EFFECTIVENESS OF EDUCATION AND TRAINING WITH REFERENCE TO TPM

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ABSTRACT

The research is entitled as "EFFECTIVENESS OF EDUCATION AND TRAINING WITH REFERENCE TO TPM". The main objective of this study is to identify the employee's effectiveness of training on TPM. The term training refers to the acquisition of knowledge, skills and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to useful competencies. TPM(Total Productive Maintenance) is a structured equipment-centric continuous improvement process that strives to optimize production effectiveness by identifying and eliminating losses associated with equipment and production efficiency throughout the production system life cycle through active team-based involvement of employees across all levels of the operational hierarchy. The results of extensive literature review indicate that TPM has a strong positive impact on multiple dimensions of manufacturing performance. The researcher adopted Descriptive design for the study. Simple random sampling method (Lottery method) was used to collect the data from respondents. Both primary and secondary source of data were collected. A detailed questionnaire was used by the researcher to collect the necessary information from the respondents. Questionnaire are given to various Modules, they are Module-1, Module-2, Module-3, Module-4 and Module-5. Questionnaires are collected directly from each employee and also ranked by the superior (post effectiveness). Analysis was done through questionnaire and the sources were tabulated in percentage analysis, weighted average method, CHI-SQUARE, ONE WAY ANOVA, ONE RUN SAMPLE TEST, REGRESSION AND CORRELATION. The collected data was analyzed and interpreted through table and diagrams. A thorough analysis has also been done on the responses given by the respondents based upon which findings, suggestions and conclusions have been drawn.

Keywords: *TPM, Training, Equipment-centric, Production, ANOVA*

1.1 INTRODUCTION

Productivity is defined as "A measure of the efficiency of a person, machine, factory, system, etc., in converting inputs into useful outputs. Productivity is computed by dividing average output per period by the total costs incurred or resources (capital, energy, material, personnel) consumed in that period. Productivity is a critical determinant of cost efficiency, Improvement in productivity has been an issue for all the firms from beginning in order to keep manufacturing expenses as low as possible. Reliability and productivity of the production systems are the attributes of the performance of a manufacturing firm. Perfect maintenance is a function of maintenance objectives and strategies, which are mutually affected by corporate policy, manufacturing policy and other potentially conflicting interests and constraints in the company. Formulation of maintenance actions and policies involves general decision structure. A

maintenance strategy is a decision rule which establishes the follow-up of maintenance actions in order to maintain or restore the system in a specified state by using suitable resources.

Total Productive Maintenance (TPM) is one of the tools which serves the purpose exercising through its various pillars as it provides a basis for "perfect manufacturing".

TPM is a structured equipment-centric continuous improvement process that strives to optimize production effectiveness by identifying and eliminating losses associated with equipment and production efficiency throughout the production system life cycle through active team-based involvement of employees across all levels of the operational hierarchy. The results of extensive literature review indicate that TPM has a strong positive impact on multiple dimensions of manufacturing performance.

The aim of TPM is to maximize equipment effectiveness by establishing Preventive Maintenance (PM) practices through various departments involving all the employees of the firm. TPM also establishes coordination between production and maintenance tasks and continuous improvement motivated employees.

Willmott and Wireman also presented TPM as an effective tool to improve productivity. It aims at to establish a corporate culture in order to maximize effectiveness of overall production system involving all the functions of a firm to achieve zero accidents, zero defects, zero breakdowns, zero abnormalities and zero losses. In the process of implementation of TPM, various activities are performed under its eight pillars i.e. Focused Improvement (Kobetsu Kaizen), Autonomous Maintenance (JishuHozen*)*, Preventive Maintenance, Education and Training, Maintenance Prevention, Quality Maintenance, Administrative TPM, Safety health and Environmental Issues. The education and training pillar is of utmost importance because the successful implementation of other pillars depends upon the effective education and training to develop operation and maintenance skills & other aspects related to the implementation of TPM. The skilled operator will be able to identify equipment abnormalities, correct them to restore the equipment functioning and set & maintain the equipment to its optimal condition. Effective exercise of education and training pillar of TPM is vital for its successful implementation. Since, success of all the activities of TPM depends upon the skills of TPM core team and other employees of the firm. Hence, it is required to measure and verify the effectiveness of such an important pillar in order to use the resources effectively and to perform the activities up to their utmost degree.

