

The Kaizen Philosophy in Industry: A Case Study

Jagdeep Singh, Munish Mehta, U.C. Jha

School of Mechanical Engineering, Lovely professional university,
Phagwara, Punjab (India)-144411

ABSTRACT

Swaraj Product portfolio includes tractors ranging from 15 HP to a class of 60 HP, which meet the needs of farmers for different farm operations. Swaraj models have special features that are suitable for the application of agriculture and transport. The Swaraj brand has a great history and has long-established reputation among farmers over the past 40 years, and the brand is identified with trust, strength and reliability. Company faced many issues at their production line, as a Kaizen action sheet (KAS) is a single sheet of paper that provides a way for an individual to suggest process improvements within their work area. The Kaizen action Sheet System is part of the lean daily management system (LDMS). These small improvements help a lot to company to increase the efficiency of the industry. To perform these Kaizen sheets, case studies have been performed and some of those case studies are mentioned in this research paper.

Keywords: Trolley, Safe lifting, Portable, Material, Industrial.

1. Introduction

Tractor production is carried out in different steps. After going through various processes, it is assembled in different shops. For H.M.S., four main heavy parts are usually fitted with proper machining. This would include trumpet housing, gear box Casing, rear cover, differential Housing. These include various components such as tires, shafts, etc.

Various parts of the assembly line were assembled within a unit called "Tractor." The different parts are installed according to the point during assembly. It would mount key parts like rear cover, drive system, trumpet housing and differential housing. next, the various rear cover post-parts are being fitted. Then the rear cover and the gear box have been helped bring to the line where gear box is assembled before the Differential Housing while the Rear Cover is on top. In the differential housing, different things like brakes, p.t.o. shaft, cage assembly, trumpet housing etc. are assembled.

Then the whole operation is fitted with the engine against the Gear Box. The tractor then completes the final assembly process of some electrical and other parts such as engine-covered radiator, steering wheel, battery, etc. The Differential and Gear Box also helps to fill the right level of engine oil. Greasing of different parts is also done with Grease Gun. The Tractor is then removed from the line before being pulled outside the hooks. The "Dismantling Phase" is called this phase. Then the tractor testing includes testing for oil level, vibrations, brakes, noise, and many other factors affecting the tractor's performance.

2. LITERATURE REVIEW

Kaizen's theory has a major impact on academics as it increases the efficiency of an organization and also allows the production of high-quality products with minimum effort. Kaizen's theory was discussed by the following researchers:

According to Imai [1] Kaizen is a process of continuous improvement that included everyone, employees and customers.

Bassant and Caffyn [2] describe the CI definition as a system of centered and sustained incremental change throughout the organization. Different tools and techniques help these gradual development processes.

Deming [3] describes organizations being developed in recorded history at a higher rate than at any time. A highly competitive and ever-changing world therefore suggests big strategic rewards as well as challenges. Most administrators have squeezed a Kaizen's theory to address this situation effectively.

Deniels [4] explains how the fundamental shop floor change can be achieved by allowing operators to set up their own efforts, support business plans, and use them to steer their Kaizen actions. Yeo et al. [5] describes the idea –do it right every time, zero defects reflect CI over reliability by detecting deficiencies. The phrase Do It Better Every Time (DIBET) technique is associated with continuous, conscious and committed efforts to limit variability in the system. Newitt [6] claimed that if Kaizen's theory is applied, the thought of management and employees will be published. This will boost creativity, and adding value can flourish.

Imai [7] describes the possibility of dividing the improvement into Kaizen and innovation. Innovation requires a dramatic improvement as a consequence of substantial capital investment in new technologies or facilities as shown in Fig. 1.

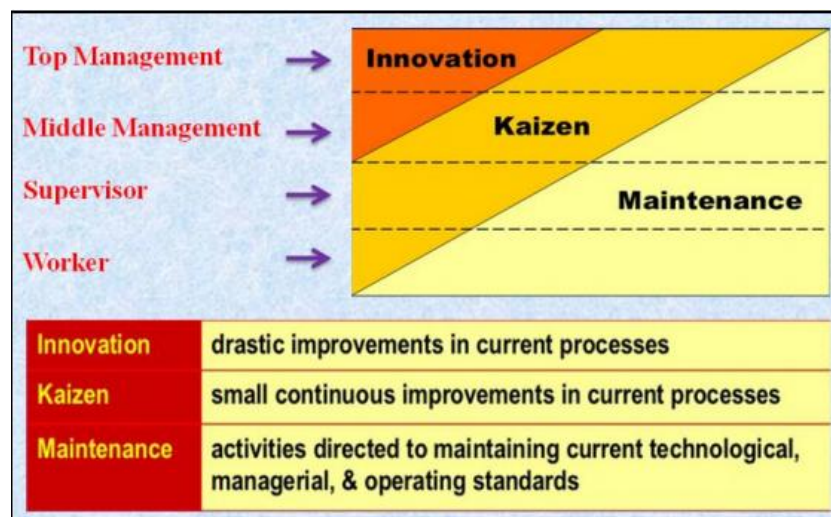


Fig. 1 Kaizen activities in industries [1].

