.	COUNTRY	1990	1991	1992	1993	1994	1995	1996
1	Australia	36.00	36.00	40.00	42.20	40.00	38.50	38.00
2	Zaire	24.00	19.00	15.00	15.00	19.00	19.00	20.60
3	Botswana	17.30	16.50	15.90	17.00	14.73	15.55	16.90
4	Russia (U.S.S.R.)	15.00	13.00	Nov-25	16.00	15.00	13.65	13.50
5	South Africa	Aug-50	Aug-20	10.00	Oct-30	Oct-62	11.00	Sep-98
6	N.A.mibia	0.80	Jan-40	Jan-60	N.A.	1-Aug	Jan-30	Jan-34
7	South America	Jan-70	2.00	Feb-60	N.A.	N.A.	N.A.	N.A.
8	Ghana	0.20	0.20	0.50	N.A.	0.50	1.00	0.82
9	Central African Republic	0.50	0.50	0.40	N.A.	0.50	0.64	0.65
10	Sierra Leone	0.70	0.60	0.55	7-Oct	0.27	0.44	Jan-20
11	Liberia	0.30	0.10	N.A.	N.A.	N.A.	0.20	0.25
12	Tanzania	N.A.	N.A.	N.A.	N.A.	0.06	0.06	N.A.
13	Angola	Jan-30	Jan-30	Feb-70	N.A.	2.00	Apr-43	Feb-50
14	Guinea	0.10	0.10	0.10	N.A.	0.10	0.64	0.90
15	Demo Repl of Congo	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
16	Other Countries	0.30	Jan-30	0.40	-	Feb-77	May-14	Apr-41
	TOTAL	106.70	100.20	101.00	107.60	106.63	111.55	111.05

Source:- www.gjepc.org

(Continue)

**World Mine Production of Rough Diamonds
Year 1997 to 2003
[Million Carats]**

SR. NO .	COUNTRY	1997	1998	1999	2000	2001	2002	2003
1	Australia	36.00	40.92	29.78	26.70	26.20	33.64	33.10
2	Zaire	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
3	Botswana	17.85	19.80	21.35	24.65	26.40	28.40	30.40
4	Russia (U.S.S.R.)	13.40	15-Oct	23.00	23.20	23.20	23.00	24.00
5	South Africa	Sep-90	Oct-65	10-Feb	Oct-78	Nov-17	Oct-88	Dec-67
6	Namibia	Jan-44	N.A.	N.A.	Jan-60	Jan-49	Jan-35	Jan-65
7	South America	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
8	Ghana	0.74	0.50	0.50	0.88	Jan-17	0.96	1.00
9	Central African Republic	0.60	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
10	Sierra Leone	0.50	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
11	Liberia	0.20	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
12	Tanzania	0.13	N.A.	0.23	0.32	0.25	0.21	0.23
13	Angola	May-34	5-Sep	4-Oct	6.00	May-17	5-Feb	May-30
14	Guinea	0.75	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
15	Demo Repl of Congo	N.A.	21.36	20-Dec	17.50	18.24	18.24	20.00
16	Other Countries	26.97	Jun-30	Jul-90	Jun-37	Jul-32	Aug-80	Aug-85
	TOTAL	113.82	119.72	117.00	118.00	120.60	130.50	137.20

Source:- www.gjpec.org

TABLE-5.5

**Exports of cut & Polished Diamonds from the
India to Major Market Year 1990 to 1994**

SR. NO	COUNTRY	EXPORTS OF CUT & POLISHED DIAMONDS							
		1990 - 91		1991 - 92		1992 - 93		1993 - 94	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION
1	U.S.A.	1,497.00	834.32	1,931.39	783.46	3,031.71	1,048.32	3,586.18	1,146.91
2	Hong Kong	657.59	366.49	997.27	404.54	1,527.14	524.08	2,805.51	897.26
3	Belgium	939.76	523.75	1,198.38	486.12	1,357.53	468.66	1,811.98	579.49
4	U.A.E	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
5	Israel	90.99	50.71	156.05	63.30	210.85	72.62	304.35	97.34
6	Japan	951.68	530.40	1,174.39	476.39	1,271.39	439.94	1,676.27	536.09
7	Thailand	175.77	97.96	201.80	81.86	233.73	80.37	371.04	118.65
8	U.K	44.26	24.67	48.97	19.86	51.95	18-Feb	61.31	19.61
9	Singapore	57.10	31.82	84.53	34.29	145.00	50.41	231.05	73.91
10	Switzerland	118.60	66.10	135.36	54.91	116.84	40.57	120.38	38.52
11	Germany	62.65	34.92	73.12	29.66	90.67	31.40	104.38	33.37
12	Australia	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
13	Others	143.31	79.87	161.38	65.47	279.34	93.17	337.44	107.88
	TOTAL	4,738.71	2,641.01	6,162.64	2,499.86	8,316.15	2,867.56	11,409.89	3,649.03

