

Skill Matrix as a Tool for Improving Productivity in Fashion Manufacturing Industry

ISHWAR KUMAR

Assistant Professor

National Institute of Fashion Technology, Jodhpur (Rajasthan) India

ABSTRACT

Apparel manufacturers need to improve their manufacturing performance to be competitive in local as well as in international markets. The garments need to be high-quality which have to meet international standard, low cost and on-time delivery simultaneously. Some of the apparel manufacturer problems like lack of skill monitoring system for employee skill evaluation methods, high levels of competition, low level of production efficiency, produce low-quality products, does not meet daily target, inadequate training, dissatisfaction of sewing operators and absenteeism, are some of the existing problems. Therefore, for such problems focusing on the performance of the sewing operator is essential. The focus is on raising the production efficiency and multi-skill development as well as single skill development in the sewing production line through a skill matrix system. The operator's skill is analysed on different jobs and based upon his/her performance on a job, a grade is given. This grade defines the level of performance an operator can achieve on that specific operation. This study aims to find out the skill gaps of each individual sewing operators and categorization of the operators based on their skill levels and builds up the operator's performance monitoring system. The categorization is done in two ways: i) skills on the operation (types and number of operations) and ii) skills on the machine (types and number of machines). The study initiated the company management to know the performance of their operators and their skill gap. Therefore, employees having better abilities may be rewarded and the wrong selection and placement may be reduced or avoided. Moreover, the operator's skill gap will be used for future capacity building of the company.

Keywords : Improve productivity, Operational standardisation, Workforce management, SAM standards, Skill development, Sewing machine operators

INTRODUCTION

There are more than a hundred garment factories already operating in the country, but productivity and wages are low. Moreover, working conditions need to improve. A huge number of skilled and unskilled workers contribute to garment industries performing various operations in this operator-intensive industry. For any operator-intensive manufacturing process improvements of operator performance for operator productivity along with the process and product quality are important for achieving the target goal. In garment manufacturing manpower is hired as direct operator, management, and

support staff. The direct operators are engaged on the products being produced, such as cutting, sewing, and finishing operators and convert materials into finished products by adding value to products. In recent years garment manufacturers has been experiencing significant changes. There is a steady shift from the hierarchy-based organisation to a team-based organisation. The multi tier organisational structure ones are replacing the structure. All these changes would be effective only when employees understand the values of their organisation placed in them. This requires clarity on the part of the employee about the contribution expected from. Identifying the contribution to be made by the employee

requires a detailed understanding of the knowledge and the skill necessary to contribute. A skill evaluation system (skill matrix) gives an outline of various skills necessary and the level of skills possessed by each employee. Measuring individual competencies is an important process in the development and retention of employees. This assures employees about the value placed on them.

This research is focused on the skill level of the sewing operator to establish an easy way to assess the individual workers based on the operation and machine type. It also reveals a useful skill evaluation system that will help the management to take initiative for the daily manpower management, worker improvement program, and adoption of modern technology. Evaluation systems can practise understanding, developing and deploying people and their skills. Well-implemented skills management should identify the skills that Job roles require the skill of individual employees and any gap between the two.

Literature Review:

Defining the concept of Skill matrix:

A skill matrix is a systematic tool used to assess and evaluate the skills, competencies, and knowledge of individuals within an organisation, particularly in relation to their job roles and responsibilities. It provides a structured framework for identifying skill gaps, planning training programs, and assigning tasks based on employees' capabilities.

Importance of Skill Matrix in Garment Manufacturing Industry:

According to this research paper, it explains the preparation of skill matrix and its efficient use in the garment industry for allocation of operators to give maximum productivity resulting in maximum gross profit. Operator's Skill Inventory is the database which maintains the record of each operator, who can do what type of operation and at what rating (Muleta *et al.*, 2019). In the context of the garment manufacturing industry, a skill matrix is a chart or a database where operator's past performances on various operations are recorded in a systematic way for future reference. In a skill matrix operator performance is recorded in efficiency percentage and updated on a regular interval. Or after completion of each style operator's current performance (efficiency %) updated on the database (Vaidya *et al.*, 2017). It is very important to keep this database updated

as over the time, operators acquire skills for most of the new operations as well as improve performance in existing operations.

Introduction to shop floor Operator skill management:

The dichotomy between skilled and semi-skilled operators in garment production underscores the multifaceted nature of operator dynamics within manufacturing environments. While skilled operators embody excellence and proficiency across diverse operations, semi-skilled operators play a vital role in fulfilling specific tasks and supporting overall production objectives. By recognizing the distinct strengths and areas for improvement within each category, garment manufacturers can implement targeted training programs and strategic workforce management strategies to optimise operational efficiency and drive sustainable growth in the industry.