Williamson [8] stresses the idea of Kaizen Costing and Target Cost. Target Costing is a strategy that ensures that the process has been designed to enable the company to offer at a lower cost to make a decent profit. Kaizen Costing focuses on the quality and efficiency of both new and existing goods during the production phase.

2.1. Why Technique

- Easy for kaizen and at the same time the easiest technique to coordinate.
- The primary objective of the technique is to determine the underlying cause of a defect or problem.
- Captivated by the maxim, ask why when you find something wrong five times; ask so many times as you consider the problem to be the biggest answer.

3. Case study (Total Productive Maintenance)

It can be called the medical science of the machine. TPM is a monitoring program for newly developed equipment and plant that requires a maintenance period. The TPM system's aim is to significantly increase output while increasing employee productivity and employee satisfaction at the same time. TPM is focused on maintenance as a vital and important part of the business. As a non-profit operation, it is no longer accepted. In some situations, downtime is scheduled for repairs as part of the day of service and as an integral part of the manufacturing process. The objective is to reduce the use of emergency repairs and unplanned maintenance.

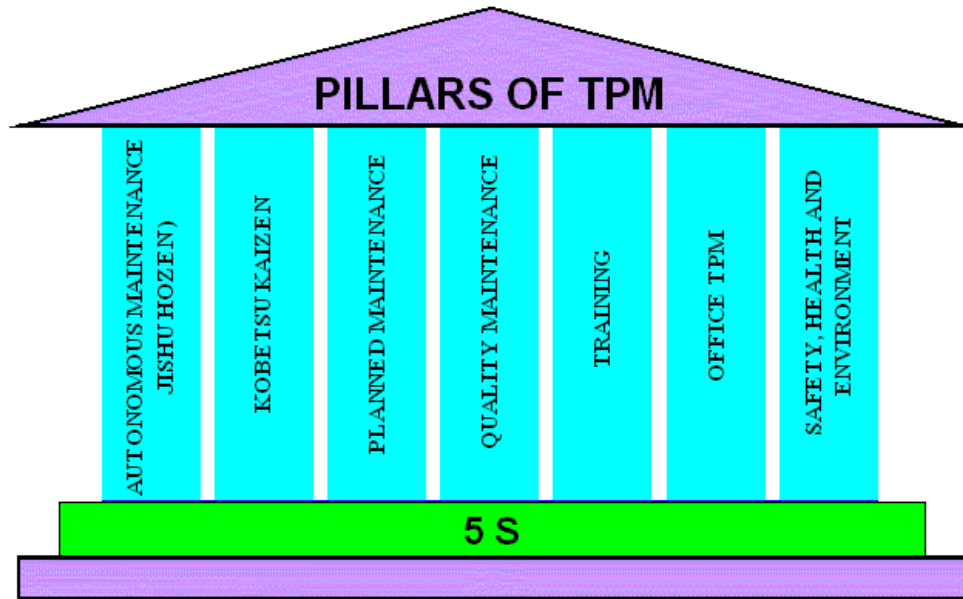


Fig. 2 Various pillars used in 5 S technique to solve the issues in industry [4].

A, B, C & D CATEGORY OF MACHINES

a category m/c – m/c which is most critical or bottleneck m/c

b category m/c - m/c which is lesser critical

c category m/c – m/c which is not critical

d category m/c – m/c which does not affect production & which does not require much attention

Table 1 'A CATEGORY' MACHINES IN LMS

S.NO	M/C NO.	M/C NAME
1	49702	VMC-40
2	49704	VMC-40
3	53801	SPECTRA GRIND
4	61501	PS-180
5	53507	AHG-80
6	21801	FN3H MILLING
7	55405	IG-1250
8	29501	CENTERING & FACING
9	48201	XLO

ANALYSIS OF LOSSES OF LMS MACHINES

(A CATEGORY)

a) VMC-40 (49702)