Source:- www.gjepc.org**(Continue)**

**Exports of cut & Polished Diamonds from the
India to Major Market Year 1994 to 1998**

SR N O.	COUNTRY	EXPORTS OF CUT & POLISHED DIAMONDS							
		1994 - 95		1995 - 96		1996 - 97		1997 - 98	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLI ON
1	U.S.A.	3,907.35	1,249.55	4,518.61	1,363.00	4,807.58	1,363.97	6,050.84	1,641.31
2	Hong Kong	3,190.87	1,020.42	3,856.81	1,161.51	3,543.88	1,006.48	4,056.88	1,099.96
3	Belgium	1,985.59	626.35	2,434.93	730.52	2,508.20	712.24	2,881.00	776.54
4	U.A.E	27.29	Aug-73	46.50	13.98	118.86	33.70	193.04	51.99
5	Israel	324.38	103.74	494.84	147.27	508.66	144.47	764.06	206.69
6	Japan	1,770.23	566.11	2,357.73	707.91	1,690.24	480.72	1,155.64	314.78
7	Thailand	496.04	158.63	728.52	219.35	573.26	163.09	324.41	88.11
8	U.K	74.68	23.88	84.40	26.50	104.08	29.55	80.74	21.99
9	Singapore	205.66	65.77	274.13	82.16	348.97	98.87	231.53	64.03
10	Switzerland	175.47	56.11	206.88	61.93	257.07	72.89	268.89	72.51
11	Germany	97.33	31.13	121.66	36.60	107.14	30.34	120.93	32.81
12	Australia	52.60	16.82	56.30	18.00	59.42	16.87	58.20	15.79
13	Others	265.91	93.67	319.67	93.16	289.14	81.91	393.29	106.15
	TOTAL	12,573.39	4,020.91	15,500.98	4,661.90	14,916.50	4,235.10	16,579.45	4,492.66

Source:- www.gjepc.org

(Continue)

**Exports of cut & Polished Diamonds from the
India to Major Market Year 1998 to 2002**

SR. NO.	COUNTRY	EXPORTS OF CUT & POLISHED DIAMONDS							
		1998 - 99		1999 - 2000		2000 - 01		2001 - 02	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION
1	U.S.A.	7,972.56	1,900.18	10,546.51	2,442.44	9,702.33	2,144.33	9,365.33	1,972.71
2	Hong Kong	5,114.65	1,219.69	7,790.00	1,803.37	7,570.26	1,669.97	7,594.46	1,600.11
3	Belgium	3,651.02	872.59	3,955.01	915.98	4,122.97	908.22	3,999.83	842.35
4	U.A.E	263.12	62.63	583.24	135.11	1,180.49	258.62	1,634.98	344.34
5	Israel	1,016.01	242.28	1,588.85	367.94	1,213.92	268.32	1,252.99	263.85
6	Japan	1,450.21	345.82	1,955.72	453.26	1,700.16	375.05	1,560.39	329.22
7	Thailand	401.74	95.80	698.66	161.67	815.21	179.36	1,020.97	215.08
8	U.K	146.45	34.80	153.82	35.59	179.47	39.46	155.95	32.93
9	Singapore	269.79	64.21	424.17	98.30	462.23	101.93	457.38	96.32
10	Switzerland	408.51	97.53	474.09	109.92	501.56	110.65	566.31	119.49
11	Germany	158.88	37.80	185.60	42.98	163.15	36.06	137.52	29.00
12	Australia	84.85	20.22	106.95	24.77	102.76	22.63	120.91	25.48
13	Others	136.33	32.56	243.89	56.49	327.29	72.10	479.47	101.03
	TOTAL	21,074.12	5,026.11	28,706.51	6,647.82	28,041.80	6,186.70	28,346.49	5,971.91

Source:- www.gjepc.org

(Continue)

**Exports of cut & Polished Diamonds from the
India to Major Market Year 2002 to 2005**

SR. NO.	COUNTRY	EXPORTS OF CUT & POLISHED DIAMONDS					
		2002 - 03		2003 - 04		2004 - 05	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION
1	U.S.A.	10,907.17	2,258.80	11,715.37	2,553.88	11,611.16	2,584.76
2	Hong Kong	9,232.97	1,915.73	11,162.21	2,436.52	13,614.16	3,042.11
3	Belgium	4,489.35	930.82	4,758.56	1,038.23	5,647.52	1,261.53
4	U.A.E	2,046.08	424.69	3,640.21	795.79	8,250.31	1,845.49
5	Israel	2,114.65	438.45	2,643.46	576.03	3,140.34	700.61
6	Japan	1,706.37	353.50	1,840.89	401.57	2,101.54	468.64
7	Thailand	1,003.05	207.48	917.77	200.41	1,179.55	263.10
8	U.K	459.05	95.70	344.43	75.16	273.76	60.87
9	Singapore	651.79	135.08	788.07	171.73	2,582.40	580.97
10	Switzerland	638.91	132.65	1,090.22	236.28	727.68	162.58
11	Germany	137.83	28.55	157.59	34.39	199.30	44.35
12	Australia	166.09	34.44	225.82	49.31	255.24	56.96
13	Others	744.57	154.68	265.95	58.18	490.42	109.51
	TOTAL	34,297.88	7,110.57	39,550.56	8,627.48	50,073.37	11,181.48