1.2 EDUCATION &TRAINING PILLAR OF TPM AND PERFORMANCE MEASUREMENT

The rigorous exercise of **education and training pillar** of TPM ensures the effective utilization of equipments in terms of availability, output quality and operating speed. Management needs information about maintenance performance for planning and controlling the maintenance process. Performance measurement is a fundamental principle of management. Like other manufacturing functions, performance measurement is important in managing the maintenance function. A performance measurement system is defined as the set of metrics used to quantify the efficiency and effectiveness of actions.

SKILLS

Skills generally refer to the capability to do one's job. The shorter the time from the detection of abnormalities to actions is, the more excellent the skills are considered to be. Skill actions based on accurate judgment are only possible if education, training, experience and information are accumulated in an orderly fashion. Skills are the powers to act rightly and reflexively (without thinking) based on learnt knowledge in all phenomena, and to sustain it for a long time. Skilled men are excellent at acting in a reflectively shorter time from finding of a trouble to taking an action.

PHASES OF SKILLS

Skills can be classified into the following 4 phases:

Level 1: Does Not Know
Level 2: Knows
Level 3: Knows & Can Do
Level 4: Can Do & Can Teach

1.3 STATEMENT OF PROBLEM

The objective of this study is to verify the effectiveness of education and training pillar of TPM and to identify the performance measurement metrics to measure the effects of the pillar on manufacturing performance.

1.4 SCOPE OF THE STUDY

- This research provides an opportunity to explore in the field of Human Resources.
- This study helps me to know the effectiveness of TPM training programme by Industries.
- It helps to know the efficiency and confidence level of employees after training.
- The study also explores to find out relevance and contribution of training in the growth of the Industries.

1.5 OBJECTIVES OF THE STUDY

PRIMARY OBJECTIVE:

- To study on effectiveness of education and training with TPM to the employees.

SECONDARY OBJECTIVE:

- To study on productivity with reference to training.
- To overcome Breakdown (zero breakdown).
- To study the employees skill and knowledge towards TPM.
- To study the effectiveness of Training programme related to and training methodology followed in the organization.
- To study the satisfaction level towards the training programme conducted by the organization.
- To identify whether the employees are aware about JH steps,OPL and JH step 2 and 3.
- To study the effectiveness of KK pillar, QM pillar, SHE pillar and PM pillar followed in the organization.
- To provide suggestion and recommendations to increase productivity in the organization.

2.1 RESEARCH METHODOLOGY

Research methodology is a purely and simply the framework or a plans for the study that guides the collections and analysis of data. Research is the scientific way to solve the problems and it's increasingly used to improve market potential.

2.2 RESEARCH DESIGN

A Research design is the specification of methods and procedure for acquiring the information needed. It is the over – all operation patterns or framework of the project that stipulates what information is to be collected from which source by what procedure, it is also refers to the blue print of the research process.

Descriptive study: It is designed to describe something. It deals with determining the frequency with which something occurs. The descriptive study is rigid and normal.

2.3 DATA COLLECTION

The required data for the project has collected from primary data and secondary data.

P RIMARY DATA

It is a fresh data, which was collected from the employees by having discussions and interaction with employees.

Source of primary data: The primary data is collected through questionnaire and direct interview.

SECONDARY DATA

 Secondary data refers to the information or facts already collected. Such data are collected with the objective of understanding the past status of any variable.

Sources of secondary data: The secondary data is collected through, websites and books.

2.4 SAMPLING TECHNIQUE

Types of sampling used in this survey were Systematic Proportionate Random Sampling. In systematic random sampling, first randomly picks the first subject from the population. Then, will select each not subject from the list. The procedure involved in systematic random sampling is very easy and can be done manually. The results are representative of the population unless certain characteristics of the population are repeated for every not individual, which is highly unlikely.

Proportionate Sampling is a sampling strategy (a method for gathering participants for a study) used when the population is composed of several subgroups that are vastly different in number. The number of participants from each subgroup is determined by their number relative to the entire population

2.5 RESEARCH INSTRUMENT

The research instrument used in this study is a structured questionnaire and personal interview. Structured questionnaire in which there are definite, concrete and predetermined questionnaire relating to the aspect for which the researcher collect data. The questions are prepared with exactly the same order to all the employees **(Questionnaire and Personal Interview).**

3.1 STATISTICAL TOOL ANALYSIS

The tools used mainly to evaluate the result are namely:

1.Percentage analysis, 2.Weighted average method, 3.Chi-square test, 4.One way ANOVA, 5.One sample run test, 6.Correlation analysis,7.Regression.

