

Project Crashing Impact to Labour Productivity and Quality of work in Construction Project

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Abstract

Crashing a project is a process of accelerating an activity or multiple activities in order to shorten the overall durations of a project. Project acceleration will increase the total cost of construction work. However, labour productivity decline with the use of crashing approach and it will give an impact to the quality of work at construction site. The purpose of this study is to obtain the impacts due to project crashing process application in construction. A total of 100 questionnaire forms were circulated to industrial personnel to obtain their reaction and opinion towards the purpose of this study. However, about 53% of the forms are returned. The data were analyzed by using Statistical Average Index Value Analysis. Series of structured interview with the 5 experts have been conducted to validate the finding and also to obtain more valuable information and explanation towards this study. The result reveals that majority of the respondents (>85%) are agreed with the purpose surveys questions related to the project crashing method. This indicates that project crashing is one of the effective techniques which can be implemented in construction project due to accelerate the project to give an impact through the route of a construction project. At the same time, this technique can be as one of the risks technique in the operational to construction project stages. Result from this findings gives better outlook for future study especially on the Project Crashing Impact to labour productivity and quality of work in construction project.

Keywords: Project crashing, Labour, Productivity, Quality of works

1. Introduction

This study is mainly conducted to make a reflection towards the use of project crashing in construction work. Project crashing is one of scheduling method that purposely uses to accelerate the project to achieve the main target of the project. The main purpose of this study is to accelerate the complete time and at the same time reducing the duration of an activity to be complete. Therefore, this project acceleration will give a direct or indirect impact to the labour productivity. It also can affect the work quality for the whole project. This situation can be considered as a serious problem in project management and it will affect the customer or the user of the product later. Mubarak S (2005) states 5 (five) reasons of accelerating a project:

1. The contractors "normal" finish date in the planned schedule does not meet the imposed finish date of contract. The contractor usually knows this situation before starting construction, or, sometimes, even before bidding. In many cases, the owner requires the contractor to submit a construction (critical path method, or CPM) schedule that sows a satisfactory finish date.
2. After starting construction and completing a certain percentage of the project, the contractor realizes that the project is behind schedule. It requires the contractor to accelerate the remainder of the schedule to make up for lost time and avoid finishing late. In many contract, penalties may be levied on the contractor for late finish.
3. In some cases, the contractor may have a contractual monetary incentive to finish ahead of schedule.
4. Sometimes, especially when the economy is doing well, finishing early means to the contractor starting another job earlier and, thus, making more profit. In many cases, the contractor knows the date when he or she is supposed to mobilize to the next project. This time frame may require them to compress the current project to free certain resources so that they can be reallocated to the new project.

5. To a certain point, accelerating a project may prove profitable to the contractor, as is discussed subsequently.

Acceleration can be planned before the start of the project, as in points 1 and 3 and possibly 4 and 5. It is not planned but sometimes during construction the work situation necessitates it. The application of this method will involve a compression works towards construction activity in order to meet up the dead line of the construction work. The scope of this study is covered the A class contractor at the district of Bukit Bintang. This is because study area experiencing rapid development and probability for the use of techniques are high.

2. Study Objectives

The main purpose of this study is to focusing on the application of project crashing in construction site and its impact towards labour productivity and quality of works. Therefore, some objectives have been proposed and been identified in order to study the project crashing impact to labour productivity and quality of work at construction site. The study objectives are as follows:

1. Identify problems which resulted in using project crashing technique.
2. Determine project crashing impact on labour productivity and quality of work at construction site.
3. Analyse the correlation between this project management method to the quality of works and labour productivity in construction project.

3. Literature Review

3.1 Project Crashing

According to Dr H. Randolph Thomas (2008), Schedule acceleration and compression is a serious problem for contractors. While schedule acceleration takes many forms and every project is unique, contractors would agree that schedule acceleration or compression will cost them more money. The goal of this section is to clear up the definition and the main ideas of project crashing and its impact. The emphasis is on labour resources, since it is the most difficult resource to manage and quantify.

When confronted with project crashing, managers especially have three options to increasing the labour hours by overtime, overmanning, and shift work. Each has its advantages and disadvantages. There are numerous overtime schedules, and these can generally be implemented rather quickly. However, the research shows that labour productivity declines with the use of an extend overtime schedule (NECA 1989). Contractors can also hire more craftspeople. Overmanning is often used in conjunction with scheduled overtime.

This combination places added burdens on supervision to provide the resources, minimize the effects of an ever-increasing frequency of disruptions, and maintain the orderly progress of the work. Craft congestion and stacking of trades at the work face is another important concern. The cost implications of adding additional labour are generally greater than scheduled overtime. Another way to add additional labor is to initiate a second or third shift. However, while another shift may relieve congestion concern, coordination between shifts is critical. The selection of work to be performed on the second shift is not a trivial matter and requires careful consideration. The resource availability problem is still present.

An accelerated project can earn additional bonus money, prevent the payment of fines or damages to the owner, or save the company additional indirect costs.