Source:- www.gjepec.org

TABLE-5.6

**Import of the Cut & Polished Diamonds by Major
Markets & India's Share
Year 1990 to 1993**

IMPORT OF CUT & POLISHED DIAMONDS BY MAJOR MARKETS & IND								
PARTICULARS	1990		1991		1992		1993	
	CTS MILLIO N	US \$ MILLION	CTS MILLIO N	US \$ MILLION	CTS MILLIO N	US \$ MILLION	CTS MILLI ON	US \$ MILLION
TOTAL IMPORTS INTO USA	Jun-31	3,384.50	Jun-70	3,464.60	Jul-72	3,663.40	Sep- 70	4,486.30
OF WHICH INDIA'S SHARE	3-Dec	901.80	Mar-41	859.10	Apr-28	959.50	May- 68	1,242.10
PERCENTAGE	49.45	26.64	50.90	24.80	55.44	26.19	58.56	27.69
TOTAL IMPORTS INTO JAPAN	Mar-26	2,534.90	3-Apr	2,056.00	Feb-87	1,711.60	Mar- 26	1,924.30
OF WHICH INDIA'S SHARE	Jan-67	631.80	Jan-63	547.40	Jan-69	489.20	2-Oct	617.80
PERCENTAGE	51.23	24.92	53.62	26.62	58.89	28.58	64.42	32.11
TOTAL IMPORTS INTO BELGIUM	Apr-27	2,977.80	Apr-58	2,950.70	Apr-25	2,684.70	5-Apr	3,069.40
OF WHICH INDIA'S SHARE	Jan-41	550.10	Jan-46	516.20	Jan-30	425.20	Jan- 75	534.60
PERCENTAGE	33.02	18.47	31.88	17.49	30.59	15.84	34.72	17.42
TOTAL IMPORTS INTO ISRAEL	0.68	455.90	0.62	396.10	0.67	460.20	0.80	501.30
OF WHICH INDIA'S SHARE	0.15	59.80	0.14	58.00	0.17	61.40	0.26	94.90
PERCENTAGE	22-Jun	13-Dec	22.58	14.64	25.37	13.34	32.50	18.93
TOTAL IMPORTS INTO HONG KONG	Feb-45	1,607.80	Feb-73	1,665.50	Mar-36	1,983.80	Apr-65	2,347.50
OF WHICH INDIA'S SHARE	1-Aug	348.60	Jan-35	431.10	Jan-58	464.70	Feb- 69	804.40
PERCENTAGE	44.08	21.68	49.45	25.88	47.02	23.42	57.85	34.27

Source:- www.gjepec.org

(Continue)

**Import of the Cut & Polished Diamonds by Major
Markets & India's Share
Year 1994 to 1997**

IMPORT OF THE CUT & POLISHED DIAMONDS								
PARTICULARS	1994		1995		1996		1997	
	CTS MILLIO N	US \$ MILLIO N	CTS MILLIO N	US \$ MILLIO N	CTS MILLIO N	US \$ MILLIO N	CTS MILLIO N	US \$ MILLION
TOTAL IMPORTS INTO USA	Oct-69	4,943.9 0	Nov-93	5,321.6 0	Dec-25	5,828.40	13.44	6,945.30
OF WHICH INDIA'S SHARE	Jun-40	1,629.2 0	Jul-56	1,386.3 0	Jul-40	1,396.80	Aug-17	1,582.40
PERCENTAGE	59.87	32.95	63.37	26-May	60.41	23.97	60.79	22.78
TOTAL IMPORTS INTO JAPAN	Mar-68	2,178.0 0	Apr-18	2,555.6 0	Mar-61	2,511.50	Feb-66	1,434.30
OF WHICH INDIA'S SHARE	Feb-45	701.70	Feb-68	784.90	Feb-37	760.20	Jan-77	437.80
PERCENTAGE	66.58	32.22	64.11	30.71	65.65	30.27	66.54	30.52
TOTAL IMPORTS INTO BELGIUM	May-29	3,516.3 0	May-88	3,893.0 0	Jun-76	4,337.50	Jun-46	4,147.50
OF WHICH INDIA'S SHARE	Jan-89	606.00	2-Aug	724.20	Feb-42	755.20	Feb-32	709.50
PERCENTAGE	35.73	17.23	35.37	18.60	35.80	17.41	35.91	17-Nov
TOTAL IMPORTS INTO ISRAEL	0.92	590.90	Jan-13	671.60	Jan-29	791.60	Jan-46	862.90
OF WHICH INDIA'S SHARE	0.30	104.80	0.36	123.70	0.43	156.00	0.53	178.80
PERCENTAGE	32.61	17.74	31.86	18.42	33.33	19.71	36.30	20.72
TOTAL IMPORTS INTO HONG KONG	May-76	2,834.4 0	Jun-53	2,975.4 0	Jun-64	2,824.00	Jul-26	2,738.80
OF WHICH INDIA'S SHARE	Mar-37	970.80	Apr-19	1,198.9 0	Apr-24	1,085.60	Apr-62	1,089.60
PERCENTAGE	58.51	34.25	64.17	40.29	63.86	38.44	63.64	39.78

