International Journal of Engineering Technology Science and Research
IJETSR
www.ijetsr.com
ISSN 2394 – 3386
Volume 5, Issue 5
May 2018

Analysis of Scraps in E.O.U DIFF Case Cell in Yash India Ltd

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ABSTRACT*- In the era of cut-throat competition, especially in automobile sector, success of an organization resides in its ability to respond quickly to the needs of its customers. These customer needs must be attended with minimum scrap, minimum manufacturing costs, minimum lead time, to launch the product in market, and delivering better performance than the existing competitors in the market. Project presents a study of parts that are scrapped in EOU DIFF CASE cell of YASH INDUSTRIES, CHAKAN. Basic tools of six sigma are employed to define and measure the problem. Root cause analysis is performed and improvement measures will be taken*

KEYWORDS- six sigma,TQM, Pareto and CFT.

1 .INTRODUCTION –

Yash Industries was established in 1995 for the manufacture of companion flanges and universal joint. The company has two main units; one catering to domestic market and another focusing 100% on export. The latter is known as Export oriented unit. EOU deals with many lines of products like differential cases, companion flanges, differential housing etc. In the year 2003 EOU has been established at Chakan plant

The work presented here deals with the parts that are scrapped in differential case cell. A differential casing is a structure that has the property that, the angular velocity of its carrier is the average of the angular velocity of its sun and annular gears The aim of this work is to study and understand the nature of scraps occurring in EOU cell. The root causes for the same will be found out and improvement actions will be taken up.

2. LITERATURE REVIEW-

Facilities in India were examined to understand lean manufacturing practices' current status and impact on operations by Ghosh[5] (2012). The research illustrates that lean manufacturing is a multi-dimensional construct in which 80 percent of survey participants have implemented some type of lean program at their facility (Ghosh, 2012). The survey results were analyzed by a scorecard with the most commonly applied lean methods being monitoring supply performance, adding focus to customer needs, and implementing a pull system. The main drivers for lean implementation were first-pass correct output, reducing lead time, and increasing productivity For (Ebrahimpour et al., 1992)[3], statistical process control is not just education, it is a strategy to reduce the variability as part of TQM strategy for permanent quality improvement (Oakland, 2000). Lascalles and Dale [01] studied the impact of buyer-supplier relationship on suppliers' QM implementation.

3 METHOD OF STUDY-

Following method have been employed for the above study

1. Interviewing Operating Engineers and Production Managers: This set is the closest to the machine and material which goes in to making the final product as well as the products that are scrapped. Their guidance and support helped to form a basic framework of the problem.

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2. Cross Functional Team Meetings:

CFT meetings are held every day to perform root cause analysis (RCA) of the previous day's scraps and a "Why-Why Analysis" is filed. CFT includes representatives from following departments- Production, Quality Assurance, Technical Service Group, Supplier Quality Assurance and Development and Maintenance

3. Process Audit:

It is performed on a selected work station. It examines the work station and its operator on various aspects of the job that needs to be performed, namely, ability to operate machine, reading drawings, understanding of control plans, awareness of quality control parameters and MMDs, safety practices etc.

4. Supplier Audit:

Suppliers' performance is critical to in- house performance. Hence an audit is performed at the supplier's facility to examine their capability to meet our requirements. Their process is thoroughly studied and improvement measures if any are discussed and an action plan is formulated.

5. Dock Audit:

It is performed on packaged boxes of finished goods. This ensures that correct number of components are packaged, proper labeling is done on boxes, job cleaning is done, rust preventing oiling is performed and metal to metal contact is avoided.

6. Pre Dispatch Inspection:

Finished jobs, stacked in pallets in the dispatch area, are inspected for dimensional and geometric conformance based on a defined sampling plan. In case of a negative outcome in any of jobs in the sample lot, a 100% inspection is performed and non conforming jobs are segregated. An action plan is taken to prevent future occurrence of detected non conformity.

TYPES OF SCRAPS- Based on previous study scraps present in EOU is brodaly classified into following main categories

i. Insert related rejections:
ii. Offset related errors:
iii. Rework error
iv. Unclean fixture
v. Loading error
vi. Machine error
vii. Operator error:
viii. Supplier issues

4. OBSERVATION-

SL NO	ROOT CAUSE	TOTAL REJECTION	JULY 2008	AUG 2008	SEP 2008	OCT 2008	NOV 2008	DEC 2008	JAN 2009	FEB 2009
1	OPERATOR ERROR	12	3	1	0	3	1	2	0	2
2	MACHINE ERROR	7	2	3	0	0	0	0	2	0
3	LOADING ERROR	24	4	2	3	0	3	0	1	1
4	REWORK ERROR	27	2	10	5	3	2	3	1	1
5	FIXTURE ERROR	15	1	2	6	2	2	1	1	0
6	WRONG OFSET ERROR	24	5	8	3	0	0	2	2	4
7	INSERT RELATED ERROR R	36	4	11	6	3	1	2	4	5
8	SUPPLIER ERROR	9	0	3	1	1	0	1	2	1

