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Application of Kaizen Methodology in Oil Section for Process Improvement

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Abstract – *Two kaizen application case studies that demonstrate process improvement in work stations are presented below. The procedure includes identifying areas for improvement, lowering ergonomic scores, reducing time for oil-top activity, and reducing costs by reusing and filtering coolant. The study also demonstrates how to save money by using Humantech software to reduce ergonomic risk and filtration trolley fabrication for coolant re-use.*

Key Words: Lean, kaizen, continuous quality and productivity improvement, change management, practice quality management, cost driven, sustainability, Automation.

1. INTRODUCTION

This Increasing quality and productivity to gain a competitive advantage has long been a top priority for most manufacturing executives. Furthermore, as stated by Giffi et al., "sustained competitiveness cannot be created overnight and will never be reached if manufacturers focus on only some of the elements in the manufacturing equations". As a result, in order to achieve a superior long-term return, a manufacturer should constantly strive to employ new manufacturing technologies to improve managerial abilities, "right size" the corporate organisation structure, and investigate any other relevant approaches. Kaizen simply means "positive change" or "improvement" in Japanese. It's a set of procedures designed to improve quality over time. The central tenet of Kaizen is the rapid examination of a problem's small, manageable components and the rapid implementation of a solution with ongoing, real-time evaluation. A "kaizen incident" is the term for something like this. Many people will notice how similar this is to the ABR's plan-do-study-act (PDSA) cycles in its PQI programmes. According to lean or kaizen, before making a change, all stakeholders, not just management, must meet and agree on what adds value to a process and what constitutes waste. When done correctly, kaizen not only reduces waste but also builds consensus and enthusiasm for change, as well as teaching employees a methodical, scientific approach to finding and eliminating waste in a process.

2. LITERATURE REVIEW

Paul Knechtges, Michael Christopher Decker [1] have said that the Toyota Production System, also known as Lean, is a systematic approach to continuous quality improvement that has transformed the automobile manufacturing process in the last 50 years. These techniques have been successfully used in the medical profession to improve quality and safety in recent years. Kaizen, which means "positive transformation" in Japanese, is one of these methods. Kaizen's central concept is rapid evaluation of a problem's small, manageable components, as well as rapid implementation of a solution with continuous, real-time evaluation. Kaizen gives change a "human face" by requiring participation from all stakeholders, not just management. A kaizen event can be a great way for a radiology department to get started with continuous quality improvement because of the small scale of the changes required and the inherent focus on human factors and change management.

Monica Bellgrana, Martin Kurdveb, Rodan Hanna [2] have suggested in a case study of green kaizen at a pharmaceutical manufacturing company, the Green Performance Map is used to involve operators and management in environmental improvements on the shop floor. Identification of improvement opportunities, a visualization input-output model (to gain consensus), and a cost-cutting strategy for prioritizing tasks are all part of the strategy (to attain force to take the step). The goal of this paper is to show how habit change necessitates operationalization and the value of using cost as a motivator for environmental change.

3. METHODOLOGY

Before First and foremost, we keep track of our oil and coolant usage and expenditures in relation to our annual AOP (Annual Operation Plan). Based on production quantity at the start of the year, we forecast and offer a fixed AOP cost. As a result, we've devised a budgeting strategy that involves tracking how much money we spend on supplies each month.

The following are the outcomes of the control plan:

- Inventory control
- Oil consumption tracking
- Controlled leaks
- Less coolant disposed
- Lower consumption by reusing the same coolant or oil in the filter

As a result, we concentrated our efforts on reducing coolant consumption through the use of a "Mobile Filtration Trolley."

We have a list of all machines and know how often they should have their coolant tanks cleaned. The coolant tank should be cleaned on a regular basis, according to the coolant manufacturer's instructions. We use a filtration trolley pump to remove and filter all of the existing coolant during tank cleaning. The removed coolant is stored in a coolant tugger tank. After the machine coolant tank has been cleaned, the stored coolant is filtered again and refilled into the machine coolant tank using the same filtration trolley.