3.1 PERCENTAGE ANALYSIS
Percentage refers to a special kind of ratio percentages are used in making comparing the awareness with various factors.

$$\text{Percentage} = \frac{\text{No. of Respondents}}{\text{Total No. of Respondents}} \times 100$$

3.2 WEIGHTED AVERAGE METHOD

The term weight stands for relative importance of different items. Weights have been assigned to various ranks. The weighted score is calculated by multiplying the number of respondents in a cell with their relative weights and the whole number is summed up to give the weighted score for that factor. In this method weights are assigned to the items. The formula for computing weighted average is:-

$$\frac{R1 \times W1 + R2 \times W2 + R3 \times W3 + R4 \times W4 + R5 \times W5}{\text{No. of Sample}}$$

Where, R= rank; W= no of response.

3.3 CHI-SQUARE TEST

A family of probability distribution differentiated by this degree of freedom in used to test a member of different hypothesis about variance, proportions and distributional goodness of fit.

$$X^2 = \frac{\sum (O-E)^2}{E}$$

Where, O= refers to the observed frequency; E= refers to the expected frequency

3.4 ONE WAY ANOVA

In statistics, one-way analysis of variance (abbreviated one-way ANOVA) is a technique used to compare means of two or more samples (using the F distribution). This technique can be used only for numerical data. The ANOVA tests the null hypothesis that samples in two or more groups are drawn from the same population. To do this, two estimates are made of the population variance. These estimates rely on various assumptions. If the group means are drawn from the same population, the variance between the group means should be lower than the variance of the samples, following the central limit theorem. A higher ratio therefore implies that the samples were drawn from different populations.

3.5 ONE RUN SAMPLE TEST:

`A run is subsequence of one or more identical symbols representing a common property of the data. The run test, based on the order in which the sample observations are obtained, is useful technique for testing the null hypothesis that the observations have been drawn at random.

Formula:

$r = (2N1N2/N1+N2) +1$

$r = 2N1N2 (2N1N2-N1-N2) / (N1+N2)2 (N1+N2)$

Calculated of upper limit $= r + 2.58\ r$

Calculated of lower limit $= r - 2.58\ r$

3.6 CORRELATION ANALYSIS

Correlation analysis attempts to determine the degree of relationship between variables. If the change in one variable produces a change in the other variable, then the variables are said to be correlated. If the two variables deviate in the same direction i.e. if the increase (or decrease) in one results in the corresponding increase (or decrease) in the other then correlation is said to be direct or positive.

At the same time, if they deviate in the opposite directions then correlation is said to be indirect or negative.

Karl Pearson's correlation coefficient is given by:

$$\rho_{xy} = \frac{\sum dx\ dy}{\sqrt{\sum dx^2\ dy^2}}$$

4.1 FINDINGS

The study reveals that the employees agreed TPM increases the skills and knowledge of performannce through training and it leads to sense of job satisfaction.It was also found that respondents agreed that safety performance been improved after implementation of TPM.TPM can reduce the chance of accident caused by equipment.Top management of industries strongly encourages employee involvement of TPM and strives for Zero breakdown.Maximum number of employeesare aware about 1s & 2s and JH awareness, purpose of Tags, HTA format, SOC format.Majority of the Employee knows and aware of start up procedure & shut down procedure after the TPM training.Employee knows and aware of Near Miss after the TPM training.

4.2 SUGGESTIONS:

- Employees while participating in the training program should forget their routine business and concentrate more and more to acquire right kind of knowledge through training.
- More Concentration should be given on individual support by the trainer.
- Not only training but more of fun based activity frequently should be implemented to keep the employees free from stress at work..
- Training can be given on a regular basis to the employees.
- Most of the employees suggested that TPM training is more effective.
- Many of the employees suggested that training should be made more interactive. The trainers should mingle freely with the employees so that the training will be more effective.
- Feedback can be obtained from the employees so that training can be improved further to their expectations and thus their productivity could be increased and accomplishment of objectives could be made easier.

4.3 CONCLUSION:-

The study on "The Effectiveness of Training with special reference to CUMI Universal ltd" has brought out the various information about the skills and abilities of individual employees. Using this survey the researcher could identify that what are the training pillars and the satisfaction level of employees. By this research, the objective of the project has been achieved successfully by applying various methodologies. From this research work it can be concluded that most of the employees in the organization have the opinion that training is essential for the growth of the organization and also for developing themselves. Also most of the employees feel that proper feedback is essential so that training can be made more effective and also TPM training is more effective than any other training. As an outcome a clear inference and suggestion have been contributed so as to make this study a future reference.

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