ABSTRACT

In recent years, the need to manage different facets of maintenance effectively has gained more importance due to changing operational technologies and changing organizational role of maintenance. Maintenance of major equipments and facilities has an impact on business performance measures such as productivity and profitability. Total Productive Maintenance (TPM) is an innovative approach to maintenance that maximizes equipment effectiveness, eliminates breakdowns and promotes autonomous maintenance involving total workforce. The Overall Equipment Effectiveness (OEE), a quantitative measure of TPM effectiveness is being widely used for productivity measurement. OEE concentrates on quality, productivity and machine utilization issues and aims at reducing non value adding activities inherent in the manufacturing process. The literature survey revealed that OEE does not take into account all factors that reduce capacity utilization, such as planned downtime, lack of material input, lack of labour etc. It is also observed that other than equipment related losses, the losses affecting human performance and yield inefficiencies also need to be accounted appropriately for achieving world-class performance.

In this study an attempt is made to carry out an empirical investigation of the impact of various factors on overall equipment effectiveness. The factors that are assumed to have an influence on OEE such as human, technical, maintenance, production, environmental, economic,
managerial and organizational factors and several elements under each factor are considered in the study. An empirical model to illustrate the relationship between the factors and OEE has been proposed. Several sets of hypotheses are formulated to test whether there is a significant influence of factors on the components of OEE, viz. availability rate, performance rate and quality rate. Also many hypotheses are formulated to determine whether there is a significant difference between various categories of companies, such as medium scale companies, large scale companies, public limited companies, private limited companies, Indian companies and multinational companies with respect to the influence of factors on the availability rate, performance rate and quality rate. A methodology to develop a measuring instrument and validate the measurement scale has been proposed in the study. The data is subjected to factor analysis using principal component analysis as extraction method in order to refine the measuring instrument. The measuring instrument is further tested for internal consistency, convergent validity and discriminant validity for using in the main study. The application of the statistical methods to test all the hypotheses proposed in the study has been demonstrated.