

Lean Production Techniques

MID-SEM REPORT

*Apply Lean production techniques on Central
Workshop BITS Pilani Hyderabad Campus*

Report presented by:

Anshul Mathur
Aniruddh Sharma

Kuldeep Singh Sidhu
Rathil Madihalli

Gopidev P Pai

OBJECTIVE OF PROJECT

Lean Manufacturing is a management philosophy that pursues continuous elimination of wastes. This results in sharp increase in efficiency and productivity.

As lean is more of a philosophy than just simple tools, it can be applied to any kind of workplace be it production, service business or even one's personal life.

The project focuses on applying some of the lean tools to the Central Workshop at BITS Pilani, Hyderabad Campus.

The main Objectives are:

1. To apply **5S** in every department of the workshop.
2. Use of **visual management** in various departments.
3. Inventory Management using **Software Development**
4. Inventory management by **Reuse and Recycle**

THE CENTRAL WORKSHOP AND ITS PROBLEMS

The Central Workshop of BITS Hyderabad is an important Laboratory for the engineering students of the campus specially Mechanical and Manufacturing students. Managed by Dr. N Suresh Kumar Reddy, the workshop has all the different machines and processes that provide students a hands on opportunity to work and learn. The workshop is divided into different sections or “shops” which include Computer Aided Manufacturing, Advanced Machining, Welding, Fitting, Carpentry, Lathe, Milling, Casting and Forming, Sheet Metal and the Inventory Store.

The workshop layout is well designed for good ergonomics but the major problem is within the individual shops. There is little or no system for keeping the machine accessories, tools, cutters, drill bits etc. They have no defined place to be kept. This makes it difficult of the operator to find the right tools for any operation quickly.

The inventory store which contains both raw materials as well as finished products is poorly maintained. Raw materials have no sorting system whatsoever and it is often impossible to keep track of how much is left of what. The finished products too are dumped in the store and often stay there till the heap is too big for the store room itself. After a certain point they are thrown away as scrap.

Clearly the Central Workshop is far from being Lean.

To tackle the main problem of poor inventory management first it is important to apply simple lean tools of 5S and Visual Management.

Once they have been implemented, a proper software based inventory management system is required to clearly know location of every tool, raw material and product in the entire workshop. This software will also keep track of the raw material inventory to tell when a new batch should be ordered. This would be the first step of applying Pull system to the Workshop.

APPLYING 5S

The 5 Steps to be applied on every shop in the Workshop are as follows:

1. Sort: Sort out & separate that which is needed & not needed in the area. Only the tools and materials required in the welding shop will stay in the welding shop. All rest is muda and to be eliminated.
2. Straighten: Arrange items that are needed so that they are ready & easy to use. Clearly identify locations for all tools and materials so that anyone can find them & return them once the task is completed. Preferably shelves (already present in some shops in the workshop) can be used to put everything in sequence.
3. Shine: Clean the workplace & equipment on a regular basis in order to maintain standards & identify defects.
4. Standardise: Revisit the first three of the 5S on a frequent basis and confirm that the standards are being met.
5. Sustain: Keep to the rules to maintain the standard & continue to improve every day. This is perhaps the most important of the 5S as it involves involvement. There is a need to involve all the Technicians in the workshop along with the manager Dr. N S K Reddy sir.

These measures will lead to:

- Improved safety for students
- 5S becomes a fundamental measure & key driver for Kaizen
- Forms a solid foundation upon which to build continuous improvement
- Workshop technicians gain a sense of ownership, involvement & responsibility
- Reduction in waste – as defined by Ohno's seven forms of waste
- Improved performance in productivity, quality & morale leads to better learning

VISUAL MANAGEMENT

We plan to put up visual aids in form of signboards and posters describing the process that is being carried out in each shop. The boards can depict the correct and incorrect procedures, which will help the students understand better. A visual teaching tool will also help the technicians in explaining the concepts to the students. Correct application will lead to lesser tool and machine damage.

Often freshmen students are afraid to work in the workshop. Visual help will also reduce mishaps and accidents helping the students overcome such fears.

INVENTORY MANAGEMENT

Lean philosophy actually talks about zero inventory to follow Just in Time production. But the Central Workshop is not a production plant. It is a students' learning center.

Inventory of raw material is supposed to be there so that every student will have sufficient supplies to learn. Thus the final products created are also a very large number and often end up as waste.

For the raw material inventory, it is important to keep track of how much is left or what. 5S greatly helps in this respect. It will be even better to have a computer software which can keep track of raw material usage. It will be a major help in deciding what to order, when to order and in what quantity. This will be the first step that the workshop will take towards applying a Pull System.

The 3 overall benefits for workshop managers would be:

1. Optimizing inventory to meet product availability and ROI goals
2. Providing inventory visibility to supply chain partners
3. Stating inventory accurately in financial reports

The workshop will keep making products as every year new batches of students join BITS Hyderabad. Our objective is to create a demand for these products being created. Every year the workshop makes wooden tables, stools, wall hanging shelf, metallic paper weights, pencil stand to name a few. All these products are usable.

We plan to sell these equipment to other labs and classrooms on the campus itself. All the above mentioned products fit in as utility in some place or another within the campus itself. We are hence saving our administration's money by selling them cheap products. In turn we reuse and recycle the workshop final products instead of sending them to scrap.

In this regard Dr. N Suresh Kumar Reddy has agreed to supply the products to laboratories or any individual who wishes to buy.

With our combined team effort, guidance of our mentor and instruction Prof. Amit Kumar Gupta and help of Dr. N Suresh Kumar Reddy we hope to do full justice to our project work.