International Journal For Technological Research In Engineering
Volume 3, Issue 10, June-2016 *ISSN (Online): 2347 - 4718*

IMPROVEMENT OF OVERALL EQUIPMENT EFFECTIVENESS OF PRESS MACHINE USING LEAN CONCEPTS

Vivekananda T[1], S. Appaiah[2]
[1]PG. Student, [2]Sr. Associate Professor
Dept. of IEM, M.S Ramaiah Institute of Technology, Bangalore, India

Abstract: In this testing environment, commercial enterprises confront the vital situation that it ought to utilize most recent innovations to support their profitability with least crude materials. Creators ought to have the capacity to give their stock top quality in an extremely esteem successful way to their clients. To meet their client requests, the associations need to move not just in their outside exercises like showcasing, production network and so forth additionally inside exercises like machine usage, process capacity, machine effectiveness and so forth. The center of this anticipate is on enhancing OEE of bottleneck machine 160T-2 press with the assistance of incline systems, for example, SMED. The undertaking plans to minimize levels of six major misfortunes along these lines enhancing the productivity of the machine. The venture was begun sans preparation as no information relating to the misfortunes was accessible. Profitability information and machine use points of interest were gathered for 4 months for estimation of beginning OEE and Bottleneck Press. The underlying OEE for the bottleneck press was observed to be 44.13%. With the backing of creation division the elements in charge of low OEE was recognized. Levels of six major misfortunes were investigated and orderly approach was taken after to expand the effectiveness. Significant misfortunes which are in charge of low OEE is high changeover and were enhanced with the assistance of incline systems like SMED, 5S, TPM and so forth.
Keywords: OEE- Overall equipment efficiency, SMED- Single minute exchange of die, Press machine.

I. INTRODUCTION

The Overall Equipment Effectiveness (OEE), or Lean Manufacturing is presently the key order in a large portion of the fruitful processing plants and assembling plants. The productivity and viability of machines assumes a basic part in deciding the execution of any organization. The causes that influence efficiency of machine like breakdowns, minor stoppages, and decreased velocities. This must be checked and controlled to accomplish most extreme advantages. Industry which has well ability to deal with all offices can make due in this driving assembling market. Raffaele Iannone et.al. (2013) [1] clarifies OEE as a surely understood approach to gauge adequacy and is the foundation of procedures for quality change. Berna Ulutas (2011) [2] clarifies in his diaries about the SMED strategy as one of the incline generation strategies for decreasing waste in assembling process. The expression "single moment" stands for "single-digit moment" which implies that all changeovers and new businesses ought to take under 10 minutes, SMED was initially created to enhance kick the bucket press and machine instrument setups, however also its standards apply to changeovers in a wide range of procedures. E.Sivaselvam, et.al [3] in his paper expects to distinguish un profitability time misfortunes inside the framework and these time misfortunes influence accessibility, execution and quality. It is found that collaboration is essential in taking care of the issues happened in machines. Ascertaining the OEE likewise give the organization where they are and where is the shortcoming point and how to move forward. Tushar N. Desai, et.al. (2008) [4] presents an instructional exercise overview on how DMAIC philosophy in an industry gives a structure to distinguish, measure and wipe out wellsprings of variety in an operational procedure. The apparatuses and methods that can be utilized amid each period of DMAIC and their favorable circumstances have been depicted quickly with a delineated contextual analysis of expansive size assembling industries.

II. COMPONENT DETAILS

Figure.1 Component

TABLE 1. COMPONENTS DETAILS

PART DESCRIPTION	MALE,BACK DOOR HINGE
PART NO.	424221-10730
ID NO.	43
MATERIAL	ST09100001020701
THICKNESS	2.60 mm
WIDTH	98 mm
NO. OF STAGES	3
1ST OPERATION	BLANKING(110-T)
2ND OPERATION	CURLING(63-T)
3RD OPERATION	CURLING(63-T)
CUSTOMER	AISIN AUTOMOTIVE KARNATAKA PVT. LTD

III. PROBLEM STATEMENT

In an Auto stamping parts manufacturing company, delivering the orders for every day, 3 days & weekly once basis the WIP in the CMD shop is huge and thus has to be identify which is the bottleneck machine and OEE improvement process has carried out to improve the productivity of that machine.

IV. Methods and methodology

- Literature survey on the use of incline procedures and OEE in press shop applications has been considered out by alluding diaries, books, manuals and web articles.
- Bottleneck machines and the extension for development in the bottlenecks has gathered by computing the current OEE of the press line.
- For finding the underlying drivers hampering the OEE of the line, information on the flow accessibility, execution, and quality levels at the press line in the shop has been gathered by utilizing man-machine process diagrams, work study methods, and control graphs.
- Improvements in the line as an aftereffect of the proposed measures has done institutionalized by utilizing of work directions graphs.

A. Identification of Bottleneck Machine

The procedure stream information has been gathered from the Production Planning and Control bureau of the Auto India Pvt Ltd. CMD shop – little squeeze line generation plan information have gathered for 4 months, (November"15,December"15, January"16, February"16) from that, bottleneck machine has been investigated. The investigation demonstrates that 160T-2 press machine was the bottleneck in the CMD line. The points of interest have been shown in table 1.

