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# Time Analysis of Pre-Engineered Building with Conventional Steel Building by using Primavera P6

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**Abstract**

*Pre-designed buildings or the Pre-Engineered Buildings are new trends, customizable buildings are made in accordance with the requirements and, at the same time, offer much space than conventional steel buildings. According to the available literature, the construction of PEB is economical in terms of cost and time with respect to conventional steel construction. This document focuses on the time required for the assembly process of the industrial sheds with the help of the time study technique and the analysis of the time performed shows that the time required for the construction of the PEB is less than that of the CSB.*

***Keywords****: conventional steel construction, customizable, economic, time analysis, pre-engineered construction*

## I. INTRODUCTION

The study of time is the study based on a direct observation method that can help us to know how much work a worker can perform in a specific time, with standard work specifications, work environment. In this way, after knowing the standard time required for the work, the work done by the worker can be compared with the standard time and the efficiency of the work done can be easily calculated. The study of time can also be called work measurement and can be used to plan and control operations.

## II. METHODOLOGY

The procedure for the study of time can best be described step by step, which will explain themselves.

Step 1: Define the objective of the study. This implies a statement of the use of the result, the desired accuracy and the required level of confidence in the estimated time standards.

Step 2: Verify that the method and standard conditions for the operation exist and that the operator is properly trained. If you feel the need to study the method or the additional training of the operator, you can complete it before starting the time study.

Step 3: Select the operator to study if there is more than one operator that performs the same task.

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Step 4: Record the information about the standard method, the operation, the operator, the product, the equipment and the conditions in the observation sheet of the Time Study.

Step 5: Divide the operation into reasonably small elements and write them down on the observation sheet of the Time Study.

Step 6:Record the data for a few cycles on the observation sheet of the Time Study. Use the data to estimate the total number of observations that will be taken.

Step 7: Collect and record the data of the required number of cycles by timing and sorting the operator.

Step 8: Calculate the representative observation time for each operation element. Multiply it by the rating factor to get the normal time.

Normal time = observed time x rating factor

The time study analyst multiplies the real time or the observed time with a factor called "Rating Factor" or "Leveling Factor" to establish the normal time a normal worker would take. This is expressed as a percentage of the representative worker / operator's efficiency that shows how efficient an operator is compared to some of his fellow operators.

Step 9: Determine the tolerances for fatigue and several delays.

Step 10: Determine the standard operating time.

Standard time = normal time + permits

The level of performance or a rhythm is selected as standard to perform a certain task. Qualification means measuring and comparing the performance or pace of a worker with a standard performance level established by the lime study analyst. The analyst observes the performance, compares it to other rhythms and learns to judge the level of rhythm as a percentage of the standard rhythm.

The work that was undertaken was erection of a bay of area 102sq.m. and the entire job was classified as follows

| Activity ID | Activity Name | Original Duration | Start | Finish | BL Project Duration | BL1 Duration |
|---|---|---|---|---|---|---|
| COMPARATIVE TIME ANALYSIS | | 275 | 23-Mar- | 08-Jan | 454 | 275 |
| A1000 | BRINGING ASSEMBLED SECTION | 7 | 23-Ma | 31-M | 7 | 7 |
| A1010 | FIXING BASES | 20 | 31-Ma | 21-A | 37 | 20 |
| A1020 | ERECTION PROCESS | 26 | 21-Apr- | 19-Ma | 35 | 26 |
| A1030 | TEMPORARY SUPPORT ASSEMBLY | 15 | 19-Ma | 03-J | 22 | 15 |
| A1040 | BRINGING SECOND ASSEMBLED RAFT | 9 | 03-Ju | 12-J | 10 | 9 |
| A1050 | FIXING THE BASES | 16 | 12-Ju | 30-J | 28 | 16 |
| A1060 | ERECTION PROCESS | 33 | 30-Ju | 04-A | 31 | 33 |
| A1070 | TEMPORARY SUPPORT ASSEMBLY | 19 | 04-Au | 23-A | 24 | 19 |
| A1080 | GIRTS BETWEEN ERECTED BAYS | 58 | 23-Au | 24-O | 72 | 58 |
| A1090 | FIXING V CLEATS FOR BRACING FIXTU | 48 | 24-Oc | 13-D | 42 | 48 |
| A1100 | ALIGNMENT | 24 | 13-De | 08-J | 9 | 24 |
| A1110 | BRINGING THIRD ASSEMBLED RAFTER | 0 | 08-Ja | 08-J | 8 | 0 |
| A1120 | ERECTION PROCESS | 0 | 08-Ja | 08-J | 9 | 0 |
| A1130 | FIXING EXTENDED GIRTS | 0 | 08-Ja | 08-J | 36 | 0 |
| A1140 | FIXING PURLINS | 0 | 08-Ja | 08-J | 84 | 0 |