Crashing can be defined as a method of scheduling used to compress the project schedule which had been constructed earlier in management phases. One of the methods that can be applied is to add resources on the critical path in scheduling. Then, it also can be done by reducing the scope of the project. It only can be apply after an agreement process with main share holder in the project.

3.2 Quality

Schexnayder (2000) define quality in construction as ‘meeting or exceeding the needs of the customer’. There may be individuals or organizations that feel they were the first to use the definition, and that they should be given credit for being its author, but the definition has become so common that now everyone uses it in common conversation about country quality. It has become the definition.

By referring to Schwalbe (2006) The International Organization for Standardization defined quality as “the degree to which a set of inherent characteristics fulfill requirements” (ISO9000:2000). Other experts define quality based on conformance to requirements and fitness for use.

Mature organizations readily admit that they cannot accurately define quality. The ISO 9000 definition is ‘the totality of feature and characteristics of a product or service that bears on its ability to satisfy stated or implied needs’ terms such as fitness for use, customer satisfaction, and zero defects are goals rather than definitions.

The building construction industry is evolving at a rapid pace. Construction related firms recognize the need for providing a quality product that will both satisfy the customer and maintain their competitiveness in an ever-changing and demanding market. Companies are being persuaded to adopt quality management system in order to meet demand of customer in globalize market. ISO 9000, a series of international quality management standards has emerged during the last two decades as a system that can be applied to different types of companies in order to obtain improvement in quality procedures and products.

ISO 9000 is being implementing all over the world as a system of standards related to quality assurance management and control for companies and institutions. The International Organization for Standardization’ as part of this institution’s efforts to promote uniformity and facilitate international exchange between nations is these standards were developed by ISO. ISO 9000 has gained popularity and is being applied to companies and institutions all over the world due to its generic nature.

ISO 9000 certification in the construction industry has been widely accepted in many countries, and the number of certifications for general, heavy and specialty contracting companies is growing considerably. Some investigator Kubal (1999) associate ISO 9000 with multiple advantages and with positive changes in internal procedures of construction firm. Yet other argue from Anitfos (1996) said that that this cannot be associated with a substantial improvement in the delivery of quality construction product.

3.3 Productivity

Productivity in construction works is normally influenced by few factors. Impact of being created in different factor can be calculated from productivity model. This model is important in cost estimation, scheduling, and work planning.

Normally productivity of work has been used for certain context with different purpose. Generally, productivity is defined as unit of output per unit of time. Due to the tradition and practice in construction industries, productivity is illustrated as an amount of time needed for producing a unit of output where the unit of output is different by depending on certain condition.

Therefore, Eddy M. Rojas said that it is normal to get manual of labor hour where productivity can be obtained. Productivity is a medium to measuring the output from production process per unit of input. Work productivity can also be defined as a rate of output of work per unit of work time as an input. Productivity may contain matrix for technical work or rate of output for efficient engineering work.

3.3.1 Factor influence the productivity

R.J Gordon (2009) state that factor that influence work productivity in individual work is as same as the factor as affect the performance of works for manufacturing firm. This factor include physical-organic, location and technology factor, the international influence also can be a factor that affecting the productivity of work. Other than that, management also distribute on the rate of productivity of work. The payment system is one of the main factors that can influence the work productivity especially in construction project. Operation by using the technology in salary management has been a best method in order to maintain the rate of productivity.*Abstract and Keywords*

3.3.2 The effect of crashing

Eddy M. Rojas (2004) also state that numerous organizations have published the results of scheduled overtime on labour efficiency. Among these are National Electrical Contractors Association (NECA 1989), The Mechanical Contractors Association (MCA 1968), The Business Roundtable (BRT 1980), and Construction Industry Institute Thomas and Raynar 1994 (2008). These and other reports are consistent in schedule of 50 hours per week. It shows a result of the lost of work efficiency at 15% after four to five continuous weeks of overtime. In short term, one principal reason about the lost of work efficiency is the difficulties in providing adequate resources to the workers that is, materials, equipment, tools, and information. Beyond four to five weeks, fatigue becomes an ever increasing problem. After 10 to 12 weeks of prolonged overtime schedule, losses of efficiency can easily exceed 35% to 40%.

According to Thomas and Raynar (2008), there are two reason of efficiency loses which is congestion or stacking of trades and dilution of supervision. Of the studies published, the consensus seems to be that efficiency losses are in range of 10% to 20%.

Strategies to minimize the negative effect of schedule acceleration must begin with understanding of the environment in which the work is to be done. Research has identified the following major characteristics of the job environment when the schedule is accelerated:

- (i) Specialty contractors have limited control over the schedule.
- (ii) Schedule acceleration leads to changes in the daily work plan, making it difficult to plan more beyond the next day.
- (iii) Specialty contractors primarily react to the situation to make things happen.
- (iv) The entire schedule float is gone.
- (v) There are many more intermediate deadlines.
- (vi) Changes often cause or accompany acceleration. The demands on the information and material supply network increase.
- (vii) Foremen are stretched to the limit such that the short-range planning function is greatly hampered.
- (viii) The turnaround time for taking positive action is relatively short.