Source:- www.gjepc.org

(Continue)

**Import of the Cut & Polished Diamonds by Major
Markets & India's Share
Year 1998 to 2001**

IMPORT OF THE CUT & POLISHED DIAMONDS								
PARTICULARS	1998		1999		2000		2001	
	US \$ MILLION	CTS MILLIO N	US \$ MILLION	CTS MILLIO N	US \$ MILLION	CTS MILLIO N	US \$ MILLION	CTS MILLI ON
TOTAL IMPORTS INTO USA	6,945.30	16.37	7,895.71	19.16	9,161.12	19.50	11,235.0 0	N.A.
OF WHICH INDIA'S SHARE	1,582.40	Oct-38	1,866.41	13-Apr	2,283.34	Dec-19	2,506.00	N.A.
PERCENTAGE	22.78	63.41	23.64	68.06	24.92	62.51	22.31	-
TOTAL IMPORTS INTO JAPAN	1,434.30	Feb-48	1,047.00	3-Aug	1,328.00	N.A.	1,212.00	N.A.
OF WHICH INDIA'S SHARE	437.80	Jan-77	345.00	Feb-27	490.15	N.A.	N.A.	N.A.
PERCENTAGE	30.52	71.37	32.95	73.70	36.91	-	-	-
TOTAL IMPORTS INTO BELGIUM	4,147.50	Jul-54	4,266.42	Jul-34	4,281.64	Aug-26	5,108.72	N.A.
OF WHICH INDIA'S SHARE	709.50	3-Oct	882.04	Feb-99	792.39	3-Jul	894.51	N.A.
PERCENTAGE	17-Nov	41.11	20.67	40.74	18.51	37.17	17.51	-
TOTAL IMPORTS INTO ISRAEL	862.90	Jan-67	1,048.00	Feb-31	1,453.72	Feb-98	2,079.00	N.A.
OF WHICH INDIA'S SHARE	178.80	0.80	244.53	1-Mar	302.73	N.A.	N.A.	N.A.
PERCENTAGE	20.72	47.90	23.33	44.59	20.82	-	-	-
TOTAL IMPORTS INTO HONG KONG	2,738.80	Jun-73	2,017.08	Sep-99	2,687.10	N.A.	N.A.	N.A.
OF WHICH INDIA'S SHARE	1,089.60	Apr-78	1,073.41	Jul-28	1,501.06	N.A.	N.A.	N.A.
PERCENTAGE	39.78	71.03	53.22	72.87	55.86	-	-	-

Source:- www.gjepec.org

(Continue)

**Import of the Cut & Polished Diamonds by Major
Markets & India's Share
Year 2002 to 2004**

IMPORT OF THE CUT & POLISHED DIAMONDS						
PARTICULARS	2002		2003		2004	
	CTS MILLION	US \$ MILLION	CTS MILLION	US \$ MILLION	CTS MILLION	US \$ MILLION
TOTAL IMPORTS INTO USA	N.A.	11,500.85	N.A.	12,162.64	N.A.	1,390.00
OF WHICH INDIA'S SHARE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
PERCENTAGE	-	-	-	-	-	-
TOTAL IMPORTS INTO JAPAN	N.A.	940.01	N.A.	971.68	N.A.	1,127.27
OF WHICH INDIA'S SHARE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
PERCENTAGE	-	-	-	-	-	-
TOTAL IMPORTS INTO BELGIUM	N.A.	5,721.28	N.A.	6,402.71	N.A.	7,575.65
OF WHICH INDIA'S SHARE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
PERCENTAGE	-	-	-	-	-	-
TOTAL IMPORTS INTO ISRAEL	N.A.	2,389.40	N.A.	3,404.20	N.A.	3,562.45
OF WHICH INDIA'S SHARE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
PERCENTAGE	-	-	-	-	-	-
TOTAL IMPORTS INTO HONG KONG	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
OF WHICH INDIA'S SHARE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
PERCENTAGE	-	-	-	-	-	-

Source:- www.gjepec.org

TABLE-5.7

Rough Diamonds - Major Suppliers to India
Year 1990 to 1994

SR · NO ·	COUNTR · Y	IMPORT OF ROUGH DIAMONDS INTO INDIA							
		1990 - 91		1991 - 92		1992 - 93		1993 - 94	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLIO N
1	Belgium	2,260.60	1,237.60	2,816.86	1,129.95	4,236.49	1,368.15	5,123.80	1,624. 37
2	U.K	1,142.81	636.92	1,621.60	656.78	2,168.99	699.59	2,463.58	781.04
3	Israel	130.91	72.96	156.42	63.25	187.75	60.76	316.34	100.30
4	U.A.E	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
5	Hong Kong	0.73	0.41	14.63	May-63	71.42	23.50	14.49	Apr-59
6	U.S.A	24.42	13.61	17.23	Jun-85	44.58	14.44	53.23	16.86
7	Switzerla nd	0.46	0.26	-	-	0.22	0.07	-	-
8	Others	May-40	3.00	25.47	Sep-65	33.39	Oct-70	Feb-98	0.94
-	Total	3,565.33	1,964.76	4,652.21	1,872.11	6,742.84	2,177.21	7,974.42	2,528. 10

