CHAPTER 1
INTRODUCTION

1.0. SCOPE

One of the most popular topics that are being currently discussed curiously among the manufacturing community over the past two decades is "Total Productive Maintenance (TPM)". Although TPM was propagated during 1970s (Seiji 1992), it became popular among manufacturing professionals only after late 1980s. TPM emanated due to the realisation that the maintenance activities should not only be technologically improved but also blended with managerial concepts (Blanchard 1997). Particularly the importance of applying total quality for enhancing quality of maintenance activities facilitated in evolving TPM concepts (Nikkan 1995). The fast rate of acceptance of TPM indicates that the practitioners always have the thirst for improvement in maintenance quality. However a critical analysis of the theory indicates that TPM concepts are not yet exhaustive to effect continuous maintenance quality improvement. Presumably, due to this reason, articles introducing many new tools, techniques and approaches are being introduced to improve TPM concepts (Geraghty 1996, Blanchard 1997, Lawrence 1999, Bamber et. al. 1999). Meanwhile, it is observed that total quality management (TQM) philosophy itself has been appended with various new approaches. Of late strategic quality management (SQM) (Ricardo 1994) approach has become popular among both theorists and practitioners. Hence this doctoral work was started with the objective of developing a model by appending and integrating TPM concepts with an appropriate SQM model. To attain this objective this doctoral work was started by designing a model called strategic maintenance quality engineering (SMQE) by
integrating a theoretical SQM model (Aravindan et. al. 1996) with TPM concepts. Followed by this, explorative studies on implementing this SMQE model in real time environments were conducted. Finally, an empirical study was carried out to examine the receptivity of SMQE model among the practitioners.

1.1. Research Problems

Currently organisations have realised the importance by attaining maintenance quality continuously for attaining core competence in global market. Researchers and theoreticians have suggested the use of TPM concepts for this purpose. But, there is little evidence that TPM concepts have fully contributed in attaining continuous maintenance quality improvement. TPM is the conglomeration of TPM and maintenance engineering principles. When TPM concepts are studied and viewed from this perspective, it is found that TPM concepts are not exhaustive in suggesting the solutions for achieving continuous maintenance quality improvement. However, no TPM model exists that integrates the most powerful TQM model with maintenance engineering principles. Hence, the problem of this research work is defined as follows:

An exhaustive TPM model that integrates a most powerful SQM model completely with maintenance engineering principles is not available.

1.2. Research objectives

The objectives of the research are listed below.

1. To study the fundamental tenets of TPM.

2. To study the various models deploying TQM philosophy and choosing the most powerful one.
3. To design a theoretical model which would link the features of TPM with the most powerful TQM model.

4. To conduct investigations on the theoretically designed TPM model.

5. To explore the practical feasibility of the theoretically designed model.

This doctoral work followed in this direction in order to fulfill the above objectives.

1.3. Research method

The research was carried out by following a systematic methodology. First, the books dealing with TPM principles were studied. Then, literatures dealing with fundamentals of TPM were studied. Also, the author attended special seminars on TPM. Secondly, the trend in TQM field was studied. At this juncture, models titled as "Strategic Quality Management" (SQM) were found to be most powerful to all. Out of the three SQM models, the model proposed by (Aravindan et. al. 1996) was chosen. In this model nine quality strategies were identified. Thirdly, a theoretical model titled as "Strategic Maintenance Quality Engineering Model" (SMQE) was designed by integrating TPM principles with SQM model. As enhancing maintenance quality through counselling is essential, a strategy named as maintenance quality through counselling was added in the SMQE model. Therefore, SMQE model encompasses ten maintenance quality strategies. Fourthly, investigations were planned on maintenance quality strategies and other elements of SMQE. As the work content was voluminous, the help of both under-graduate and post-graduate engineering students were availed. The model or technique of SMQE elements was given to these students and data are collected from different sources. They were closely guided. They used the model technique and the data to carry out their mini and major projects. With the exception of very few elements,
the investigative studies cover of SMQE elements were completed during this phase. Fifthly, the empirical study was conducted to explore the practical feasibility of applying SMQE model holistically in practical environment. Useful inferences were drawn from this explorative study.

1.4. Chapter Organisation

This doctoral work is reported in this thesis in three parts. In the first part, the antecedent of initiating this doctoral work has been appraised. Second part deals with the explorative on SMQE model implementation. The investigations on maintenance quality strategies, application of benchmarking while SMQE implementation and the explorative studies conducted to examine the practical validity by SMQE model are presented in second part of this thesis from chapter number 3 to 13. The thesis is concluded in the fourth part in which the contributions of this work are appraised. The thesis is organised in such a way that a reader interested in referring to any one module of the work can also peruse through that particular chapter, as there is little need to refer to any other chapters for gathering background information.

1.5. Concluding remarks

This thesis reports a doctoral work, which has resulted in the evolution of a model called SMQE. During this doctoral work, unrealistic assumptions have been avoided. Hence, it is expected that both theoreticians and practitioners would find it convenient to read through the chapters of this doctoral thesis.