4. Study Methodology

The main purpose of methodology is to achieve the objectives of the study. The flow of this study was divided into three stages which are planning stages, data collection, data analysis and conclusion. The main objective of this study is to identify project crashing impact on labour productivity and quality of work at construction site. The survey and data collection was conducted at the district of Bukit Bintang as stated to be the main scope of this study.

The questionnaire of the study was developed based on the information gathered from the literature review and it was be synchronized by the info gathered by pilot study which was conducted at the earlier stage of the questionnaire arrangement works.

Structured interviews were conducted with the industrial personnel that were directly connected to the application of project crashing. The question of the interview was constructed by referring to the questionnaire. The purpose of the structured interview is to ensure that the information gathered is based on the main issues of this study and at the same time to get a detail explanation on all questions in the questionnaire. Other than that, the structured interview was conducted due to control the additional information gathered both from the questionnaire and interview to be in parallel line of data collection.

All data collected from questionnaire was analyzed by using Average Index Value Analysis. The data was analyzed and graded by following calculation involved in determining the average index value of every question stated in the questionnaire form. Data collected by interview was gathered and used to elaborate the data collected by using the questionnaire and it will be synchronized with the information gathered from literature review.

5 Results

5.1 Factors which cause the use of project crashing in construction work.

The use of project crashing can be influenced by many factors. It will be considered due to its correlation between the benefits and its capabilities to accelerate the project schedule. In this study, the data collection shows a final bar chart as below:

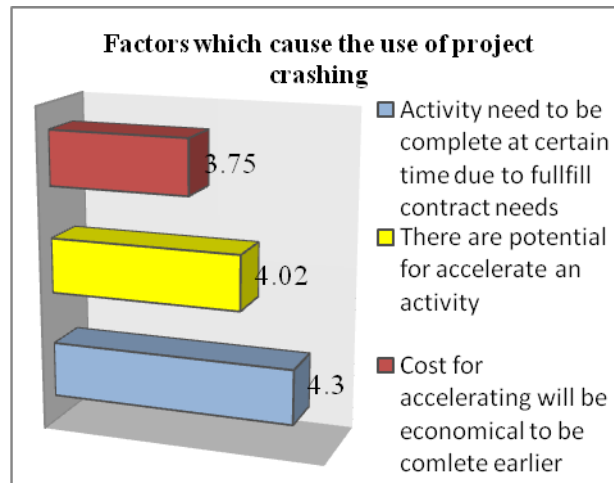


Fig. 1: Factors which cause the use of project crashing

Figure shows the factors that had been infiltrated by pilot study where these were the best factors that influence a construction project to apply project crashing into their construction practice. Figure shows that the higher average index value is 4.30, it can be rated as significant factors. This represents the factor that there are activity needs to be complete at a certain time. In these cases, it can be divided into two cases, normally it can happen when the demand of the contract needs the contractor to complete the construction activity at a certain time. At this moment, the contractor has two choices: whether to apply project crashing or apply the conventional construction practice to fulfill the contract demand without extending the project duration and being caught in delay.

In this case, project crashing will be applied at the early stages of the construction where a detailed planning especially in source management will be conducted due to avoiding any problem in the future. Source management will be divided into two main items: material and workforce. In terms of material, the best way to conduct it is by appointing several sources or suppliers for providing the material to the site. This can avoid supply issues that occasionally occur in construction projects that will affect the progression of the construction project. Workforce can refer to the capabilities of man power to conduct and adapt the working load on the construction site. Basically, it depends on the number of workers. In this case, the application of project crashing may need an extra workforce due to accelerating the construction work. The management should appoint a group of high-skilled workers due to maintain the progression of work. In this case, it will affect directly on the total cost of the project.

Cost is one of the important aspects that have to be considered in conducting a project. This is because, in the construction industry, every chance or alternative founded suitable to save the total cost of the project will be taken into consideration for a different judgment due to gain profit towards the project.

In this survey, there was a conflict onwards this issue where some of the respondents did not agree with the statement according to the cost accelerating will be economical to be complete earlier.

From the interview, respondents said that normally, this situation will occur when there will be changes due to the material price in a certain time. Based on the contract, the contractor had listed and calculated the project total cost by referring to the recent construction material price. After signing the contract, there will be no additional budget provided by the client to cover any increment in costing issues. So, the contractor has to create an alternative solution to avoid the increment of the total cost and project crashing will be one of the effective ways due to solving the situation.

The second rate of the factors is a potential for accelerating the activity. This means that in scheduling, the work flow will be organized by considering to the expected duration of work to be done, the material delivering process, and the organization of the work flow. In certain cases, some of the activity can be complete earlier than the expected time of the completion. This will lead the construction management group to apply project crashing to the construction work.