Skill competency:

Competency is like an umbrella covering the ability of an individual, which directly or indirectly affects the university administrator's knowledge and experiences. It indicates how they should perform their duties and how to react in any working situations. This study adopts the conceptual framework of human resource competency in improving the manager's performance to further explain the IDP in general (Mahdzir *et al.*, 2021). Skill competency is known as the underlying characteristic of a person that could be a motive, trait, skill, aspect of one's self-image, social role, or a body of knowledge which he or she uses (Cevikcan *et al.*, 2013). Competencies are also specified as a means of 'being able to perform a work role to a defined standard with reference to real working environments'. Cachay *et al.* (2012) further expands competency to include the capability of workers to implement new techniques to reflect the need of being versatile and adaptable in the production floor.

Workers skill level and attributes:

The problem of maximising the utilisation of manpower in labour intensive assembly lines, such as garment production. The proposes a method of assigning workers to different operations based on their skill and experience levels, using a skill matrix. The objective is to achieve the highest level of productivity and delivery as per planned target. It presents a case study of a jacket

production line, where the proposed method is applied and compared with the existing system and collects data from a garment factory that produces jackets (Bada and Lekan, 2022). It analyses the garment design and creates an operational bulletin with the process sequence, operational description, machine requirements, and standard minute values for each operation and also records the Performed SMV and efficiency of each worker in the existing system. Then they use the skill matrix to rearrange the workers based on their machine and operation skills, and their SMV and efficiency levels. They compare the output and productivity of the existing and the rearranged systems, and also introduce another worker to the bottleneck operation to further improve the performance (Islam *et al.*, 2015).

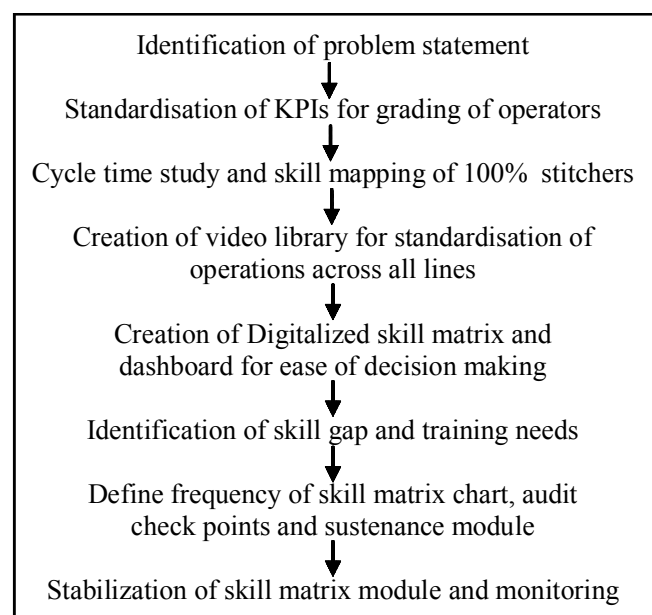
Objectives:

The primary objective of this project is to achieve accurate skill mapping and skill forecasting for the entire workforce, ensuring a thorough and precise alignment of skills across the production floor.

Sub objective:

- Standardisation of SAM library.
- Standardisation of Operations by creating video library
- Identification of skill gaps and preparation of training plan.

METHODOLOGY



Data collection:

The process of data collection are Operator Cycle Time, Defect Rate, Attendance, and Capacity Calculation:

The data collection process was conducted systematically, capturing key metrics to assess the efficiency and performance of individual operators within the garment manufacturing industry.

Steps of making Time study:

- STEP 1: Obtaining and recording all the information available about the job, the operative, and the surrounding conditions, which is likely to affect the carrying out of the work.
- STEP 2 : Recording a complete description of the method, breaking down the operation O into elements.
- STEP 3: Examination of the detailed breakdown to ensure that the most effective method O and motions are being used .
- STEP 4: Measuring with a Stopwatch and recording the time taken by the operative to perform each element of the operation.
- STEP 5: At the same time, assessing the effective speed of working of the operative O relative to the observer's concept of the rate corresponding to standard rating.
- STEP 6: Extending the observed time to basic time.
- STEP 7: Determining the allowances to be made over and above the basic time for the operation.
- STEP 8: Determining the standard time for the operation

KPI and Skill Matrix:

To standardise KPIs for grading operators in the skill matrix of the garment industry

Efficiency of Operators Efficiency in the garment industry refers to the ability of operators to utilise their time and resources effectively to complete production tasks. It is typically measured as the ratio of actual output (e.g., number of garments produced) to the standard or expected output within a specific time frame (e.g., per hour or per shift). Efficiency takes into account factors such as machine downtime, setup time, idle time, and the speed at which tasks are completed. Higher efficiency indicates optimal utilisation of resources and higher productivity.