Source:- www.gjpc.org

(Continue)

Rough Diamonds - Major Suppliers to India
Year 1994 to 1998

SR · N O.	COUNTRY	IMPORT OF ROUGH DIAMONDS INTO INDIA							
		1994 - 95		1995 - 96		1996 - 97		1997 - 98	
		RS. IN CRORES	US \$ IN MILLIO N	RS. IN CRORES	US \$ IN MILLIO N	RS. IN CRORES	US \$ IN MILLIO N	RS. IN CRORES	US \$ IN MILLIO N
1	Belgium	5,328.2 7	1,703.9 6	6,945.91	2,088.4 3	7,879.24	2,239.0 6	8,129.45	2,188.3 5
2	U.K	2,371.2 6	758.32	2,881.28	866.32	2,450.14	696.26	2,165.83	587.31
3	Israel	510.17	163.15	579.94	174.37	809.93	230.16	692.39	187.09
4	U.A.E	1-Dec	0.36	2-Aug	0.63	Apr-78	Jan-36	0.87	0.23
5	Hong Kong	368.86	117.96	460.35	138.41	372.73	105.92	120.70	33.12
6	U.S.A	34.01	Oct-88	27.51	Aug-27	31-Jul	Aug-83	38.96	Oct-33
7	Switzerla nd	-	-	-	-	33.35	Sep-48	196.22	53.94
8	OtheRs	89.87	28.74	20.86	Jun-27	681.39	193.63	89.91	24.38
	TOTAL	8,703.5 5	2,783.3 5	10,917.9 4	3,282.7 0	12,262.6 3	3,484.6 9	11,434.3 3	3,084.7 5

Source:- www.gjepec.org

(Continue)

Rough Diamonds - Major Suppliers to India
Year 1998 to 2002

S R . N O .	COUNTRY	IMPORT OF ROUGH DIAMONDS INTO INDIA							
		1998 - 99		1999 - 2000		2000 - 01		2001 - 02	
		US \$ In Million	Rs. In Crores	US \$ In Million	Rs. In Crores	US \$ In Million	Rs. In Crores	US \$ In Million	Rs. In Crores
1	Belgium	2,188.3 5	10,081. 75	2,388.2 8	13,772. 61	3,167.7 5	11,558. 64	2,535.6 8	11,660. 74
2	U.K	587.31	2,785.0 6	658.01	4,275.5 5	983.58	5,142.7 3	1,130.2 7	4,978.5 8
3	Israel	187.09	878.75	207.89	1,800.0 8	414.04	1,416.8 5	310.37	1,150.7 5
4	U.A.E	0.23	91.07	21.32	214.02	49.32	767.73	167.81	818.75
5	Hong Kong	33.12	506.05	118.62	1,269.0 9	292.03	1,480.7 0	323.18	1,855.2 0
6	U.S.A	Oct-33	41.02	Sep-77	61.69	14.18	79.95	17.55	39.65
7	Switzerlan d	53.94	72.74	17.38	91.85	21.14	54.34	Dec-25	21.65
8	OtheRs	24.38	Nov-70	Feb-75	21.73	5-Feb	45.12	Sep-88	246.53
	TOTAL	3,084.7 5	14,468. 14	3,424.0 2	21,506. 62	4,947.0 6	20,546. 06	4,506.9 9	20,771. 85

Source:- www.gjepc.org

(Continue)

Rough Diamonds - Major Suppliers to India
Year 2003 to 2005

SR. NO.	COUNTRY	IMPORT OF ROUGH DIAMONDS INTO INDIA					
		2002 - 03		2003 - 04		2004 - 05 (PROVISION)	
		RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION	RS. IN CRORES	US \$ IN MILLION
1	Belgium	17,189.34	3,533.54	18,167.72	3,924.97	19,506.17	4,321.28
2	U.K	7,164.48	1,473.12	7,875.56	1,699.46	7,836.85	1,736.99
3	Israel	1,880.44	386.56	2,230.80	483.33	2,634.17	584.02
4	U.A.E	1,493.29	307.57	1,720.36	369.17	968.07	214.96
5	Hong Kong	2,587.42	531.34	1,840.39	397.65	1,741.95	385.21
6	U.S.A	59.05	Dec-15	114.00	24.71	165.47	36.71
7	Switzerland	73.32	15-Mar	691.92	150.58	327.20	72.75
8	Others	56.84	Nov-68	423.28	91.17	1,062.07	243.37
	TOTAL	30,504.18	6,270.99	33,064.03	7,141.04	34,241.95	7,595.31

Source:- www.gjepec.org

TESTING OF HYPOTHESIS

(1)