Table 2. Average of 4 month production stroke & its percentage

Press list	Average of 4 month Production Strokes Details		Percentage
	Plan	Actual	
45 T-2	102438	92194	90%
63 T-4	139742	131357	94%
100 T-2	156454	139244	89%
100 T-1	150275	136750	91%
110 T-1	184773	164447	89%
160 T-2	123929	86750	70%

The points of interest specified in table 3 demonstrates that creation subtle elements (Plan/Actual) for the CMD little squeeze line. In view of the profitability investigation every press singular strokes has been gathered physically and recognized that 160T-2 Press machine is the bottleneck. The 160T-2 kind of squeezing machine utilized as a part of organization is mechanical press which is utilized with the assistance of pneumatic and hydraulic.

B. Time study on Bottleneck Press

The venture was begun from the scratch as no information relating to the misfortunes was accessible. From the information examination on efficiency 160T-2 was recognized as the bottleneck press machine for stamped parts. t can't accomplish generation according to necessity. For finding the reasons of bottleneck, information gathering configuration was set up for machine usage and Losses recognizable proof.

C. Reasons for high changeover process

This changeover procedure flowchart gives the points of interest of movement from when the real generation with past stamping instrument is done to crisp creation from new stamping apparatus to be prepared. This setting incorporates the stacking and emptying of sheet material and stamping apparatus to finish a full setting time. Present Changeover process stream can be appeared in figure 4. At present existing changeover time is 88.02 mins (1.28hr).

V. SMED CONCEPT

Single Minute Exchange Of Dies (SMED) is one of the essential incline devices which require submitted exertion. This exertion fizzles once in a while on the grounds that associations fall into the longing to surge with an almost no or no forthright arranging. With constrained time and assets, the exertion is destined for disappointment. So it is especially important to execute SMED deliberately (Berna Ulutas, 2011). For this action a backing requires from the distance of industry incorporates Design, Quality and Maintenance. With this methodology it is effectively conceivable to lessen changeover time in 160T-2 Press. A Seven stage approach is made from the inputs of literary works, books and web articles. SMED has seven steps explained below.

A. Observe the current practices of Tool change activity.

The perception of current practices of hardware change movement was noted down for 15 times of changeover. The base time of changeover is taken as 76 min, most extreme time of changeover is taken as 98 min and the normal time of changeover is taken as 86.8 min.

B. Study the Elemental Activities of Die changeover.

In 160T-2 Press every one of the exercises identified with change after some time conveys inside, it causes more down time and it prompts generation misfortune. Point of this progression is to distinguish the where precisely process is slacking. The present practices saw from the subtle element time study investigation and video study examination. In 160T-2 Press every one of the exercises identified with change after some time conveys inside, it causes more down time and it prompts generation misfortune.

C. Separate the Internal & External Activites.

Overall changeover time exercises were partitioned into outside and inside classifications. That is to say, there is a plausibility to bring the press creation time progressively when the exercises have been isolated.

D. Externalizing Internal Activities.
In this progression it is obviously sorted that exercises which should have been changing over to outer had been changed over. The timings of the individual setup is condensed. The consequence of this progression, the apparatus inward changeover time is lessened from 88.08 min to 33.6 min.

E. Improve Internal Setup Activities.
After execution of arrangements there are some figures that enhanced such a large number of exercises and some variables has been disposed of. Before usage of arrangements the inner changeover time was 33.6 min, in the wake of building up the arrangements the inward changeover time has boiled down to 11.1 min.

F. Improve External Setup Activities.
Before implementing of solutions the external changeover time was 54.48 min, after developing the solutions it has come down to 18.73 min.

External Setup Time	Internal Setup Time	Eliminated Time
54.48	33.60	35.75
54.48	**33.60**	**35.75**
Total Setup Time	88.08	
Reduced setup time	69.35	Note: Time
Final External setup time after elimination	18.73	indicating in min

Figure 4. External Setup time after SMED.

VI. RESULTS

Before implementation, internal setup time is 33.6 min. After solutions implemented, the eliminated time in internal setup is 22.48 min. External setup time come down from 54.48 min to 18.73 min. Eliminated time was 35.75 min.

Internal Setup Time	External Setup Time	Eliminated Internal Setup Time
33.6	54.48	22.48
33.6	**54.48**	**22.48**
Total Setup Time	88.08	
Reduced setup time	76.96	Note: Time
Final Internal setup time after elimination	11.1	indicating in min

Capacity Improvement after SMED
After the execution of SMED the profitability of the 160T-2 press machines had been expanded. The capacity had been expanded from 1500 parts for each movement to 2100 segments in one shift. This enhances the result and turnover of the organization. SMED usage diminished the changeover time and the proficiency of the works.

REFERENCES

[1] Raffaele Iannone et.al. (2013). Managining OEE to Optimize Factory Performance. [online].
[2] Berna Ulutas (2011). An application of SMED Methodology. Turkey, Eskisher 26480.
[3] E.Sivaselvam, et.al. (n.d.) Improvement of Overall Equipment Effectiveness in a Plastic Injection Moulding Industry. IOSR Journal of Mechanical and Civil Engineering, 12-16.
[4] Tushar N. Desai, et.al. (Oct-2008). Six-sigma - A new direction to quality and Productivity Management. J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68-73.
[5] Huang, et.al. (2006). Performance Measurement using Overall equipment effectiveness (OEE):Literature review and Practical application discussion. International Journal of Production Research, IJPR-0559 (R1)
[6] Robert C.Hansen (Jan-2001). Overall Equipment Effectiveness. Industrial Press Inc - Technology & Engineering, 278.

