ABSTRACT

Over the last four decades, a number of quality improvement tools were evaluated such as Total Quality Management (TQM), Just In Time (JIT), Total Productivity Maintenance (TPM), ISO 9001/14001, Kaizen and Lean. But, none of them sustained when implemented together to obtain the desired benefits probably due to the non availability of a common platform. To overcome this situation, Japanese 6-S principles have been established as foundation of all the improvement activities.

6-S principles (Sort, Simplify, Shine, Standardization, Sustain and Safety) are considered as the first step in Operations Management in a Total Quality Management programme because work place safety is one of the major issues of concern for Operations managers in a shop floor. But the success of 6-S implementation is dependent on effective commutation across the organization which helps in improving the performance and employee participation. 6-S Auditing score is often a subjective topic because the score varies depending upon the auditor and expectations of the auditor and non availability of proper check points for safety. This can create much confusion when several people express their opinion on ways to maintain 6-S. Hence, an effective 6-S auditing technique is the need of the hour to improve quality and productivity along with Safety.

The sustenance of 6-S requires a small team. It should be a self directed work team skillful at problem solving in addition to carrying out their regular work. But, most of the organizations have failed in implementing or sustaining 6-S due to improper communication regarding 6-S related issues and lack of responsibility. This research work has arrived at solutions for overcoming this problem by developing new 6-S Audit

methodology and introduction of a performance improvement tool in 6-S activities. 'Action Research' methodology was followed in this work and this research work consists of the following five phases.

During the first phase of the research work characteristic features of 5-S and its auditing techniques available in the literature were studied. Following this, the literature that dealt with the progression from 5-S to 6-S to understand the need of Safety in housekeeping activities was studied. The literature consisted of evidences that lack of communication led to poor performance owing to employees being less motivated, but none of the articles has dealt the safety assessment in addition to 5-S auditing as a sixth 'S'.

During the second phase of the research work, the 6-S Audit Worksheets are designed and developed for Shop floor, Stores and Office. The practical validity of these 6-S Audit Worksheets are tested by conducting audits in Light Compact Aircraft Production Group, Hindustan Aeronautics Limited (HAL), Bangalore, India. But, the process is found to consume more time since it involved extensive manual calculations. To overcome this limitation, during the third phase, a software named as '6S-Safety house' has been developed for 6-S auditing to avoid excessive manual calculations and reduce cycle time of 6-S auditing. This software has been implemented in shop floor of various divisions of HAL, Bangalore, India to evaluate the performance of the software. Moreover, handling of this audit system did not require much experience or knowledge about 6-S.

Fourth phase involved implementation study of the library. A new computational model for 6-S auditing in library named as '6S- Safety Library' has been developed. This methodology has been developed in five libraries functioning under HAL, Bangalore, India. The results of this auditing methodology reduced not only Standard Deviations of individual audit scores but also auditing lead time. Even though 6-S has been accepted as one of the improvement tools, performance improvements of 6-S activity have been very slow. To overcome this limitation, A3 Report was introduced in 6-S activity during the final phase of the research work and implementation study has been conducted at Tool crib in HAL, Bangalore, India.

Thus, this research work has established computational methodology for 6-S auditing to avoid ambiguity in auditing and A3 Report for improving the communication and performance of 6-S activities. Before concluding the work, the experiences to pursue the 6-S auditing and A3 report preparation were analyzed. The research work ended by suggesting further researches to concentrate more in implementing the system and the scope for extension of the auditing system and A3 report.