Fig.1 Activity Details with Standard Times of PEB & CSB on Primavera P6

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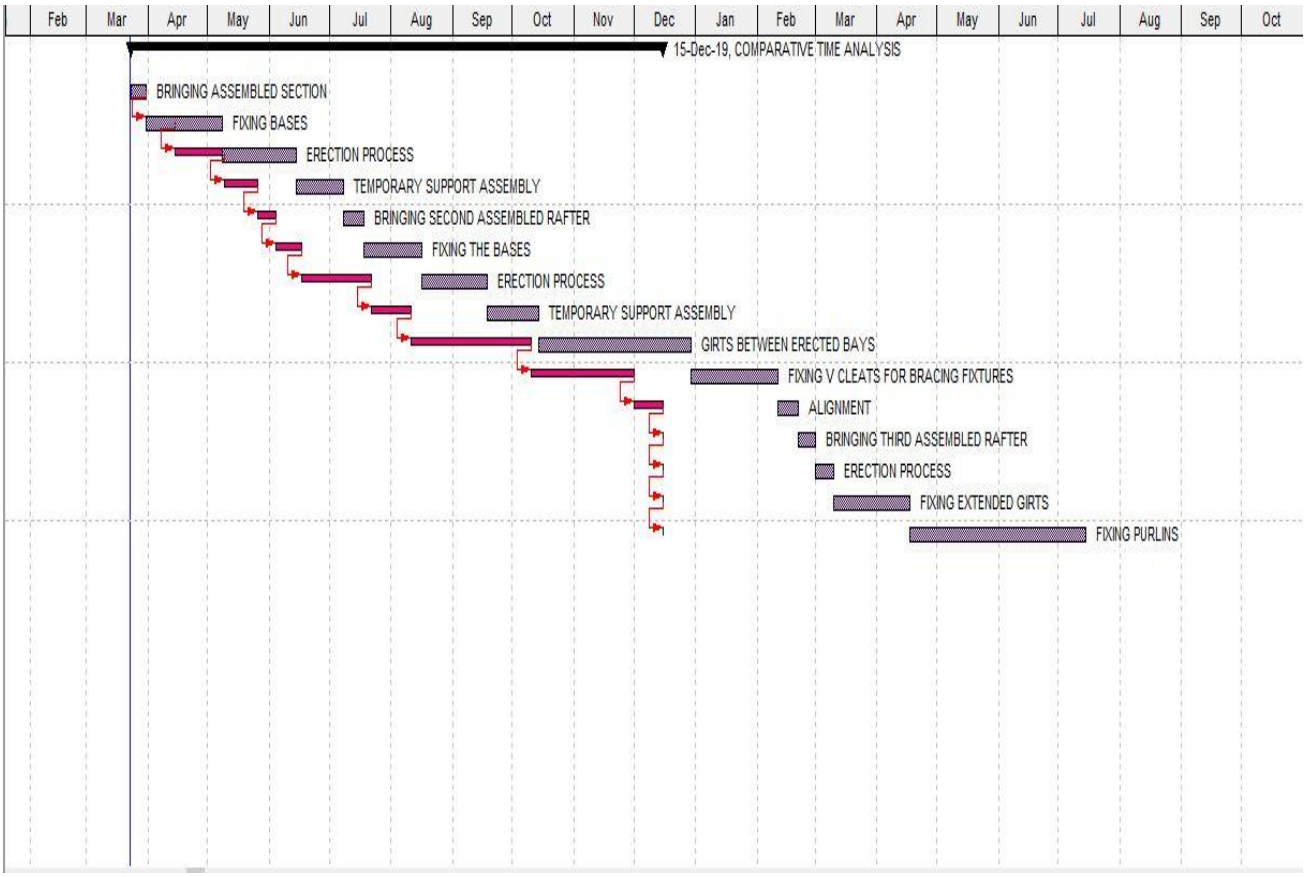


Fig.2 Gantt Chart Representation

**III. Results & Calculations**

The time requirement of every activity for PEB &CSB is compared using Primavera P6. The time requirement is compared by using the feature of baselines in Primavera P6 where one of the time requirement schedules is kept constant and the other may be varied according to the deviation in the time span with respect to the first.

From the Fig.1 we can see that the BL project Duration is the baseline that has been maintained i.e is kept constant for the comparison. This BL1 is the time requirement of PEB erection and BL project Duration is the time required for CSB. The time required for CSB is 454 mins and that for PEB is 275mins

Thus the time span required extra for erection of CSB than PEB is 454-275 = 179mins.