ANOVA

Edu	M	F	
Iu.	70	10	80
ssc	41	2	43
hsc	19	3	22
gd	4	1	5
	134	16	150

$$\bar{X}_M = 33.5$$

$$\bar{\bar{X}} = \frac{33.5 + 4}{2} = 18.75$$

$$\bar{X}_F = 4$$

$$\begin{aligned} \text{SS between} &= 4(33.5 - 18.75)^2 + 4(4 - 18.75)^2 \\ &= 4(217.56 + 4(217.56)) \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{SS within} &= (70 - 33.5)^2 + (41 - 33.5)^2 + (19 - 33.5)^2 + (4 - 33.5)^2 \\ &+ \\ &\quad (10 - 33.5)^2 + (2 - 33.5)^2 + (3 - 33.5)^2 + (1 - \\ &33.5)^2 \end{aligned}$$

$$= 1332.25$$

$$= 133.25 + 56.25 + 210.25 + 870.25$$

$$= 2469$$

$$= 552.25 + 992.25 + 930.25 + 1056.25$$

$$= 3531$$

$$\text{SS total} = \underline{4801}$$

	SS	df	MS	F ratio	
BS	0	(27)1	0	0/800% 0	F(1,6)
WIIS	6000	(8.2)6	1000	0	= 234

H_0 Accepted

H_1 Rejected

There is a no significance difference between edu & quality of diamond.

(2)

	M	F	Total
0 – 3000	19	7	26
3001 – 6000	94	8	102
6001 – 9000	10	1	11
9001 – 12000	7	0	7
12001 – 15000	4	0	4
	134	16	150

$$\bar{X}_M = 26.8$$

$$\bar{X}_F = 16/5 = 3.2$$

$$\bar{X} = \frac{26.8 + 3.2}{2} = 15$$

$$\begin{aligned} \text{SS between} &= 5(26.8 - 15)^2 + 5(3.2 - 15)^2 \\ &= 5(139.24) + 5(139.24) \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{SS within} &= [(19 - 26.8)^2 + (94 - 26.8)^2 + (10 - 26.8)^2 + (7 - 26.8)^2 + \\ &\quad (4 - 26.8)^2] + [(7 - 3.2)^2 + (8 - 3.2)^2 + (1 - 3.2)^2 + \\ &\quad (0 - 3.2)^2 + (0 - 3.2)^2] \\ &= [60.84 + 4515.84 + 282.24 + 392.04 + 519.84] \\ &\quad + (14.44 + 23.04 + 4.84 + 10.24 + 10.24) \\ &= 5769.8 + 62.8 \end{aligned}$$

$$= 5832.6$$

$$\text{Total} = 5832.6$$

	SS	df	MS	F-ratio	table 5% limit
Bet Sample	0	(2-1)1	0	0	F(1,8) =238.9
within sample	5832.6	(10-2) = 8	5832.6/8 =729.075		

H_0 = accepted as the table value at 5% significant level is more than F-ratio.

H_1 = rejected

H_0 = No significance difference among earning of the diamond labour.

(3) Money Saving

	Male	Female	Total
In Bank	49	11	60
In Post	5	2	7
In Shares	3	-	3
In Jewellery	3	-	3
Other	35	2	40
Not saving	36	1	37
Total	134	16	150

$$\bar{x}_1 = \frac{134}{6} = 22.33 \quad \bar{x} = \frac{\bar{x}_1 + \bar{x}_2}{2}$$

$$\bar{x}_2 = \frac{16}{6} = 2.67 \quad = \frac{25}{2}$$

$$= 12.5$$

$$\text{SS between} = 6(\bar{x}_1 - \bar{x})^2 \dots\dots$$

$$\begin{aligned}
&= 6(22.33 - 12.5)^2 + 6(2.67 - 12.5)^2 \\
&= 96.62 + 96.62 \\
&= 0 \\
\text{SS within} &= \sum (x_{1i} - x_1)^2 + \sum (x_{2i} - x_2)^2 + \sum (x_{3i} - \\
&x_3)^2 \dots \\
&= (49 - 22.33)^2 + (5 - 22.33)^2 + (3 - 22.33)^2 \\
+ & \\
&(3 - 22.33)^2 \\
&+ (35 - 22.33)^2 + (36 - 22.33)^2 + (11 - \\
&2.67)^2 \\
&+ (2 - 2.67)^2 + (2 - 2.67)^2 + (1 + 2.67)^2 \\
&= 711.2889 + 300.3289 + 373.65 + \\
&373.65 \\
&+ 160.53 + 186.86 + 69.3889 + 0.4489 + \\
&0.4489 \\
&+ 2.7889 \\
&= 2193.37
\end{aligned}$$

	SS	d.f.	MS	F - Ratio	5% Level
Between	0	(2-1) = 1	0	0	241.4
within	2193.37	(12 - 2) = 10	219.337		

$H_0 =$ accepted

$H_2 =$ Rejected

There is no significant difference in money saving quantum by the diamond labour.