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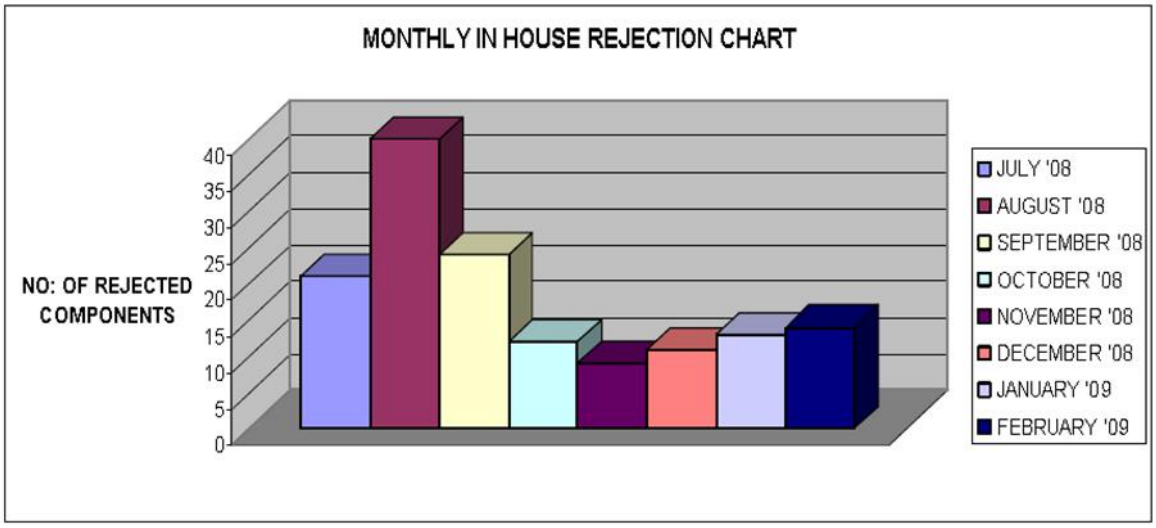
EOU INHOUSE REJECTIONS: CHECK SHEET

MONTHLY REJECTION HISTOGRAM:--



5. ROOT CAUSE ANALYSIS—

Root cause analysis was performed on all of the above categories and details are mentioned below.

I) insert related rejections:

1) Insert wear before life

a) Wrong grade of insert

b) Poor quality inserts

c) Faulty methods/ less than optimum parameters are being used, leading to increase in rate of tool wear

2) Insert not changed in time because

a) Insert not available

b) Operator ignorance

3) Insert play because

a) Insert screw not changed in time, because operator not monitoring it

b) Insert screw not changed in time because not available

4) Insert not seated properly because

a) Burr in insert pocket

b) Insert pocket damaged

5) Failure to provide safe offset subsequent to an insert change

II) Offset related errors:

Value fed in by operator is wrong because:

a) Lack of understanding of the method of determining the offset value

b) Operator fatigue

III) Rework error

1) Not following standard procedure because

a) Not available

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b) Lack of awareness or over confidence

IV) Unclean fixture

1) Operator fails to clean the fixture

2) Faulty air gun

V) Supplier issues

1) Hardness value related

2) Dimensional non conformance in casting

3) Casting defects like blowholes, inclusions etc.

VI) Loading error

1) Double loading: no system at workstation to prevent mixing up of finished and unfinished work pieces

2) Wrong loading: operator lack of awareness or carelessness

VII) Machine error

1) Thermal distortions

2) Machining forces

3) SCALE MISMATCH: a) servo loop gains may need adjustments

b) one of the machine axes is over traveling or under traveling

4)BACKLASH

POSITIVEBACKLAS

NEGATIVEBACKLASH

UNEQUAL BACKLASH –

5) STICK SLIP

6) SQUARENESS ERROR a) Orthogonal axes not moving at 90 degrees to each other b) bent axes or some other misalignment

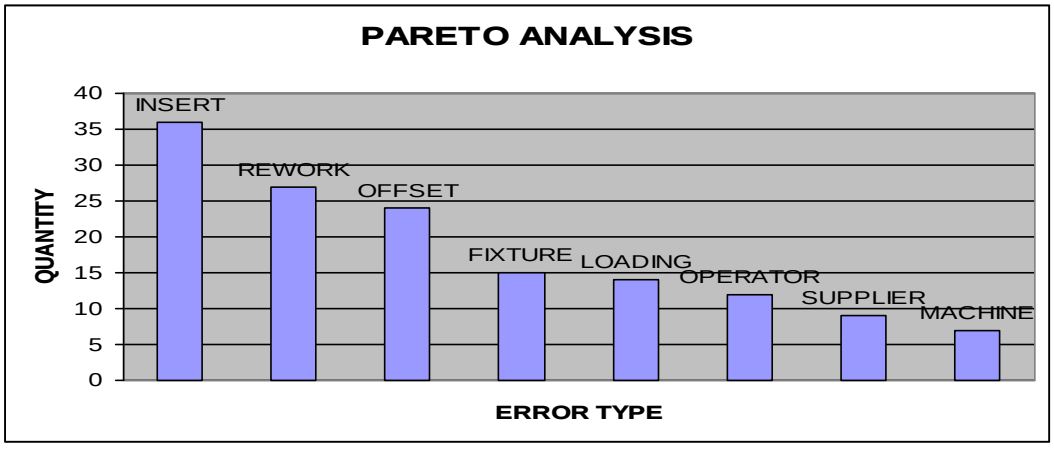
VIII) Operator error:

1) Fatigue due to physical demands of the work

2) Fatigue due to working environment

6. PARETO ANALYSIS OF SCRAP CAUSES:

Pareto analysis shows that the top 3 root causes for scraps are insert related errors, rework related errors and offset related errors. The Pareto graph has been shown below:



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7. IMPROVEMENT IDEAS:

The first program (O0200) is a setup program. You'll have a different setup program for each job – and of course, this program is created by the programmer. It must be run once before the job can be run. This program tells the machine which adjustments you will be having operators entering with the new method. The maximum (with this example) is ten total adjustments. The SETVN commands (for set variable name) will place a short message (up to eight characters) next to the related #500 series variables. The operator will now be entering the dimension values into #500 series permanent common variables – and there will be a nice message to tell them which dimensions are involved.

The second program (O9000) will be automatically executed whenever a T command is specified in the program. In order for this to work, you must first change a parameter. This parameter is documented in your Fanuc Operator's Manual in the custom macro section and is described in detail next.

Again, once this parameter is set, the control will set common variable #149 to the tool station number (T word) and then execute program O9000. Notice that at the very end of this program a T word is specified to actually index the turret.

DETECTION OF GAUGE CALIBRATION DATES:

Gauges and measuring devices that are used in the shop floor needs to be monitored and calibrated based on prescribed time intervals. However due to the enormity of the number of gauges it is difficult to keep track of calibration due dates of each gauge. The following is a Visual Basic program that will make it easier for the standard room staff members to monitor the status of gauges in the plant with just a click of the mouse.

FIGHTING OPERATOR FATIGUE:

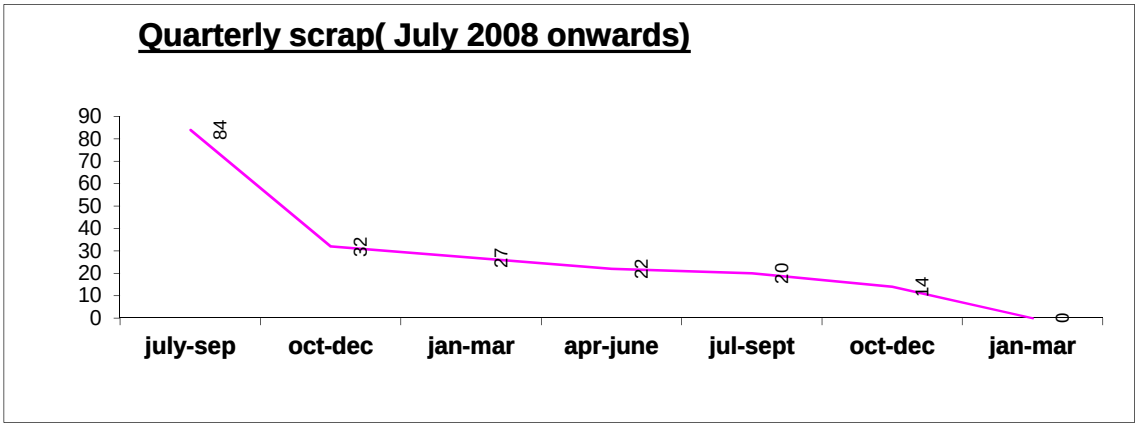
In an interview with the operators, 12 out of the 15 OEs admitted that they had committed mistakes due to lack of alertness or fatigue. Operator fatigue is one of the key reasons which lead to the category of errors called as operator error. Fatigue can be toned down. "To consolidate and summarize a large body of research, the alertness of a person can be triggered by nine key internal and external factors which can be considered as the switches on the control panel of the mind". These keys are as follows:

- Environmental Sound
- Environmental Temperature
- Sleep Bank balance
- Muscular Activity

Out of these 9 keys the environmental keys are the easiest to control. Fans (of the proper air displacement ratings) will ensure proper ventilation in the shop floor. In the night shifts, it has been proven that, increased lighting enhances the alertness levels of operators. The use of aromas and sounds, such as music, are having increasing success in combating fatigue. Some Japanese plants have found that using lemon scents greatly increase a worker's alertness.

8.RESULT AND DISCUSSION

We studied the audit reports and different reasons of scarp and the brain storming session has been conducted to determine the probable causes of the problem and represented in table. The why-why analysis was done for each of the probable causes .Then, the remedial journey for the most probable cause (root cause) was initiated.. It was observed that the defect was eliminated and resulted in zero scrap in the last quarter of 2009.



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