## IV. Conclusion

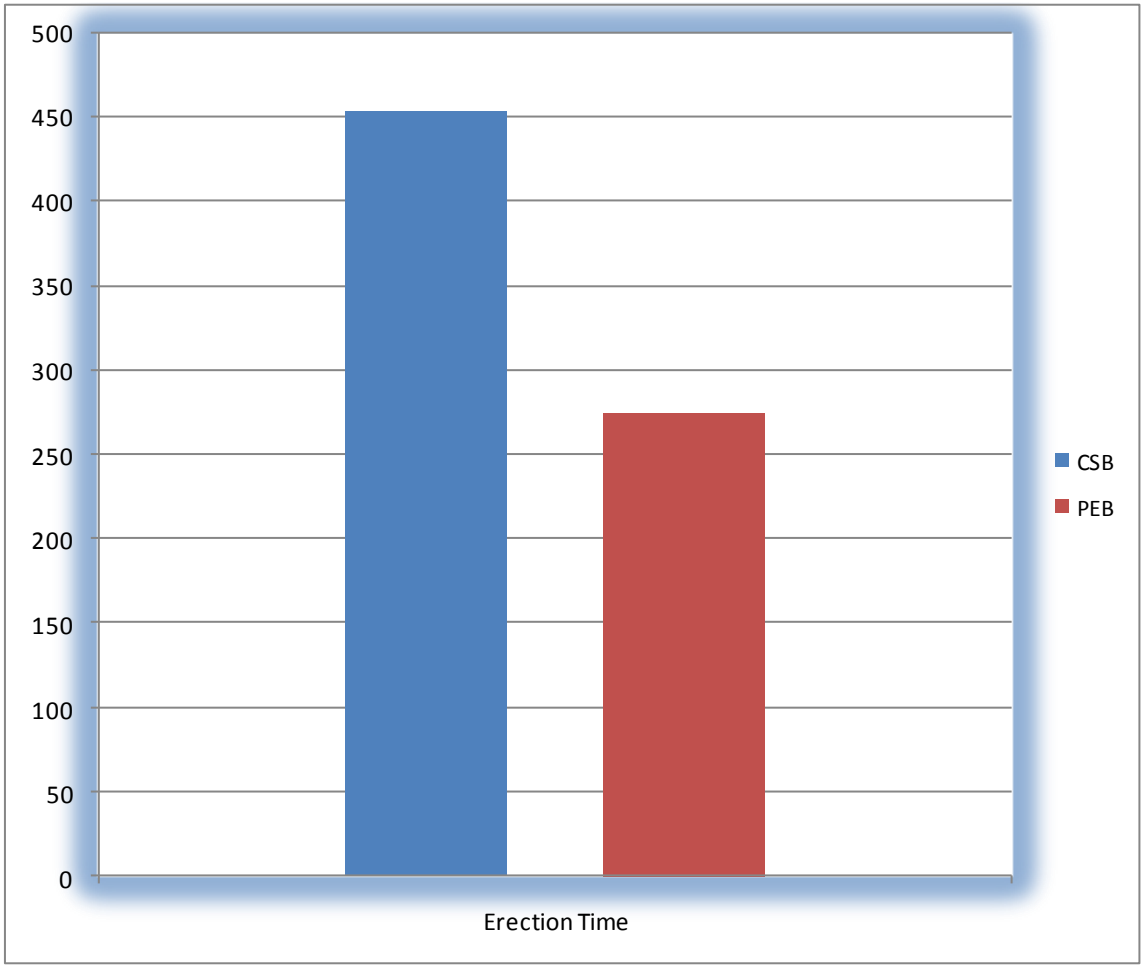


Fig.3 Comparative Representation of PEB and CSB w.r.t Time

The time required to erect a shed for 102 sq.m calculated with help of Primavera P6 can be proved economical in terms of time. The time required for the erection of shed using CSB is 454 mins and by PEB is 275mins and the percentage saving in overall time can be calculated as

(454-275)/454 *100 = 39.4%

Therefore, use PEB that CSB can save 39.4% of the time necessary for the construction of the industrial building to be faster.

## REFERENCES

1. Technical Instruction Set For Time Study by Kyle Stanshine
2. IshwarBhiradi and B.K.Singh, *"WORK MEASUREMENT APPROACH FOR PRODUCTIVITY*

*IMPROVEMENT IN A HEAVY MACHINE SHOP",25th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014) December 12th–14th, 2014, IIT Guwahati, Assam, India.*

3. Aditya P Mehendale, Dr. AK Gupta, Prof. D. B. Desai,"Assessment & maintenance of pre-engineered buildings*", National Journal of Multidisciplinary Research and Development ISSN: 2455-9040; Impact Factor: RJIF 5.22*
4 S D. Charkha and Latesh S (June 2014)," Economizing Steel Building using Preengineered Steel Sections"*International journal of research in civil engineering , architecture & design, volume 2 , issue 2*
5. U. D. Dabhade1, N.A.Hedaoo2, Dr. L. M. Gupta3 and Dr. G. N(2009). Time and Cost Evaluation of Construction of Steel Framed Composite Floor with Precast Concrete Floor. *International Symposium on Automation and Robotics in Construction*
6. AymanAlshehri, Ibrahim Motawa, and Stephen Ogunlana,"The Common Problems Facing the Building Maintenance Departments",*International Journal of Innovation, Management and Technology, Vol. 6, No. 3, June 2015.*