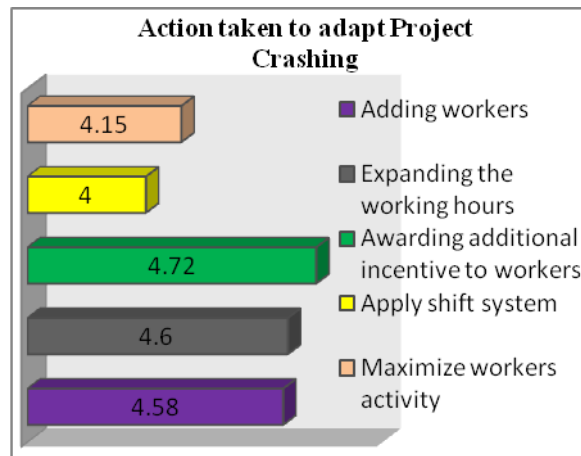


Fig. 2: Action taken to adapt project crashing

In applying project crashing into the project, there were certain action can be adapted to ensure the progression of the construction work to be smooth as contractor desire. From the figure above, analysis shows that the highest average index value is by awarding additional incentives to workers. This step is one of the most listed step that have to be adapted due to encourage the workers to perform well in construction works especially in project crashing where workers have to double up their daily activity just to balance the project needs. Workers is a human being and human is binds with motivation that will encourage them to performs in every activity or task given to them.

Due to the application of project crashing, motivation is a main factor that will influence the successful of a project. Refer to Gould (2002), crashing cause the direct cost of the project to increase because of the inefficiencies caused by accelerating the work at a rate faster than normal. People may end up working in tighter quarters, or equipment may end up sitting idle. But as the sidebar illustrated, the increase in direct cost expenditures may be justified in indirect costs are saved or a bonus is provided. An accelerated project can earn additional bonus money; prevent the payment of fines or damages to the owner, or save the company additional indirect costs.

Mubarak (2005) states that one of the techniques can be used to overcome project crashing is by offering incentives to workers or crews for improving productivity. Normally the contractors have the incentives for compressing the schedule. The only way to attract workers to complete the situation is by offering special incentives to encourage workers to works hard.

The second rating is by expanding the working hours to the workers. Refer to Mubarak (2005) work overtime-more hours per day and/or more days per week. The result of some studies suggests that productivity declines with more hours worked per week than the basic 40 hours. The Business Roundtable (1980) suggested an immediate, significant drop (1st week, as a result of the initial pattern change), followed by a partial recovery (2nd and 3rd weeks, when the person is starting to adapt to the overtime schedule), then a gradual, slight decline (4th through 9th weeks, as a result of work fatigue), and finally a leveling off (after the 9th or 10th week).

As for cost, overtime pay is almost always more than regular-time pay. In most construction contracts, hours exceeding 40 per week and any hours for Saturday are compensated at 1.5 times the regular rate and at Sunday and night hours, they will be give in 2 times rates of regular payment.

Other than that, Acquire more workers can be implemented in this project crashing application. According to Mubarak (2005), this is means that adding more workers to certain activity due to accelerate the works to be more efficient and productive. Several factors must be balanced in this regard: the cost of the

extra resources, the cost of not having these resources when needed, and the consideration of what to do with the extra resources after the peak needs ends.

The least average index value is by applying shift system due to keeping the progression of the project will run day by day. From the interviews, respondent stated that apply a shift system is an inefficient procedure where the limitation on quality control will occurs. This means, the productivity and quality of work produce by different workers is different and the working environment of both shift which is day and night will represent a different quality of works.

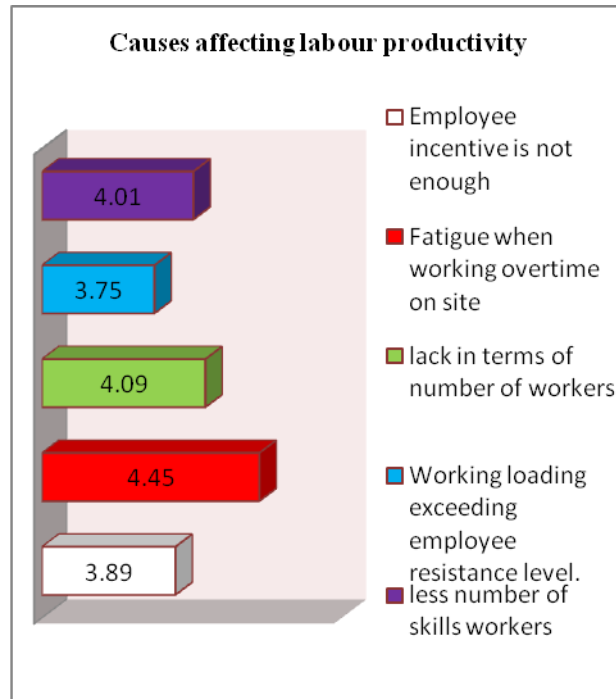


Fig. 3: Cause affecting labour productivity

In this section, the higher rating based on average index value formulation is fatigue when working overtime on site. Back to the surface fundamental of human, human have their limitation due to energy and work ability. In the application of project crashing, the activity level will be increase based on the demand of works required to be completed. In these cases, human or workers will be appointed to work beyond the limitation in order to fulfill the working demand. At one stages, the ability of the workers to do the work will reach its limit and fatigue will occurs when the demand of works increase beyond the workers limitation.

