Total productive maintenance analysis

Total productive maintenance, (TPM) is a philosophical concept of managing workshop equipment with the focus being on achievement of top quality service with optimal use of the equipment efficiency. In many industrial firms, maintenance is critical as it cutting down the expenses on to the lowest possible value. It is not a form of investment that that increases process reliability. According to Tsarouhas (2007), " The goal of TPM is to bring competitive advantages to organizations, improve quality of the products, and reduce the cost production of the line" (cited in Bon & Ping 2011, p. 163). The usefulness of TPM can be realized if its ideals are implemented by monitoring the Overall Equipment Effectiveness, (OEE) in industrial manufacturing firms to initiate efficient maintenance programs. The implementation of TPM ideals require adoption of specific approaches in order to develop a working TPM. The TPM programs in a workshop would lead to quality services at low costs, timely delivery of projects, and a motivated workforce environment for the working staffs.

TPM brings together the concept of continuous improvement and the significance of having a motivated workforce that has authority to freely participate in the maintenance processes through their various departments (Tsarouhas 2007). Whereas the Japanese model for TPM focuses on small group responsibilities for workers, the Western model puts emphasis on equipment use and the role of a machine operator in the process of maintenance. Either way, both the Japanese model and the Western models try to minimize imperfections or faults in equipment, keep accidents and breakdowns to the minimum possible levels. In summary, Bon & Ping (2011) write " The aim of TPM activities is to improve the Productivity, Quality costs,

Cost of product, Delivery and movement of products, Safety of operations and Morale of those involved, (PQCDSM)" (p. 164). The TPM concept is based on 8 foundation pillars with each pillar having its own responsibility. Few of the pillars are elaborated in the section below.

Overall Equipment Effectiveness, (OEE) is an important metric used in measuring the level of productivity of machines. There are various ways of working out OEE problems using mathematical models. The mathematical models all converge at resolving three main OEE elements: efficiency of equipment, rate of quality, and availability with TPM standard of 95%, 99%, and 90% respectively (Bon & Lim 2011). The benchmark OEE overall standard of 85% is however recommended at the international performance level.

One of the industries that find TPM very useful is the automobile production units. This is because in most regions, car manufacturing is a booming business. Available markets lie overseas; hence, firms in the industry must develop strategic plans to manage the workshop operations. Other than manufacturing, an auto workshop handles production of vehicle parts and components among other accessories. The productions ought to meet international standards, which justifies the focus on TPM.

The advantages of the TPM model is that it creates high productivity levels if well managed. Products come out of the end process will minimum defects, low breakdowns, and better quality. In addition, the concept of adopting TPM lowers cost of production and this means more returns to the firms. To the employees, they are directly involved in creating workforce programs that

suit their interest. The workforce is highly motivated as and this increases their level of production.

A manufacturing firm that implements TPM requires the critical pillar of focused improvement, (FI) in order to sustain attempts towards tasks resolutions. According to Carter (n. d), “ Failure to improve performance of your processes leads to a failure to improve the organization and results in improperly managing the business.” The various models of improving business processes: six-sigma, lean among others ought to be targets of FI. FI is a basic requirement in sustaining process improvement through lean and six-sigma to produce positive impacts on critical manufacturing processes.

Process efficiency is measured in terms of time taken; for instance, cycle time. This is important in implicit determination metrics mainly used in the manufacturing firms to monitor equipment uptime, yields, changeover, and aset revenues. All the time aspects should be brought together in stream mapping framework to show all the main flows of a firm’s interactive patterns. In this manner, a vivid picture will show problems areas and opportunities for adjustment. FI does not require fixed time metrics for the workforce to follow; hence like the TPM ideals requires, decisions will only depend on the situation at hand. The input of FI mainly addresses the workforce initiatives towards customer satisfaction, development of new products, the production process, and decision-making process. In a manufacturing process the most relevant process is the production process in which, as indicated above, the metrics include cycle time, process efficiency, inventory turnover, and production cycle variance (Carter n. d).

Most manufacturing firms in the current operation environment resort to quick fix solutions that consume much time at the expense of the focusing on their processes. The consequence of quick fix solutions is that it leads to heroic worshipping for the person who develops a solution. If more time is dedicated towards FI, more time will be available to every staff in the workforce to come up with best ways of improving the manufacturing process. Carter sums (n. d) it up that " When you start focusing on your processes you'll experience improved quality, reduced cycle times, lower costs, and a predictable and manageable workload."

