

## A hybrid fuzzy MCDM approach to maintenance Quality Function Deployment

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### ABSTRACT

Maintenance Quality Function Deployment (MQFD) is a model, which enhances the synergic power of Quality Function Deployment (QFD) and Total Productive Maintenance (TPM). One of the crucial and important steps during the implementation of MQFD is the determination of the importance or weightages of the critical factors (CF) and sub factors (SF). The CFs and SFs have to be compared precisely for the successful implementation of MQFD. The crisp pair-wise comparison in the conventional Analytical Hierarchy Process (AHP) may be insufficient to determine the degree of weightage of CFs and SFs where vagueness and uncertainties are associated. In this paper, a modification of AHP based MQFD by incorporating fuzzy operations is proposed, which can improve the accuracy of determination of the weightages. A case study showing the applicability of this method is illustrated in this paper.

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## 1. Introduction

Lot of changes have taken place in the business scenario after the second world war. Organisations started adopting various models and better methodologies to excel in the competition. In the mid twentieth century, the field of maintenance quality engineering emerged (Decker 1996). This field developed by adopting new approaches (Chan et al., 2005) and in 1970's a new framework was evolved called Total Productive Maintenance (TPM). The TPM couples the principles of maintenance quality engineering and Total Quality Management (TQM) (Sherwin, 2000). The TPM proved successful in achieving a higher degree of maintenance quality (Mekone et al., 2001, Pramod et al., 2007a). Understanding customers' needs and incorporating them in the product is a necessity to meet the customer's increasing dynamic demand for higher degree of quality and customer satisfaction. Quality Function Deployment (QFD) is a technique adopted in TQM to translate customer's voice into technical language (Kathawala & Motwani, 1994). QFD is found to be successful in many different industries and applications (Carnevali & Miguel 2008). Researchers had realized the need to link TPM with QFD to include customers' voice in maintenance quality improvement plan.

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