There was an issues discussed due to the data collection and interviews. The discussion is more about the working load exceeding the workers resistance level. The data collected by questionnaire shows that 2 out of 53 respondents did not agreed with this statement. It can be because they apply shift system due to overcome any problem arising in the application of project crashing. From the interview, discussion of this had been made, and they give a positive respond and explanation towards the issues.

After using project crashing, normally the number of works to be done by the workers will be increased up to two times the normal activity. Worker should expand the productivity and the assignment to be complete will be bigger than the usual practice. In this situation, the productivity and motivation of work will decrease by time. The effect of this situation is the quality of the product or construction works will be in a bad shape.

By applying this project crashing in construction work, the must do item have to be done is adding a number of workers to withstand the working load at the construction site. By adding extra workers, additional work can be placed to the project and it will help the acceleration process of the construction work to be done.

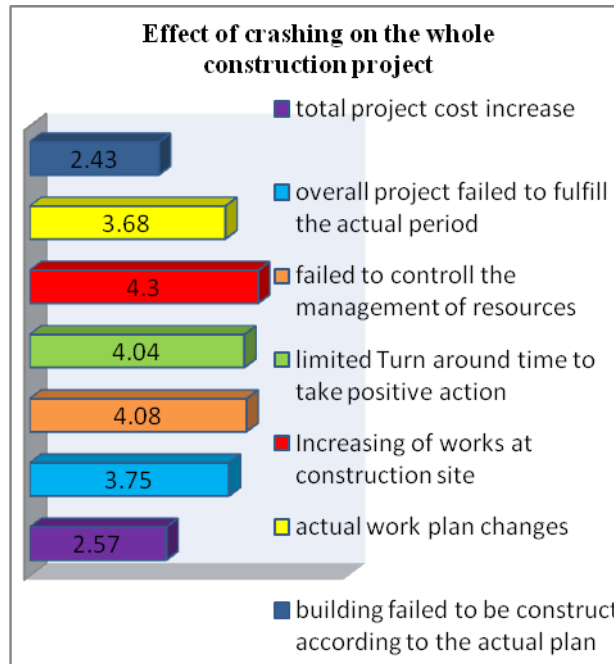


Fig. 4: Effect of crashing on the whole construction project

The figure shows the bar chart of the average index value for the effect of project crashing to the whole construction project. The highest average index value is increasing of work in site. The least average index value on the bar chart is building failed to be construct according to the actual plan.

The issues that arise in this section is about the failure of constructing the building according to the actual plan. In this case, both of information sources did not agreed with the issues where in order to constructing a building, contractor have to construct the building by following the actual plan. In order to change the design or shape of the building, meetings have to be arranged and it requires agreement from all parties involves. Contractor can be fined due to the failure they created.

In other ideas, this segment may be discussing on the failure of the contractor to build the product according the actual qualities requires by the client. Client has the right to take action towards contractor if they failed to construct the building according to the actual plan.

From the interview, the industrial personnel states that project crashing can be applied at the middle of the construction process. It can be applied when there were a activity caught in delay situation where it can give an impact towards the project reputation. There will be major changes in activity and the actual schedule will be compressed. The drastically changes will be occurred especially on the management stages including supply management, resources management, and management of works. These changes will interrupt the progression of construction works. In terms of management changes, the total cost of the project will be increase over 30% from the actual cost.

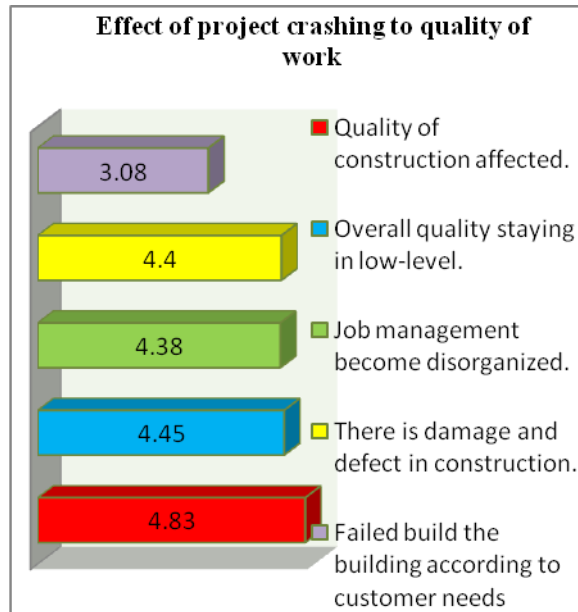


Fig. 5: Effect of crashing on the quality of work

From the data analysis, we can see that the respondent agreed with the statement that by using project crashing, the quality of work will be affected. Quality is one of the most important aspects in construction work. Quality of work will lead the building to the extending of the building life. Therefore, there will be less maintenance works needed if the construction work was done correctly. Quality of work can be referring to the application of ISO practice in every company. But not every ISO practice is applied due to the application of project crashing.