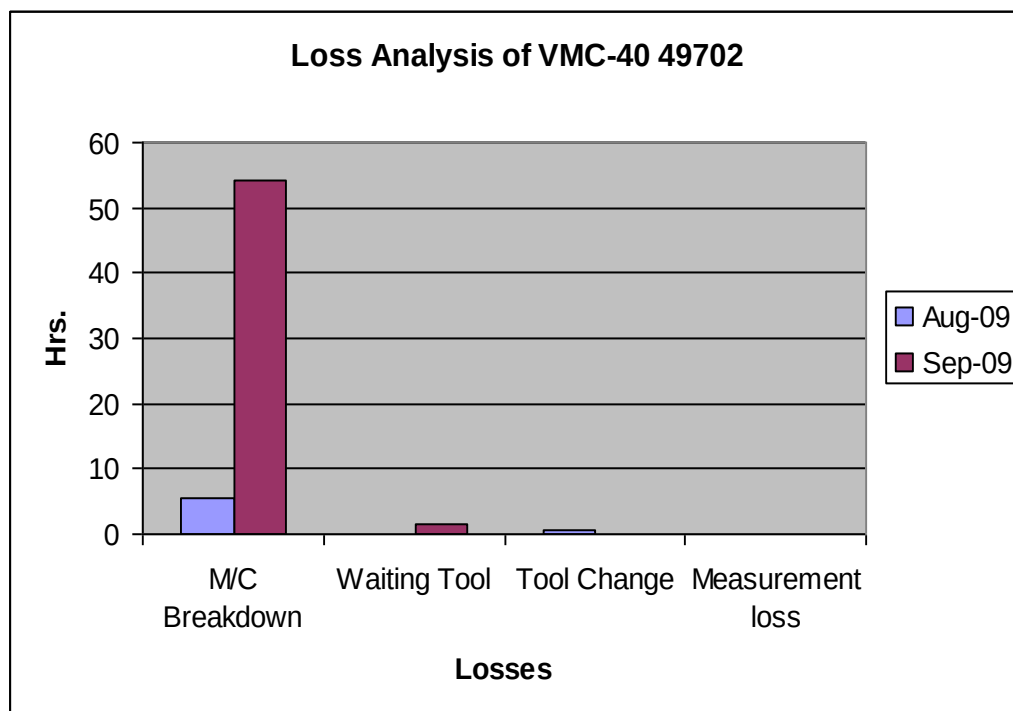


Fig. 3 Loss analysis for VMC-40 49702

b) VMC-40 (49704)