The filtration frequency is maintained every six months for all machines. On a regular basis, coolant is checked, maintained, and monitored. Dosing for the filtered coolant, such as PH booster, Biocide for reduced coolant odour, Rust preventive, and so on, is carried out following the analysis of the coolant filtration report.

CASE-STUDY 1: OIL TOP-UP ACTIVITY

Statement: Different types of oil are available in the oil section for various machines. Each machine must be topped up on a regular basis in order to function smoothly for precise manufacturing. The person must carry a 20 to 35 litre oil can from the oil section to the pegard section machines, climb a ladder, and top-up at a height of 5 feet and above. In total, he must fill between 70 and 140 litres, posing an ergonomic risk. This job must be completed in two shifts and is done twice a week.

Solution provided: A motorised mobile oil pump trolley with easy access was provided for oil top-up activity on Pegard series machines as a kaizen idea to solve the above-mentioned problem.

Benefits:

1. Unsafe activity is eliminated.

2. An ergo score reduction of 37 to 4 equals an RPS of 89 percent.

3. Oil top-up is an easy and stress-free activity.

4. The top-up activity can be completed in a shorter cycle time.

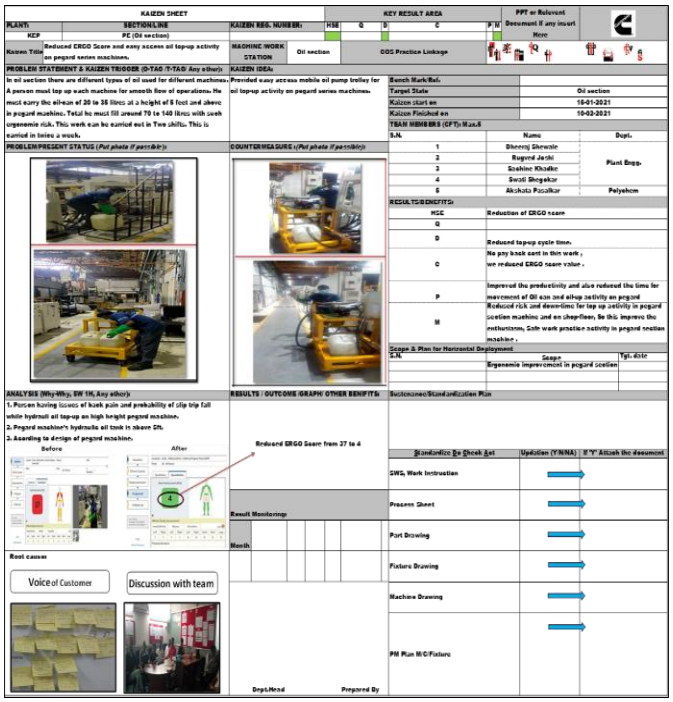

Fig -1: Kaizen Sheet for oil top-up activity.

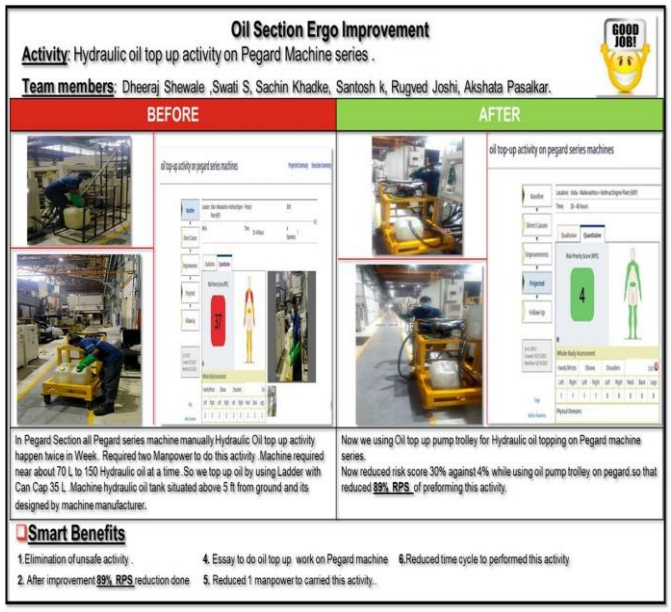

Fig -2: One Page for Ergonomics Score Reduction

CASE-STUDY 2: RE-USE AND FILTRATION OF COOLANT ACTIVITY

Statement: Various types of coolant are used on the shop floor to machine the product in various machines. Every machine has a coolant change and tank cleaning schedule, which results in waste / used coolant production and increases the coolant disposal load at the ETP plant.