(4)

Wh	M	F	Total
6	1	0	1
7	0	0	0
8	18	9	27
9	1	0	1
10	86	7	93
11	13	0	13
12	14	0	14
13	0	0	0
14	1	0	1
	134	16	150

$$\bar{X}_M = \frac{134}{9} = 14.89 \quad \bar{X}_F = \frac{16}{9} = 1.78$$

$$\begin{aligned} \bar{X} &= \frac{14.89 + 1.78}{2} \\ &= 8.335 \\ &= 8.34 \end{aligned}$$

$$\begin{aligned} \text{SS between} &= 9(14.89 - 8.34)^2 + 9(1.78 - 8.34)^2 \\ &= 9(42.9025) - 9(43.034) \\ &= 386.1225 + 387.306 \\ &= 773.4285 \end{aligned}$$

$$\begin{aligned} \text{SS within} &= [192.93 + 221.71 + 9.67 + 192.93 + \\ &5056.63 + 3.5721 + 0.7921 + 221.71 + 192.93] \\ &+ [3.17 + \end{aligned}$$

$$3.17 + 52.13 + 3.17 + 27.25 + 3.17 + 3.17 + 3.17 + 3.17] \\ = 6092.8742 + 101.57 = 6194.44$$

$$\text{Total} = 6967.87$$

	SS	df	Ms	F-ratio	Table
Bet.	773.43	(2-1) = 1	773.43/1 = 773.43	773.43/387.15 = 1.99	F(1,16) = 243.9 (app)
within	6194.44	(18- 2) = 16	6194.44/16 = 387.15		

$H_0 = \text{accepted}$ $H_1 = \text{Rejected}$

There is no significance diff in the working hours of the diamond labour.

(5) Diwali Holidays

No. of Holidays	Male	Female
1 – 10	1	-
11 – 20	38	9
21 – 30	88	6
31 – 40	3	-
41 – 50	2	-
51 – 60	2	1
	134	16

$$\bar{x}_1 = \frac{134}{6} = 22.33 \qquad \bar{x} = \frac{22.33 + 2.67}{2}$$

$$\bar{x}_2 = \frac{16}{6} = 2.67 \qquad = 12.50$$

$$\begin{aligned}
\text{SS between} &= 6(22.33 - 12.5)^2 + 6(2.67 - 12.5)^2 \\
&= 96.62 - 96.62 \\
&= 0 \\
\text{SS within} &= [(1-22.33)^2 + (38 - 22.33)^2 + (88 - 2.33)^2 \\
&\quad + (3 - 22.33)^2 + (2 - 22.33)^2] + [(2 - \\
&\quad 22.33)^2 + \\
&\quad (0 - 2.67)^2 + (9 - 2.67)^2 + (6 - 2.67)^2 + \\
&\quad (0 - 2.67)^2 + (0-2.67)^2 + (1 - 2.67)^2] \\
&= 454.97 + 245.54 + 4312.55 + 373.64 + \\
&\quad 413.30 + 413.30 + 7.1289 + 40.06 + \\
&\quad 11.0889 \\
&\quad + 7.1289 + 27.89 \\
&= 6306.59
\end{aligned}$$

	SS	d.f	MS	F-ratio	5% level
Between	0	(2-1) = 1	0	0	241.4
Within	6306.59	(12-2) = 10	630.65		

$H_0 =$ accepted

$H_2 =$ Rejected

Conclusion :-

There is no significant difference in the length of the diwali holiday of the diamond labour.

(6)

Age	Rent House	Own House	In the fact	Total
8 – 30	68	43	7	118
31 – 40	12	15	0	27
41 – 50	2	0	0	2
51 – 60	3	0	0	3
	85	58	7	150

$$\bar{X}_{\text{Rent}} = \frac{85}{4} = 21.25$$

$$\bar{X}_{\text{Own}} = \frac{58}{4} = 14.5$$

$$\bar{X}_{\text{Fact}} = \frac{7}{4} = 1.75$$

$$X = \frac{37.5}{3}$$

$$= 12.5$$

$$\text{SS between} = 4(21.25 - 12.5)^2 + 4(14.5 - 12.5)^2 + (1.75 - 12.5)^2$$

$$= 306.25 + 16 + 462.25$$

$$= 784.5$$

$$\text{SS within} = [(68 - 21.25)^2 + (12 - 21.25)^2 + (2 - 21.25)^2 + (3 - 21.25)^2] + [43 - 14.5]$$

$$= [2185.56 + 85.56 + 370.56 + 330.66] +$$

$$812.25 + 0125 + 210.25 + 210.25) +$$

$$27.56 + 3.06 + 3.06 + 3.06)$$

$$= 4242.08$$

$$\text{Total} = 784.5 + 4242.08$$

$$= 5026.58$$

	SS	df	MS	F-ratio	Table F(2.9)
Bet	784.5	(3-1) = 2	392.25	0.8	= 4.26
with	4242.08	(12-3) = 9	471.34		

$H_0 =$ accepted

There is no significant difference in the residential status of the diamond labours.

(7)

$$\bar{x}_1 = \frac{134}{7} \qquad \bar{x} = 10.72$$

$$= 19.14$$

$$\bar{x}_2 = \frac{16}{7}$$

$$= 2.29$$

$$\text{SS between} = 7(19.14 - 10.72)^2 + 7(2.29 - 10.72)^2$$

$$= 476.27 - 497.45$$

$$= 1.18$$

$$\text{SS within} = [721.45 + 832.89 + 9.85 + 26.42$$

$$+ 199.94 + 293.78 + 260.5] + [59.44$$

$$\begin{aligned}
& + 7.34 + 1.66 + 5.24 + 5.24 + 5.24 + 5.24 \\
& + 5.24] \\
= & 2434.23
\end{aligned}$$

	SS	df	MS	F-ratio	5% level
between	1.18	1	1.18	0.0058	243.9

$H_0 =$ Accepted

$H_1 =$ Rejected

Conclusion =

There is no significant difference in the experience of the diamond labour.