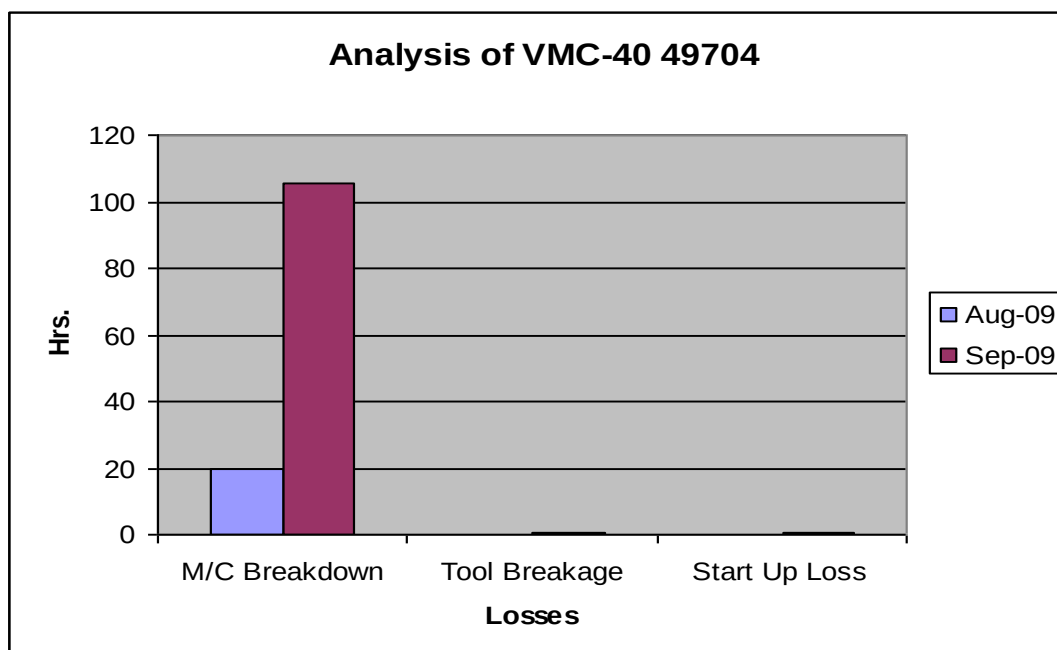


Fig. 4 Loss analysis for VMC-40 49702

c) SPECTRA GRIND

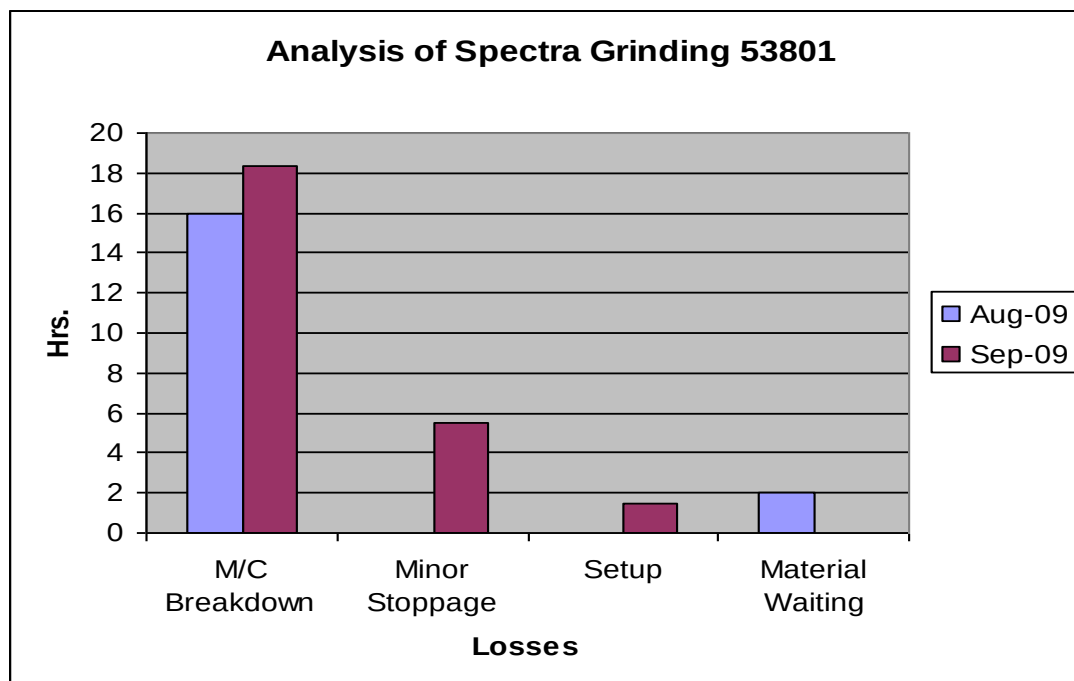


Fig. 5 Loss analysis for spectra grinding machine 53801.

