

# Tool Management System incorporated with Skill Matrix

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**Abstract**— This work has been carried out for the purpose of improving productivity and effectiveness of system for the integrated management of tools within a company, by integrating planning, inspection and tool-room functions; automated tool management can ensure optimum utilization of tools and manpower on the selected machines, guaranteeing their effective outcome.

The first stage of the work consisted of defining and developing a Tool Management System whose central concept is a unified Data Base for all of the tools, forming part of the company's Technological Files (files on machines, materials, equipment, methods, etc.), interfacial with all of the company departments that require information on tools.

All the processes are involved in the tool management system along with skill matrix evolution of the associates working in the respective process departments. When tool management system is incorporated with skill matrix, it helped for evaluation of each process and every associate performance along with the fixture management and work instructions related to tool room operations.

**Index Terms**— integrated management of tools, Tool Management, machines, materials, equipment, methods.

## I. INTRODUCTION

Frequently, moreover, the lack of effective standardization of tools leads to their excessive proliferation as well as continuous modifications in the solutions adopted by the programmers of CNC Machine Tools. For these reasons, specialized software systems for the implementation of tool management procedures (Tool Management System - TMS) have been introduced, starting in the 1980s. The first applications were chiefly concerned with tool management on the shop level; here in fact TMS is utilized for "physical" management of tools, both in the Store and tool room.

Room where tools for current use are usually kept and in the Tool Room, where tools are taken from the warehouse, prepared for machining, preset, reshaped or regenerated. Within the sphere of Production Systems, the development of the concept of integration has subsequently led to considering the integrated management of tools. Data on tools do not concern shop procedures alone, but are absolutely essential for establishing the working cycle of a product and for programming machine tools to carry out the various operations. Some information, moreover, must also be made available to the company's management system. The

objectives that may be attained through the implementation of an integrated TMS system include:

- ❖ Improvement in performance of the Production System
- ❖ High levels of machine utilization
- ❖ Reduction in downtime
- ❖ Optimum tool selection
- ❖ Reduction in variety and number of tools used
- ❖ Optimized industrial purchasing
- ❖ Supplying tools to machines just in time involving the engineering department in the concerns of the shop.

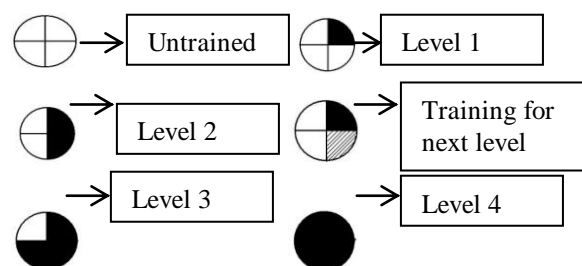
When an integrated tool management system is adopted, changes must be made in many company procedures while at the same time each department involved must be encouraged to utilize the potential of the system to best advantage. Correct application of the system, however, can yield significant financial results very quickly (in some companies the application of TMS has resulted, in less than a year, in 30% and more reduction in the number of tools in circulation)

**"Skills management** is the practice of understanding, developing and deploying people and their **skills**. Well-implemented skills management should identify the skills that job roles require, the skills of individual employees, and any gap between the two." The TMS incorporated with skill management help to identify and evaluation of the skill of the associates working in respective departments and also the performance efficiency of each operation can be evaluated.

It is an integral part of our Visual Management System (VMS).

- It is a simple visual tool to aid in the management, control & monitoring of skill levels.
- It displays all tasks & skills required to work in an area or team.
- It displays all current team members.
- For each team member it displays current competency/ability levels for each task.
- It is a simple tool to aid resource planning.

• **Skill level indicators for the associates work evaluation**



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II. PROJECT DISCRPTION

The objective of the work carried out was that of designing a Tool Management System able to provide management of tools, perfectly integrated with the company departments involved in this activity, more specifically with the Schedules and Methods Department and the Shop Engineering Department, the Tool Store Room and the Tool Room, the Industrial Purchasing and Accounting Departments. The project, carried out in several stages, first calls for the creation of a Tools File, utilizing a Data Base of the relational type designed to serve as single source of information on tools and thus to be utilized by all of the different users within the company. Consequently, it must contain a great variety of data needed by the different departments. This file will form part of the Company Technological Files, consisting of Processes File, Machine Tools File, Materials File, Equipment File, Manufacturing Sheets File, Cutting Data File, and will necessarily be interfaceable with them and perfectly integrated with them. The skill level provided by upper management department is put in to the respective form and by applying various logical calculative structures in MS Excel the various visual added graphs are plotted and further they are also displayed on the polygon board so as to develop the skill level.

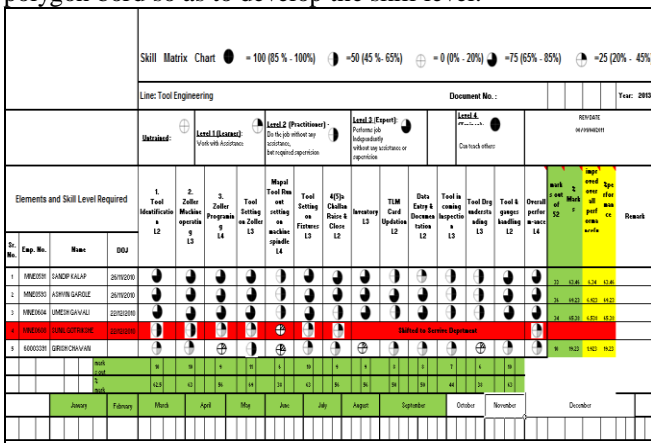


Fig. 1: Skill matrix evaluation chart

Individually skills of the persons are evaluated and so as the scope for the development of each test associate is also denoted respectively in the bar graph, thus they inter linked with each other they also prove out to be easily manipulative so as to increase the productivity and reduce the inventory cost