(8)

Problems	Male	Female
Skin Diseases	14	1
Eyes	30	4
Headache	30	2
Weakness	11	3
Job Security	3	-
	134	16

$$\bar{x}_1 = \frac{134}{6} = 22.33$$

$$\bar{x} = \frac{25}{2}$$

$$\bar{x}_2 = \frac{16}{6} = 2.67$$

$$= 12.5$$

$$\begin{aligned}
\text{SS between} &= 6(22.33 - 12.5)^2 + 6(2.67 - 12.5)^2 \\
&= 579.77 - 579.77 \\
&= 0
\end{aligned}$$

$$\begin{aligned}
SS \text{ within} &= (14 - 22.33)^2 + (46 - 22.33)^2 \dots\dots \\
&= (1 - 2.67)^2 + (6 - 2.67)^2 \dots\dots \\
&= 693.88 + 560.2089 + 58.82 \\
&+ 58.82 + 128.2689 + 373.64 + 2.7889 + \\
&11.0889 + 1.7684 + 0.4489 + 0.1089 + \\
&7.1289 \\
&= 1897.13
\end{aligned}$$

	SS	df	MS	F-ratio	5% level
between	0	(2-1) = 1	0		
within	1897.13	(12-2) = 10	189.713	0	241.4

$H_0 =$ Accepted

$H_1 =$ Rejected

Conclusion :-

There is no significant difference in individual problems of the diamond labour.

(9)

A	A_M	B_F	T
A Yes	52	9	61
B No	82	7	89
T	134	16	150

$$(AB) = \frac{61 \times 134}{150} = 54.49$$

	M	F	T
Yes	54.49	6.51	61
No	79.51	9.49	89
T	134	16	150

groups	ob. Frequency	expected	(0.6)	(0.6) EN
	52	54.49	-2.49	0.11
	9	6.51	2.49	0.95
	82	79.51	2.49	0.078
	7	9.49	-2.49	0.65
			0	1.788

$$\bar{X}^2 = 1.788$$

Degree of = 1 table

There is not significant

Freedom = 3.841

difference in the wage of the

diamond

labour.

(10) CLI - square

Observed frequency

x bt	Male(a)	Female(b)	Total
Yes 17)	50	9	59
No 13)	84	7	91
	134	16	150

Expected Frequency

x bt	Male	Female	Total
Yes	$\frac{59 \times 134}{150} = 53$	6	59
No	81	10	91

	134	16	
--	-----	----	--

CLI Square Table

Obs	Exp	(obs – exp)	(obs – exp) ²	(obs – exp) ²
50	53	-3	9	0.1698
9	6	3	9	1.5
84	81	3	9	0.1111
7	10	-3	9	0.9
				2.6809

$$D.f = ((-1) (12-1))$$

$$= (2-1) (2-1) = 1$$

∴ Table value 5% level of significant

$$= 3.841$$

∴ H₀ = accepted

H₂ = Rejected

Conclusion: -

There is no significant difference in the debt condition of the diamond labour.

(11)

$$\bar{X}_M = 10.30$$

$$\bar{X}_F = 1.23$$

$$\bar{X} = 5.76$$

$$SS \text{ between} = 1069.44 + 266.77 = 1336.21$$

$$SS \text{ within} = [7174.01 + 18.49 + 86.49 + 86.49 + 68.89 - 86.49$$

$$+ 86.49 + 86.49 + 68.89 + 53.29 + 86.49 +$$

$$86.49 + 75.69]$$

$$+ [0.58 + 22.66 + 33.17 + 22.66 + 33.17 22.66 +$$

$$22.66$$

$$+ 22.66 + 33.17 + 33.17 + 22.66 + 33.17 - 0.58]$$

$$= 8064.69 + 302.97$$

$$= 8367.66$$

	SS	df	MS	F-ratio	Table
bet	1336.21	1	1336.21	3.83	(1.24)
with	8367.66	24	348.65		249.1

$H_0 =$ accepted

There is no significant difference among the cases of the diamond labour.

$$\bar{X}_M = 22.33 \quad \bar{X}_F = 2.67$$

$$\bar{X} = 12.5$$

$$SS \text{ between} = 579.77 - 579.77 = 0$$

$$SS \text{ within} = [335.99 + 300.33 + 454.97 + 1202 + 498.63$$

$$+ 215.21] + [2.79 + 2.79 + 0.44 + 11.09 + 1.08 +$$

$$1.78]$$

$$= 3028.01$$

	SS	df	Ms	F - ratio	Table
ss bet	0	1	0	0	F(1110) = 241.4
ss within	3028.01	10	302.801		

$H_0 =$ accepted

There is no significant difference in the migration problem faced by diamond labour.

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