Solution provided: Provide an easy-to-use, stress-free mobile coolant filtration trolley for coolant re-use and load reduction on ETP plant.

Benefits:

1. The amount of waste/used oil and coolant disposed of at ETP has been significantly reduced.

2. Purchases of fresh/new oil and coolant are significantly reduced on a monthly basis.

3. Used the re-use method to save fresh concentrated coolant.

4. All washing chemicals, water-based coolant, and other items can be filtered and reused.

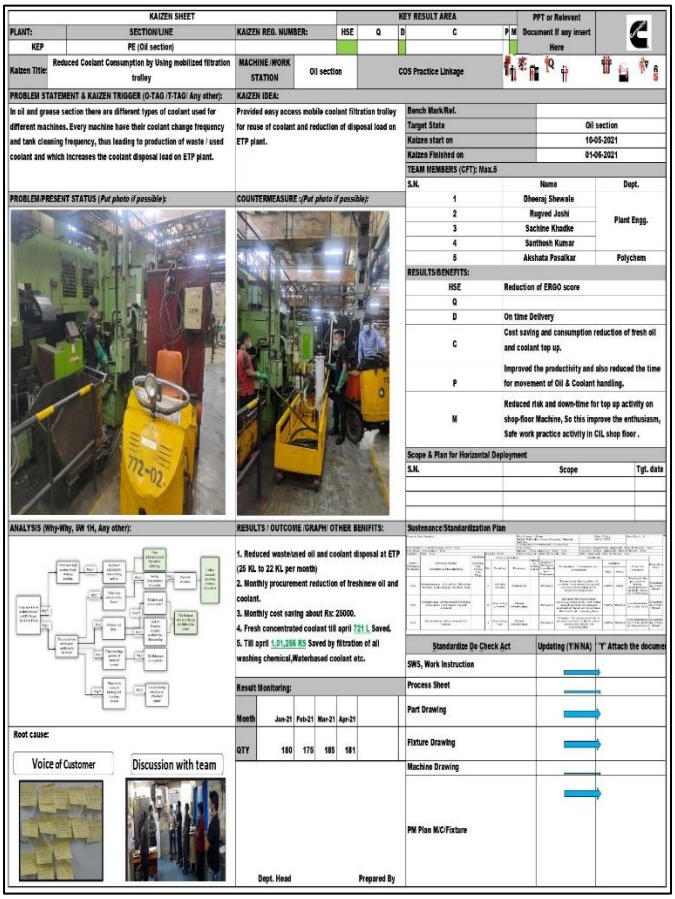

Fig -3: **Kaizen Sheet for Filtration Trolley.**

4. CONCLUSIONS

Although a kaizen approach is not appropriate for all quality improvement projects, it is ideal for an introductory quality improvement project due to its concentrated nature and consideration of human factors. A successful kaizen event can result in new initiatives for the practice's ongoing quality improvement program, as well as increased experience and credibility. To deal with the current regulatory and reimbursement environment, a strong departmental quality improvement program is required. Quality improvement program will become even more important in the manufacturing sector in the coming years, necessitating the establishment of organization-specific goals for achieving success and delivering better results. Regardless of the method used to improve quality, it all stems from the conviction that there is a better way to do things. The added value of such optimism could be a valuable departmental asset in the face of rising regulatory and financial obstacles.

The following are some of the benefits of this study and research project:

- Better inventory management.
- The amount of coolant disposed to the ETP unit has been significantly reduced.
- Coolant consumption is reduced when re-used coolant is loaded and the coolant tank is properly cleaned.
- The procurement cost of the coolant has dropped dramatically.

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