Assessment of Procurement Parameters for A Construction Project

Miss Ingale Nilam Nandkumar
Civil Engineering
Phaltan Satara India
nilingale11@gmail.com

Mr. Jadhav Vishal B.
Mechanical Engineering
Baramati Pune India
Vishaljadhav38@gmail.com

Prof. Abhijit Warudkar
Civil Engineering
ICOER Pune India.
abhijitwarudkar@gmail.com

Mr.Jadhav Sujit Balasaheb
Mechanical Engineering in
Baramati Pune
Jadhavsujit86@gmail.com

***Abstract*—**The Procurement of raw material and the handling equipment for the Construction works involve valid sources of supply with varying cost and other liabilities while arriving at the most effective proposal. The abvious parameters for arriving at a purchase decision are cost, lead time, quality of commodity being purchased. Typically supplier are located in a vicinity of the site through their prices could vary amongest themselves as well as the index for the quality. The distant supplier might seem economic for the price while the lead time might not justify the choice. These contrasting needs of the purchasers underline the need for optimal or balanced methods of evaluating the impact on the said resources.

Keywords-*Taguchi method, ANOVA, Regression equation,design of experiment.*

*****

I. INTRODUCTION

With the advent of new materials and processes in the construction industry coupled with pressing deadlines for the projects, the need for organized procurement planning has gained more importance to date. The lack of structured procedures, based on good information, for the selection of construction procurement system sometimes inhibits the opportunity for clients to choose a procurement option in a fully informed manner. The construction industry differs from most other industries, because it tends to produce a one-off prototype emerges as a Model and is replicated, the construction can be compared with mass products. Unlike with mass production, the client usually takes the initiative to have construction designed and build. The client is the actor who pays for the construction. Then client may sell or let construction later Thus the client is the one who orders the construction.

II. LITERATURE SURVEY

[1] Three parameters are used in optimization of burnishing parameters such as tool diameter, tool material, and number of passes. In this work by taking the high quality of tool material the diameter of tool can be reduced and number of passes is also reduced by taking maximum depth. The number of tool passes was found to be most predominant effect on surface finish.

The result of burnishing operation which is obtained from Taguchi fraction factorial approach is compared with result of experiment. So final conclusion of that experiment was proposed DOE methodology which is very cost effective and optimization of parameters was done.

[2]The influence of surface characteristics like hardness, surface finish, microstructure and induced compressive stresses, on the wear resistance was analyzed.

An attempt was made to determine the depth of burnishing affected zone, based on the result from wear test and x-ray diffraction.

Roller burnishing is a surface modification process in which a burnishing tool, which consists of one or more highly polished and hard rollers, is made to come in contact with the rotating work piece at certain force.

The rotation of the work piece and the force with which the tool is pressed against the against the work piece causes the material of the surface irregularities to flatten, there by resulting in smooth surface with improvement in other surface characteristics like wear resistance, fatigue life etc. Commercially available mild steel was chosen for the

current study because of its extensive usage in the industries, in many applications where the specimen is subjected to excessive wear.

The final conclusion was Remarkable improvement in the wear resistance of the burnished components when compared

to that of the turned ones. The reasons for this improvement were investigated, which include –surface finish, hardness, compressive stress and microstructure.

[3] In the present work different parameters are used such as temperature, catalyst concentration and catalyst type. The main objective of the method is to produce high quality product at low cost to manufacturer.

The experimental design proposed by Taguchi involves using orthogonal arrays to organize parameters affecting the process and the levels at which they should be varied; it allows for collection of the necessary data to determine which factors most affect product quality with minimum amount of experimentation, thus saving time and resources .Taguchi method was used to optimize the process parameters for the production of fuel from waste polypropylene.

By using orthogonal arrays to design the experiment helps the designer to influence of multiple controllable factors on the average quality characteristics and variation in a fast and economic way.

In the present reaction system three operating parameters, each at three levels are selected to evaluate yield of liquid fuel. By using interaction plots it can seen visually that there are non-parallel lines between temperature and acidity of catalyst also

the plastic to polymer ratio does not show any significant interaction for yield of liquid fuel.

In the process of catalytic decomposition of waste polypropylene in a batch reactor the rank indicates that temperature has the greatest influence followed by acidity of catalyst and then plastic to catalyst ratio which can be observed.

The conclusion of this experiment is the simulation experiment was successful in terms of achieving the main objective of the experiment, which was to quantify the main effect as well as interaction of potentially influential factors on the degradation of pollutants.

[4] When using Taguchi method of L18 or L17 orthogonal array is usually adopted but this requires many experiments, consuming time and resources but this study proposes a progressive Taguchi neural network model, which combines the Taguchi method with the artificial neural network to construct a prediction model for a co2 laser cutting experiment.

During co2 laser cutting energy from the moving laser is accumulative. This paper develops an integral equation of energy density during laser beam movement. The advantages of laser cutting are its quick processing speed, convenience of operation, high precision, small heat-affected zone, and minimum deformity.

In this paper four parameters are used such as speed, power, material thickness, auxiliary gases each control factor has three levels. Floating parameters reduces the interaction between various control parameters and avoids unreasonable parameters.

The data is transferred to the operation panel of laser cutting machine.

After material was placed on the cutting table of the machine and lid was closed, the machine started to cut. During the L9 orthogonal array laser cutting experiment, after cutting each line four measurement points were selected to calculate the vertical cutting angle.

In this paper L9 orthogonal array is taken as network training example, the input Modula includes four items: speed, power, material thickness, auxiliary gas.