d) PS-180

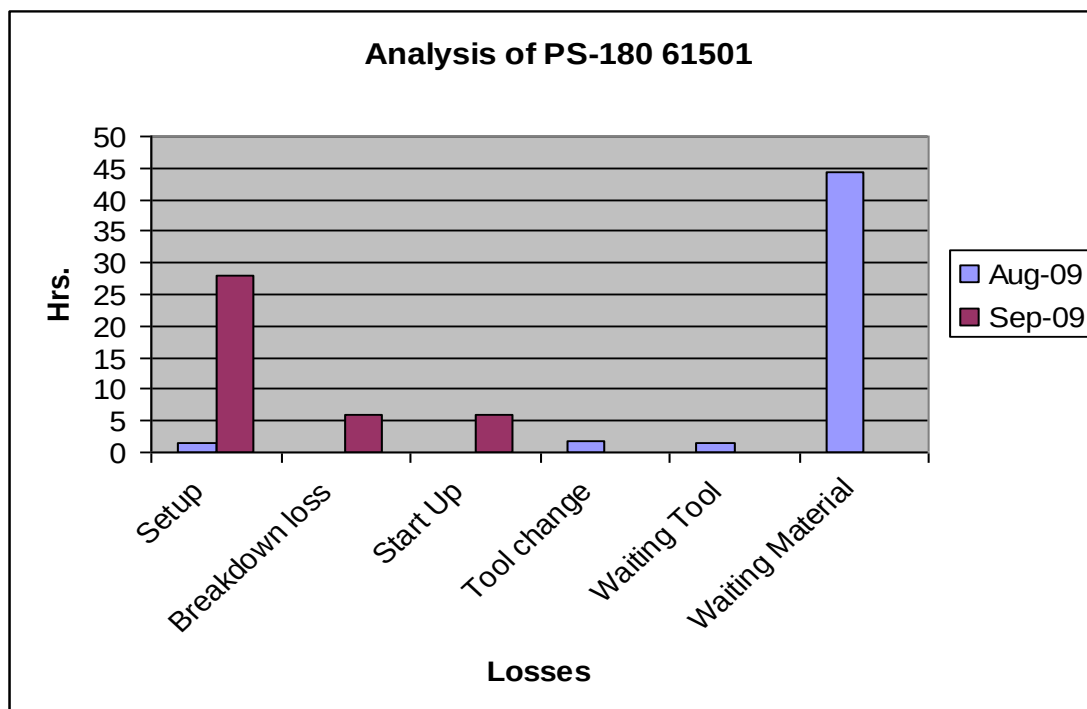


Fig. 6 Loss analysis for PS-180 61501

e) AHG- 80

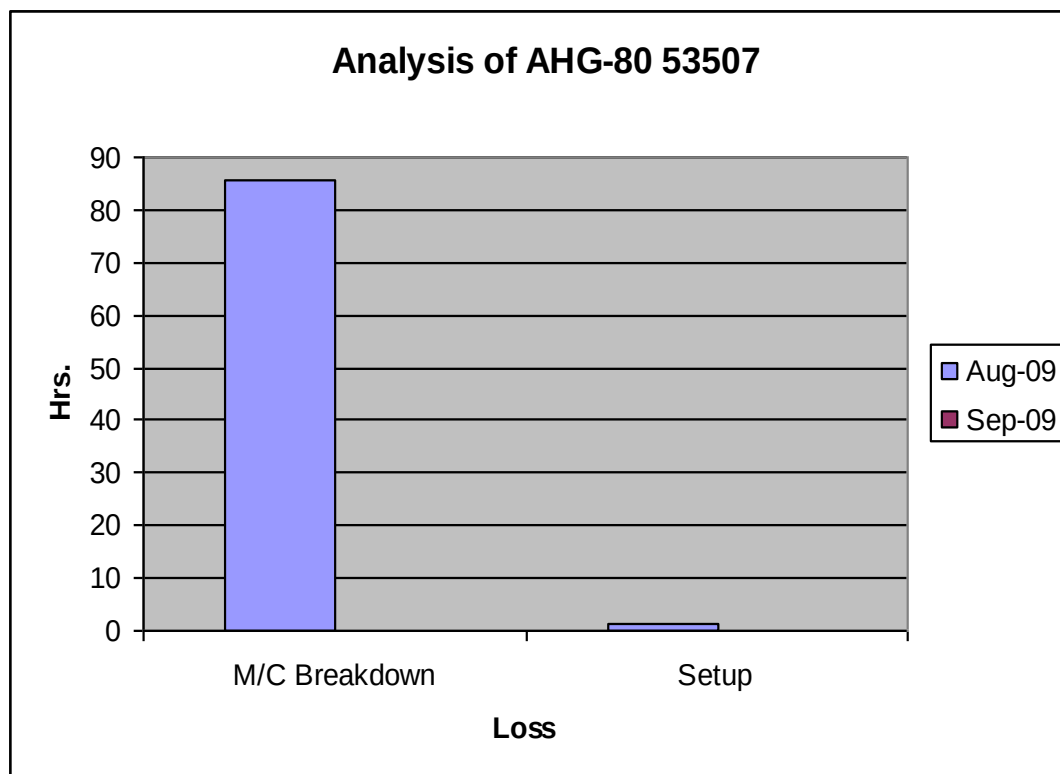


Fig. 7 Loss analysis for AHG-80 53507.

f) IG-1250

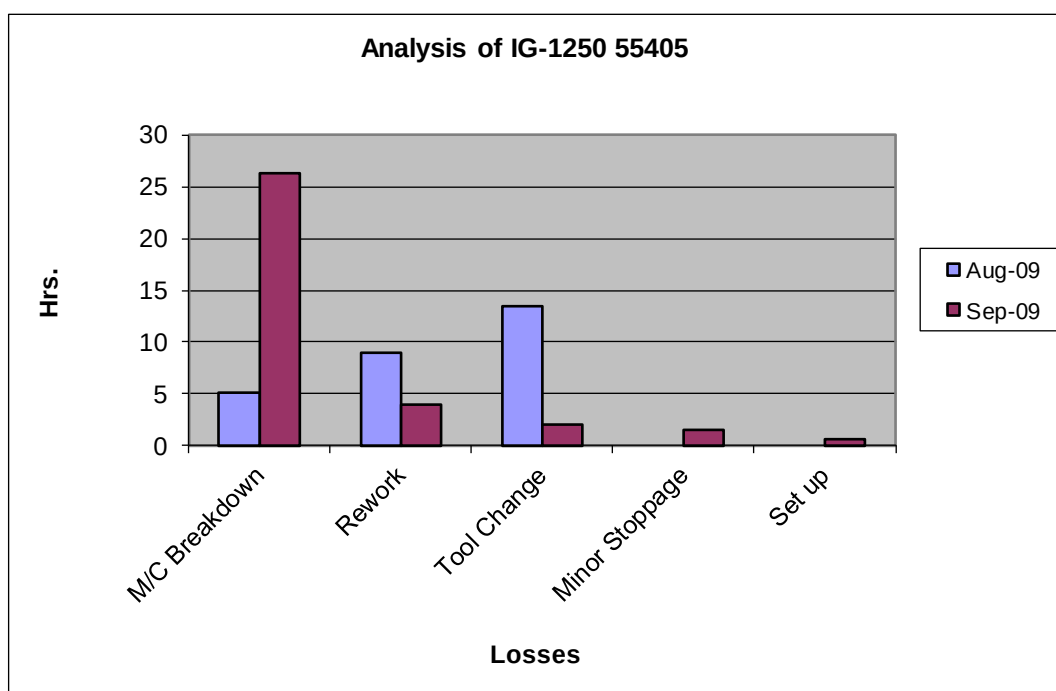


Fig. 8 Loss analysis for IG-1250 55405.