Purpose: The efficiency of an operator is important because it helps determine how effectively they are

Skill level Categories	Attributes
Poor Skill	Very slow at work. An error occurs frequently
Fair Skill	An error occurs sometimes Very slow at work Can't coordinate with the sequence
Average Skill	Works with reasonable accuracy Little slow at work Follow the sequence of the operation
Good Skill	Work speed is good Correctly follows the sequence of operations Performance is more than satisfactory
Excellent Skill	Works without errors in action or sequence. The performance is fast.
Super Skill	They are so fast that they are hard to follow. Machine-like appearance and action.

(Devotta, 1988)

5 Points Rating Scale	
Level 1 (Unsatisfactory)	Their performance is always below expectation and they need improvement
Level 2 (Improvement needed)	They sometimes meet the expected performance goal
Level 3 (Meets expectations)	They consistently meet the expected performance goal
Level 4 (Exceeds expectations)	They consistently exceed expected performance goals
Level 5 (Exceptional)	Their performance far exceeds expectations due to exceptionally high quality of work

(Parchure, 2016)

operating the machine and performing their assigned tasks or operations. Efficiency is a measure of how well an operator is utilising resources, such as time, materials, and machinery, to complete their tasks

Conclusion:

Skill matrix helps in allocating the right person for the right job which helps in achieving desired performance level. It keeps record of all operations an operator had done in the past and efficiency level in each operation. Engineers / line supervisors need minimum time to find and select the most efficient operators for an operation from the pull of operators. For line balancing, operators can be selected according to work content. When someone is absent, the supervisor can easily find a suitable person from the skill matrix table and replace. To analyse the skill availability and distribution throughout the factory. This can be compared with the skill requirement for a

particular time period and shortage/excess skill availability to achieve at the training requirement. So productivity can be achieved by allocating skill & semi-skilled workers to the right place and unskilled operators should be trained properly.

REFERENCES

- Bada, Olufunke and Lekan, Akinode John (2022). Employee Attrition prediction using machine learning algorithms. Conference: Proceedings of the 3rd International Conference, The Federal Polytechnic, Ilaro, 16th & 17th Aug, 2022.
- Cevikcan, E. and Kilic, H.S. and Zaim, S. (2012). Westinghouse Method Oriented Fuzzy Rule Based Tempo Rating Approach. International Conference on Industrial Engineering and Operations Management Istanbul, Turkey, July 3.
- Cachay, J., Wennemer, Jan, Abele, Eberhard and Tenberg, Ralf (2012). Study on Action-Oriented Learning with a Learning Factory Approach, Elsevier, Science Direct, Volume 55, 5 October 2012, Pages 1144-1153.
- Devotta, A. F. (1988). A Survey of Performance Rating Research In Work Measurement. Department of Industrial Engineering Kansas State University.
- Islam, Md. Mazharul, Hossain, Md. Tanjim, Jalil, Mohammad Abdul and Khalil, Elias (2015). Line Balancing for Improving Apparel Production by Operator Skill Matrix. *Internat. J. Sci., Technol. & Society*, 3(4): 101-106.
- Mahdzir, Mohamad Nasaruddin, Rahim, Ahmad Shahril Azwan Abd, Seni, Mohammad Khair Mohd and Othman, Abdul Kabir (2021). Integrating Competency Based-Management Into Individual Development Plan For University Staff. *Advances in Business Research International Journal*, 7(1): 117-128.
- Muleta, Ashenafi Edae, Wakbucho, Amanuel Geniti and Kavitha, Rajan (2019). An empirical analysis of the factors affecting the sewing efficiency of operators in ambassador garment factory, Ethiopia. *J. Emerging Technologies & Innovative Res.*, 6(6): 418-428.
- Parchure, D. N. (2016). Enhancing Performance Through Matrix. Journalism and Management Practices. (Vol. 2).
- Vaidya, Akshay G., Gandhi, Pratik, Gaddekar, Swapnil and Shiva Prasad, H.C. (n.d.). Multi-Skill Workforce Development Strategy: Evidence in Indian Cement Company (Vol. 1). Dr. Shiva Prasad H.C, Professor, Department of Humanities and Management, Manipal Institute of Technology, Manipal University.