It also mentioned that one of the effect of project crashing was the building will be exposed to the defect and sometimes it can be major defect occurs. This is because the purpose of crashing needs a contractor to accelerate all work as possible. There were some items or structures that have to be sturdy at a certain time such as concrete. In example, a scaffolding need to be remove from the mixture after 7 days, but in application of project crashing, it will be removed earlier and it will cause the concrete did not get the maximum strength that it should be.

Other than that, project crashing application also will give an impact to the management process. The management of sources will be interrupted and it will be exposed to failure due to management point of view.

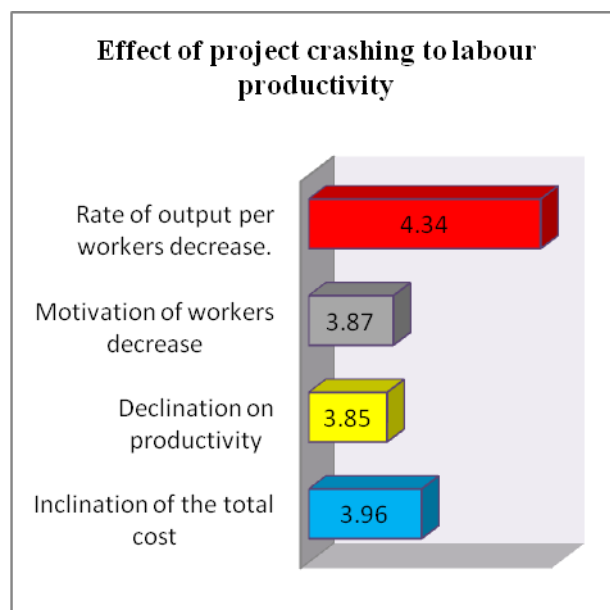


Fig. 6: Effect of crashing on the labour productivity

Work productivity is a good measurement technique in order to measure the rate of output efficiency in certain construction project. Normally, level of productivity will give benefit to a company. Level of work productivity improvement in sustainability also related to the economical progress where it will produce level achievement in non inflation in cases related to salary and reward.

Productivity was one of the important benchmarks in measuring the product efficiency especially in construction project. The approach can be applied is by appointing more workers, extend working hours and apply shift system in the construction process.

Therefore, there will be a problem occurs during the crashing application at it will give a negative impact to the construction project.

Refer to the bar chart, the higher average index value of the project crashing effect to labour productivity is 4.34 where it state that the output of the workers will be decrease. When applying crashing in construction works, the actual schedule and certain activity will be compress by depending on its suitability and by considering the effect of crashing towards the actual cost. After applying crashing, the working load will increase and it will affect the workers. Then, the motivation of the workers will be decrease and the rate of the labour productivity also will be decrease due to the rate of fatigue of among workers will increase because of the increment of working load.

R.J Gordon (2004) stated that factor that influence work productivity in individual work is as same as the factor as affect the performance of works for manufacturing firm. This factor include physical-organic, location and technology factor, the international influence also can be a factor that affecting the productivity of work. Other than that, management also distribute on the rate of productivity of work. The payment system is one of the main factors that can influence the work productivity especially in construction project. Operation by using the technology in salary management has been a best method in order to maintain the rate of productivity.

One of the issues arise in data collection is the rate of fatigue among workers will be decrease. According to data collected from the interview, they said that the rate of fatigue for a worker will be increase when the working load is increase. Fatigue can be influenced by several factors which are physical of the workers, condition of the workers, age, and the environment of the working area. When the rate of fatigue increase, the ability of the workers to concentrate to their works will decrease and this will give a negative impact to work progression in construction site.

Eddy M. Rojas (2008) stated that other reports are consistent in schedule of 50 hours per week. It shows a result of the lost of work efficiency at 15% after four to five continuous weeks of overtime. In short term, one principal reason about the lost of work efficiency is the difficulties in providing adequate resources to the workers that is, materials, equipment, tools, and information. Beyond four to five weeks, fatigue becomes an ever increasing problem. After 10 to 12 weeks of prolonged overtime schedule, losses of efficiency can easily exceed 35% to 40%.