To compare the improved results of precision from progressive Taguchi neural network model, this study performed four prediction verification experiments.

The error difference for the vertical cutting angle between the network and experiment values was developed.

This paper proposes a prediction model of co2 laser cutting experiment using the progressive Taguchi neural network model.

The analysis of progressive Taguchi neural network model shows that for stage 1 preliminary network due to its limited its limited number of training samples, good results is achieved in regions near Taguchi generated factors level points.

For region further away the prediction results have greater errors. stage 2 because of its network‘s accuracy, provides better predictive results for all the region. Lastly results from network analysis confirm that the construction of Taguchi artificial neural network improves upon the traditional neural network which has the inherent disadvantage of requiring a large number of training samples.

[5] A grey-based Taguchi method is proposed to discover the optimal design of the rifle muzzle flash reducer. In this paper five possible critical factors that may affect the performance of the reducer were contemplated following interviews with specific domain expert:

1) Existence of the front cover.
2) Diameter of the outside exhaust whole.
3) Location of the exhaust hole on the extension tube .
4) Diameter of the outside tube .
5) Length of the outside tube.

Using these suitable input parameters the output results of the combination of the muzzle reducer's control factors can be obtained.

In product development, the designer's goal is to identify settings of product design parameters that make the products performance less sensitive to the effects of environmental variables, deterioration and manufacturing variation. In this paper Taguchi method is used to obtain an original factor-level combination or the rifle muzzle flash reducer.

After presentation of the grey matrix analysis the combination of factors changed slightly. The use of these two methods does help in obtaining and verifying the critical design features. This will boosts our confidence that the chosen reducer's parameters will be able to achieve optimal quality.

The same research model, using Taguchi design with grey matrix verification has been successfully applied to the design of the rifle muzzle noise reducer.

III Proposed Work

1) By using above methodology Parameters are optimize in the construction project of civil engineering. In this present work, the three parameters are considered such as cost, lead time and quality.

2) The Procurement of raw material and the handling equipment for the Construction works involve valid sources of supply with varying cost and other liabilities while arriving at the most effective proposal.

3) If the material is of very good quality but it is at very far distance then maximum time is required for transportation.

4) There is Also different sources of material are available in the various city but cost of good quality material is high.

5) The main objective of this paper is to overcome the above problem and get a material in minimum cost and in minimum time and having high quality.

6) Three Parameters are studied: cost, quality, lead time. The Taguchi method is applied to design an orthogonal experimental array and a multi-objective optimization approach is then proposed by simultaneously minimizing the relative cost and lead time and maximizing the quality.

7) Verification test is also performed to prove the effectiveness of the presented technique.

III. CONCLUSION

We presented an approach that applies determining process procurement parameters for construction project for managing resources in an optimal setting. Also here we optimize the process parameters such as cost, quality and lead time which will be cost effective for the any construction project. By using the Taguchi method it's very easy to optimize the process parameters.

REFERENCES

[1] Murli Krishna Ravuri,Eshwara prasad Koorapati and G.K.Shrinivas "Optimization of Burnishing Parameters by the Application of Design of experiments",ISSN 0973-4562 volume 4 (2009)pp 1247-1257

[2] R.Murli Krishna.T.B. subha Reddy, Eshawara Prasad Koorapati and N.Ravindra Reddy "Optimization of Burnishing process Parameters for Improved Corrosion Ressistance of alumonium and mild steel" ISSN 097-3154 Volume 4, Number 1 (2011),pp.55-66.

[3] P. Ravindra Babu,Siva Prasad, A.V. Raju and K.sym Sundar ,"Experimental analysis of external Roller- Burnishing On the Surface Roughness,Surface Hardness and Microsructure of brass and Aluminium " Int sj of Applied Enginnering Reaserch Volume 5 Number 4 (2010) pp.729-745

[4] R.Murli Krishna, Eshawara Prasad Koorapati and R. Kotaiah,"An Inveastigation in wear Resistance of Roller Brnished Mild Steel Specimen T,ISSN 0975-6469 Volume 3 Number 2 (2011), pp 141-148 .

[5] F klocke, V Backer et al, " finite element ananlysis of the roller burnishing process for fatigue resistance increase of engine components" Proceeding of the IMech,Part B: Journal of Engineering Manufacture,February 4,2011,pp 2-11 .

[6] R.Murli Krishna, Eshawara Prasad Koorapati, "A Study of the wear Resistnce of Non-Ferrous Roller Burnished Components"IJMS:Vol.3 No.1 January-June 2012 pp 11-24

[7] Chung-Shang Chang,Ren-chiech Liao, Kum-Li Wen, Wen-pai Wang "A grey-based Taguchi method to optimize design of muzzle flah resrtaint device" In J Adv manuf Technol (2004) 24: 860-864

[8] Ching-Been Yang, Chyn-shu deng,Hsius-Lu Chaiang. "Combining the Taguchi method with artificial neural network to cvonstruct a prediction model of a CO2 laser cutting experiment In J Adv manuf Technol (2012) 59: 1103-1111

[9] Achyut K.Panda,R.K.Singh "Optimization of Process parameters by Taguchi Method: Catalytic degradation of polypropylene to liquid fuel"ISSN:2321-3124 July-August-2013

[10] Rossella Surface,Luigi Alberto ciro De Fillippis, Antonio Domenico Ludovoco, Giancarlo Bohgetich " Application of Taguchi Methoid for the multi-objective optimization of aluminium foam manufacturing parameters" pp 2 July 2009.