g) FN3H MILLING

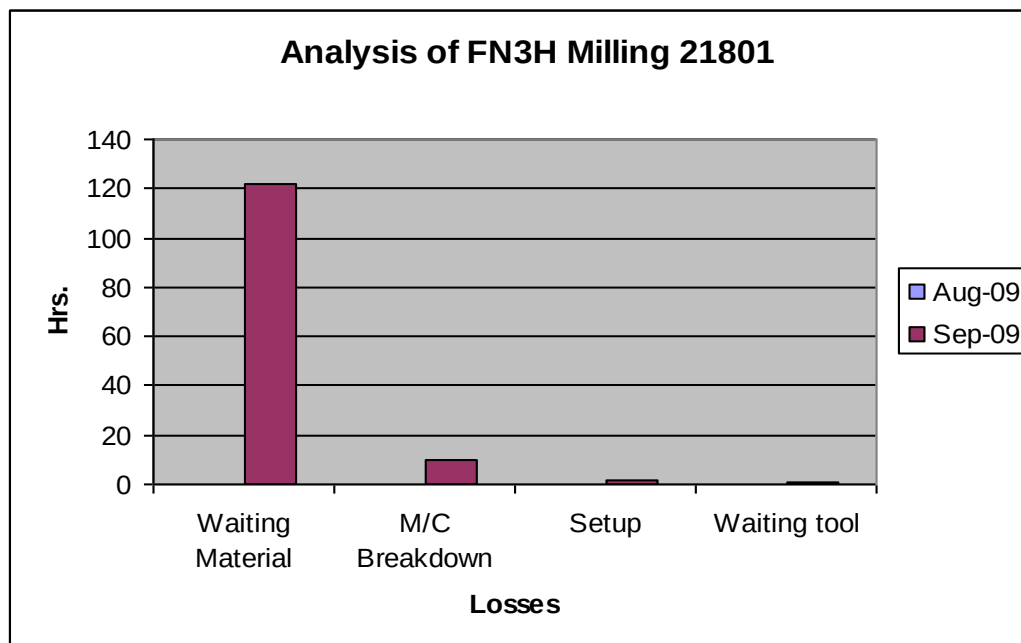


Fig. 9 Loss analysis for FN3H Milling 21801.

h) CENTERING & FACING

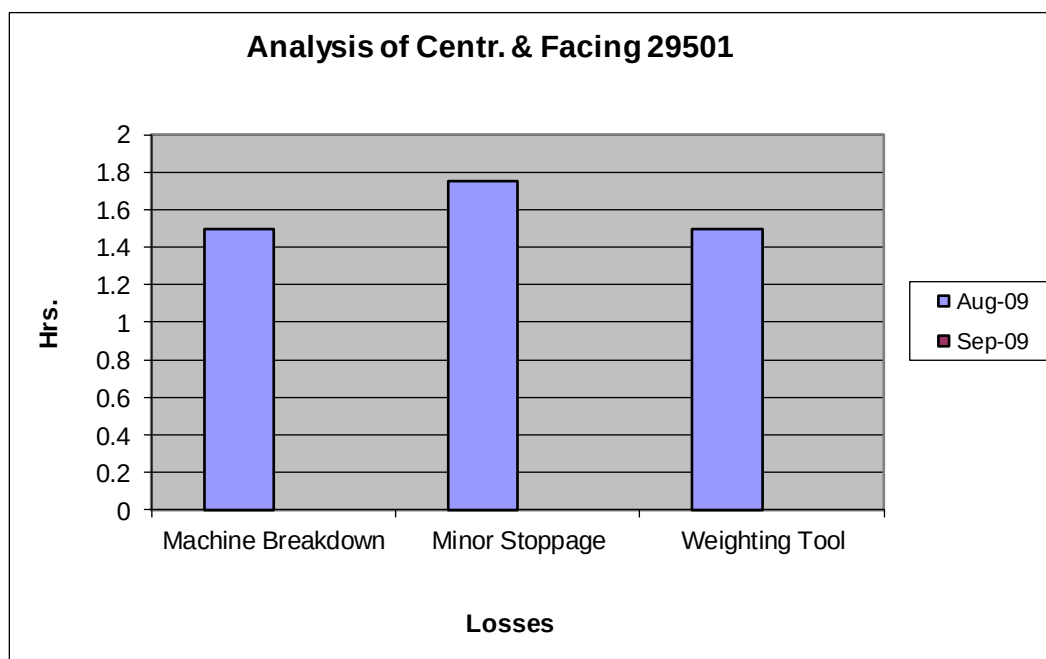


Fig. 10 Loss analysis for centering and facing 29501.