In the aforementioned statements, the TPM ideals were modeled in Japan and the Western front. The origin of the model; however, was in Japan. The other pillar of the TPM is 5S CANDO, which is illustrated in the table below.

Source: (Levinson & Tumbelty 1997)

From the table above 5S CANDO refer to a pillar of TPM that was developed in Japan and applied in other regions in order to make the workshop safer place. This coursework develops the 5S CANDO pillar in relation to its applicability in the vehicle workshop.

Clearing up

All unnecessary items in the workshop should be removed and prevention of their dumping in the workshop. When an item is essential in one shift an nonessential in another then the item can be tagged and put in a secluded area. If the item is not used in another shift then it should be discarded. Used items should be organized depending on their frequency of use; for instance,

tools used daily should be in the workshop, tools used weekly should be in a place near the workshop, while those taking more than a month to be used should be completely out of the workshop.

Arranging

All the tools and machines in the workshop should be kept in their respective places. This calls for management of an efficient storage system like cabinets, toolboxes, and racks. Tools, their parts, and storage areas in the workshop are labeled. The items should be easy to remove and replace in their storage areas.>

Neatness The workshop, items, the floor, and walls should be kept neat. The benefit of keeping the workshop clean is to identify any anomalies as problems can clearly be seen. Removal of fragments and dirt in the workshop that can cause breakage of machines during routine workshop maintenance Neatness ensures that the workshop is safe and pleasurable to work in.

Discipline In this context, discipline refers to setting up of regulatory measures to direct operations in line with other standardization marks at national and international levels. Standardization includes those directed towards staff qualifications and training before working in a workshop. It is important to include the workforce in making decisions that affect their workstation. The management too has the responsibility of committing to the provisions of 5S CANDO.

Ongoing improvement

The rule of ongoing improvement is to allow the production line to adopt innovative processes to respond to the challenges of environment. Eco-innovation in the automobile industry would have significant impact in the world, as locomotives are major contributors of greenhouse gas emission. Green technology like production of electric cars would be a significant initiative. Friction reduction is another essential part of ongoing improvement.

Autonomous Maintenance, (AM) is another pillar of the TPM that is also fundamental. It could be confused with TPM because at implementation stage, the pillar impinges on most people engaged in the workshop processes. AM " is a technique to get production workers involved in equipment care, working with maintenance to stabilize conditions and to stop accelerated deterioration," (Campbell, Ardine & McGlynn 2010, p. 219). The implementation of AM requires that workshop operators should be taught how to maintain machines so that they can function without failure. The operators should also know how to rectify abnormalities. This is a potential areas that cam bring conflict of interest from the various workers if there were strict regulations created earlier. For the successful implementation of AM, the management should make the operators know recognize the improvements via strong leadership and control mechanism that only guarantee satisfactory workshop servicing.

As much as the impacts of AM elude most workshop operators, it is a way of letting staffs to shore up improvement initiatives towards problem solutions. As such, more time should be spent on diagnosing how to maintain and prevent complex vehicle workshop duties. During AM, Campbell, Ardine &

McGlynn (2010) observe that “ Operators perform routine equipment inspections and cleaning, lubrication, adjustments, inspection, and minor repairs, (CLAIR) maintenance task, which are critical to how the equipment performs,” (p. 219). The role of AM is to jumpstart the cleaning and equipment rehabilitation programs to discover any improvement opportunities as outlined by the Japan Institute of Plant Maintenance. Via regular cleaning, operators will be able to single out hidden defects that may compromise machine performance.

Planned Maintenance (PM) activities are same as the usual vehicle maintenance schedule. For instance, an owner’s manual that suggests oil should be changed after a vehicle cover 3000 miles. In addition, the manual may give direction on how to plan vehicle transmission services, wheel balancing, or cleaning of parts among other operations.

The TPM concept in managing workshop operations has been proven. The workshop is one of the busiest sections in a manufacturing firm. Moreover, the workshop is where production takes place and as such, it is expected to be the department with the highest numbers of the workforce. It is essential to come up with management concepts that will let the human resource self-manage and while items and the workshop set up remains orderly for ease of work. The pillars of TPM ensure that the workshop remains an orderly place work in. However, implementation of TPM ideals would take long before a firm realizes its benefits.