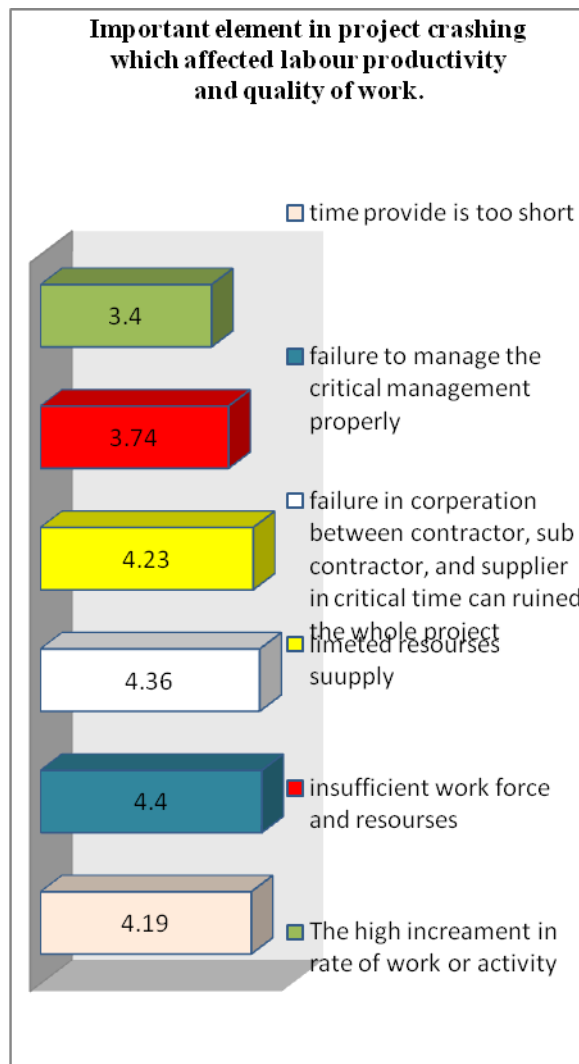


Fig. 7: The important elements in project crashing which affected labour productivity and quality of work

Refer to the bar chart, the highest average index value is 4.0 which is a problem regarding to the management in managing the critical management. In terms of project crashing, the application of it will make the management to be in a critical path where the organization and the alignment of the schedule should be compress according to the suitability of construction environment. It is state that, normally, the lack in management stages will affect the whole construction process including labour productivity and quality of works.

Time provided will be too short in the application of project crashing. it is based on the activity that have to be compressed and shorten than the actual time. it sometimes will affected the work management where the demand of the work will increase and the working load for workers also increase ant it will affect the final product.

Failure in corporation between contractor, sub contractor, and supplier in critical time can ruined the whole project. In this case, the contractor should have an additional alternative in terms of source supplier. The corporation amongst parties is very importance in the completion of the project especially the project involves in project crashing.

In terms of time, at the application of project crashing, the time provided is too short, so there will be no space to accept failure or any mistaken in works. The occurrences of mistakes in work or failure will only makes the work delayed because the activity on the schedule is too packed. So the management and supervision towards works in the project should be more organize and carefully conducted by the workers.

Other than that the insufficient workforce and sources also obtain in certain construction project. From the interviews, this issue seems to be a general problem in certain construction works. It is because the

demand of works increase at the highly stages of the construction, the management sometimes will face a problem with source, lost of workers, and limitation of the machineries.

According to Thomas and Raynar (2004), there are two reason of efficiency loses which is congestion or stacking of trades and dilution of supervision. Of the studies published, the consensus seems to be that efficiency losses are in range of 10% to 20%.

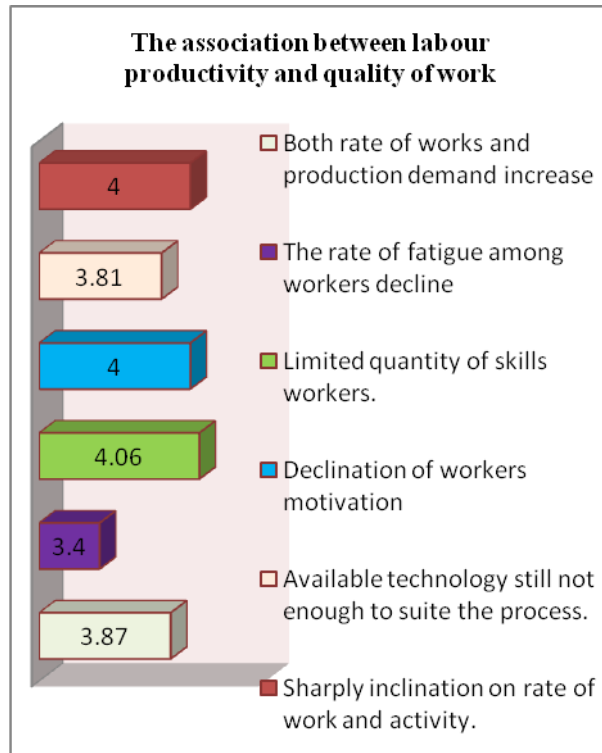


Fig. 8: The association between labour productivity and quality of work

From the analysis, it is found that the highest average index value is 4.19 which is when the increment of the activity influence the management to hire more craft person and at this moment, skills is not a main criteria in workers selection. This is a complex for explanation because there are many views and opinion in facing this situation. Sometimes it only based on the demand of the workers to fulfill the work demand in the construction site.