4. KAIZENS SHEETS

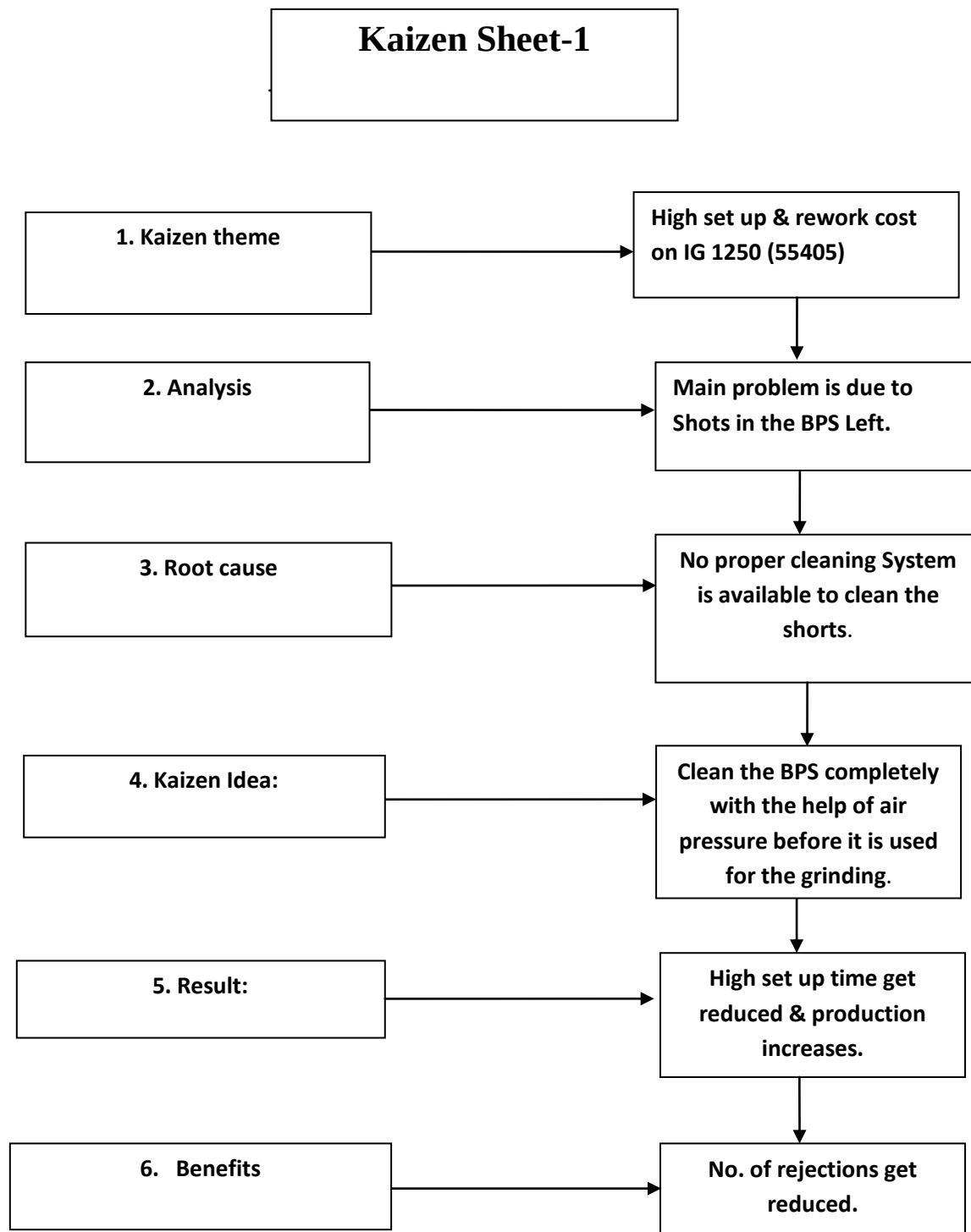




Fig. 11 Grinding roller used for grinding bps shaft.