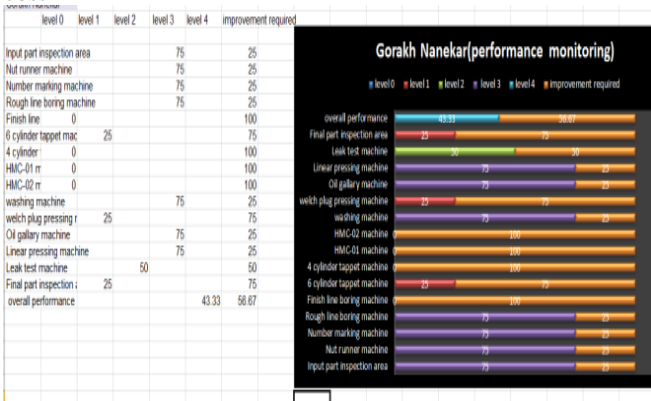


Fig. 2: Individual performance of a associate

The standard deviation best denoted the over all review of the upredation skills of the associates of the entire working line so as to the breaf out senerio it is necessary to have the standard format of the normal distribution curve so as to have maximun output offered.

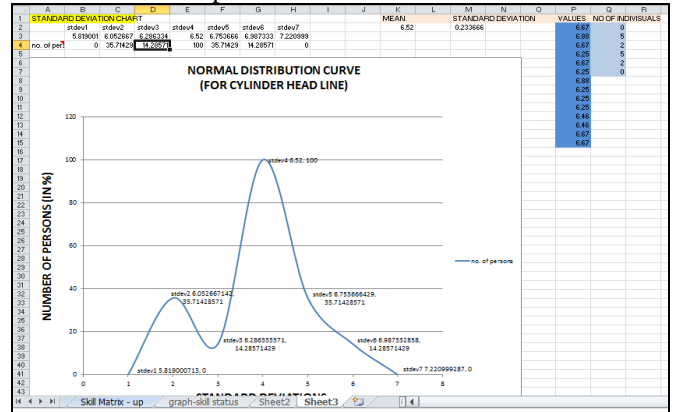


Fig. 3. Standard deviation Graph for skill evaluation

The important things to be noted about a normal distribution curve is, the curve is concentrated in the center and decreases on either side. This is significant in that the data has less of a tendency to produce unusually extreme values, called outliers, as compared to other distributions. Also the bell curve signifies that the data is symmetrical and thus we can create reasonable expectations as to the possibility that an outcome will lie within a range to the left or right of the center, once we can measure the amount of deviation contained in the data.

Referring it to our graph, so as to improve the productivity /efficiency mean value should be shifted towards RIGHT.

Value of standard deviation should be as close as possible to mean, so that average performance of each associate will be optimum.

The TMS system includes of following default parameters:-

- ✓ **Design, CAD:** Design of tools required in production is provided by manufacturing engineering department.
- ✓ **Purchasing, warehousing:** The required tools are purchased from the selected vendors and stored in ware house
- ✓ **Tool assembly/disassembly:** The tools bought may be either assembled or separate components so they are stored as per in the requirement.
- ✓ **Inspection, presetting, measuring:** Whenever the tool is needed for production then it is inspected and presetting is done as per the required measures and then allowed for production.
- ✓ **Production:** The tool is utilized on the production line and its various parameters are monitored so to improve its performance.
- ✓ **Tool repairs:** once the tool life is done of the used tool it is again inspected and further processed for reshaping.
- ✓ **Quality assurance:** The tool is send to respective vendor for the reshaping process and then, while it is again being added to inventory it is goes through quality assurances.
- ✓ **Incoming goods/ outgoing goods:** All this trafficking of the tool is monitored and various procedures are followed as per the norms.

- ✓ **Controlling/ management:** The governing staff for the various processes has a control over the processes, so as to develop optimum managerial solution.
- ✓ **Work preparation, CAM:** Thus all the above processes are computerized and making the tasks more easy and work efficient.

Therefore, to have more efficient TMS working system it should be incorporated with skill evaluation of the associates handling the department and system. Thus the software based work function of TMS must be incorporated with the skill up gradation as well as the timely evaluation of the respective associate towards the promotional approach. Thus the various graph and notifies must be displayed, so that the associate will have the idea about his progress and can work upon his weak areas. This skill up gradation in the software will not only help for the betterment of the entire company but also helps rapid profit growth. This entire sequential operation along with the existing TMS deployed so as to have more efficient and partial work environment in the industry. The pictorial representation of the various processes in software in the along with the sequential operations is wide and broad scoped operational spectrum of this system. The individual work evaluation of the various processes and the grading along with its specification helps in precise and modular development of the system.

### III. CONCLUSION

- 1) In the development of this manual, the characteristics and architecture of a Tool Management System have been completely defined and operating modes have been established for its correct utilization within the company by all of the departments using tools.
  - 2) Thus after successfully implementing above procedures for tool engineering department, the expected target must be sufficed.
  - 3) Management review meeting is conducted monthly, in which the performance with respect to given targets and our own presetted targets review is displayed.
  - 4) The top management team comments and recommends us various improvement factor and possibilities to achieve the desired goal.
  - 5) Again the corrective action is taken for improvement and the new set goal are again to be achieved.
- Thus by incorporating all the above processes in the TMS system it is the optimum utilisation of the manpower and time in all the perspectives so as to achieve the presetted goal.

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