The issues discussed at this segment are about the limitation of skills workers in the construction site. As we know, skills craft person is one of the important element that have to be added in the application of project crashing. But, by the cost of hiring skills workers will be more expensive than a fresh worker. So, some of the contractor will hire more fresh workers rather that the skills workers. The issues arise in this segment is the contractor will use the in house skills workers to train the freshies and this might delay the whole project because the rate of the productivity will decrease and the quality of work produced by the fresh workers will be at low quality and it will affect the whole project appearance.

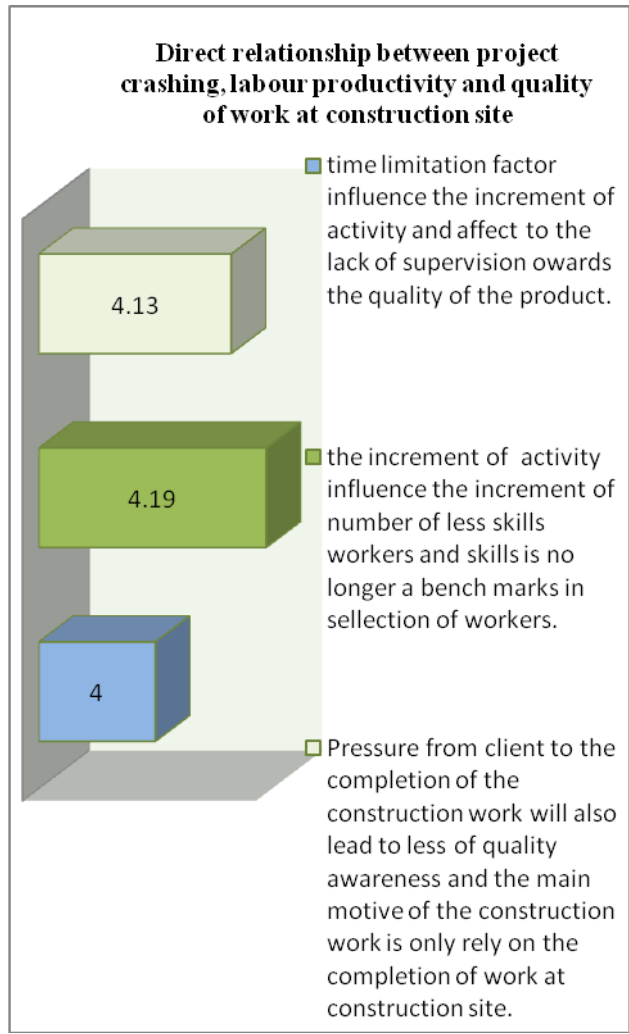


Fig. 9: Direct relationship between project crashing, labour productivity and quality of work at construction site

Bar chart shows the relationship among project crashing, labour productivity and quality of work at construction site. The study found that the increment of the activity will influence the inclination on rate of hiring a craft person and this point, skills is not a major measurement in hiring workers. It is only about the quantity of workers is important at this stage which they look that high number of workers will balance the number of activity occurs on site.

Time limitation will influence to the increment of the activity. At this stage, the site is burden with the high job request and it will lead to the lack of quality control among the works and certain construction works. At the same time, the rate of fatigue among workers will increase and the productivity of the workers will decline and it will lead to the low quality of the end product.

Pressure from client to the completion of the construction work will also lead to less of quality awareness and the main motive of the construction work is only rely on the completion of work at construction site.

6. Conclusion

From the analysis, it shows that this technique is one of the techniques applied to accelerate the construction process for a construction project. Although it gives an advantage due to accelerate the total project duration, it also gives an impact towards the labour productivity and quality of works at the construction site.

Not every construction practice in Malaysia applies this technique to their construction activity. This is because this application is hard to control and the probability of problem will occur when this technique is applied in the construction works.

Most of the contractor which applied this technique into their construction practice has an experience and although the application was done by experience, the construction works also being affected by this technique because the problem occurs in the application is out of contractors' control. Most of the building constructions which applied this technique are shopping mall, restaurant, shop house and some of normal building construction. This is because the list of the building is normally constructed in a short term of duration in terms of construction work.

Therefore, there are still a group of contractors applied this technique even though it will lead them to the problem which can give an impact toward their reputation and credibility of works.

In order to reduce the effect of this situation, a drastic prevention plan should be organized due to ensure the effectiveness of the usage on project crashing in construction practice. Permittivity in management is the main key in planning the project journey which applied this project crashing. Workers management need to be well implemented and orderly to mitigate fatigue level that endured by worker in succeed building project.

Other than that, in term of supervision, it has to be well supervising due to ensure that the project will be conducted smoothly and at the same time to improve and strengthen the quality of construction industry in Malaysia.

This technique is one of the applications that can be adapted to construction project and there were important elements should be taken by the contractors in order to use this technique in their construction practice. The elements that have to be considered are costing, the variability of resources, and the preparation of additional team to resist the working load due to the application of this technique in order to keep up the project momentum.

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