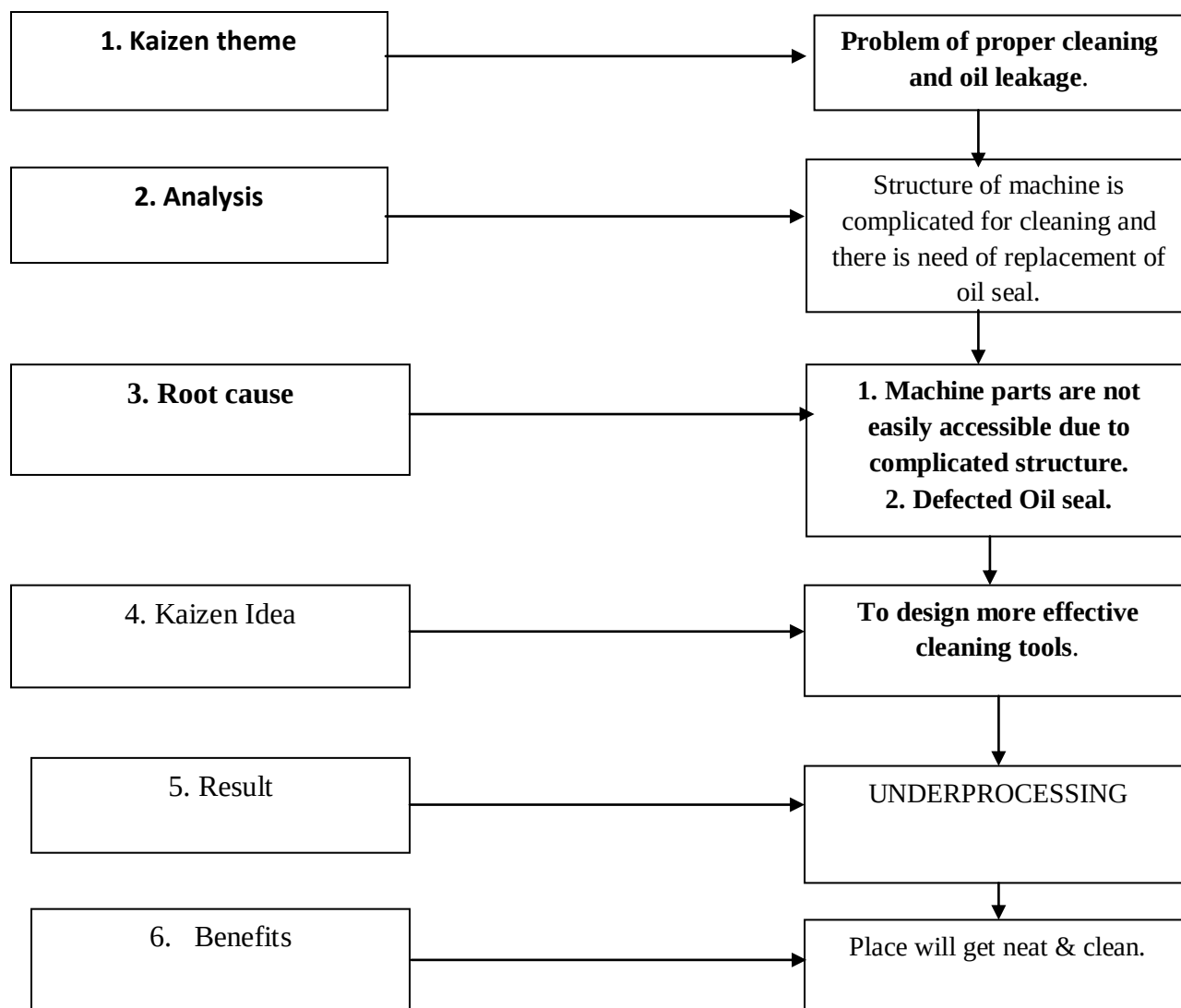


Fig. 12 Breakage of grinding drill due to bps shorts.

WHY- WHY ANALYSIS

Sr.No.	Root cause	Why	Why	Why
1.	High Setup time	BPS Shorts creating problem.	Shorts get trapped in BPS during short blasting in Heat Treatment.	No proper cleaning system available for shorts.

Kaizen Sheet-2



WHY- WHY ANALYSIS

S.No.	Root cause	Why	Why	Why
1	Problem of proper cleaning and oil leakage.	Structure of machine is complicated for cleaning & need for replacement of oil seal.	Due to lack of proper cleaning tool & due to defected oil seal.	—

5. Conclusions

- I. Such constant incremental improvements adding up to significant advantages. We lead to increased efficiency, improved quality, improved safety, quick delivery, reduced costs, and increased customer service.
- II. With the help of these Kaizen actions, working methods has been improved in drastic way which helps the workers to improve their performances.
- III. After performing kaizen sheets, why why analysis has also been performed to find the root cause of various problems.

References

1. Imai M., Gemba kaizen. A common sense, low-cost, approach to management, Kaizen Institute, Warsaw, 2008.
2. Bassant J and Caffyn S (1994), —Rediscovering Continuous Improvementl, Technovation, Vol. 14, No. 1, pp. 17-29.
3. Deming W E (1995), The New Economics for Industry Government and Education, 2nd Edition, MIT Press, Cambridge, MA.
4. Deniels R C (1995), —Performance Measurement at Sharp and Driving Continuous Improvement on the Shop Floorl, Engineering Management Journal, Vol. 5, No. 5, pp. 211-214.
5. Yeo C H, Goh T N and Xie M (1995), —A Positive Management Orientation for Continuous Improvement, Proceedings of IEEE Annual Engineering Management Conference on _Global Engineering Management: Emerging Trends in the Asia Pacific_, pp. 208-213, Dayton North, USA.
6. Newitt D J H (1996), —Beyond BPR and TQM—Managing the Processes: Is Kaizen Enough?, Proceedings of Industrial Engineering, pp. 1-5, Institution of Electric Engineers, London, UK.
7. Imai M., Kaizen: The Key to Japan's Competitive Success, Random House Published, New York, 1986
8. Williamson A (1997), —Target and Kaizen Costing, Manufacturing Engineer, Vol. 76, No. 1, pp. 22-24.