

APPLICATION OF THE 4M FRAMEWORK IN REDUCING DEFECT RATES: A CASE STUDY FROM THAILAND'S PLASTIC MATS MANUFACTURING SECTOR

Penpitsha PONJUTTURUT¹ and Panutporn RUANGCHOENGCHUM^{1*}

¹ College of Graduate Study in Management, Khon Kaen University, Thailand;
rpanut@kku.ac.th (Corresponding author)

ARTICLE HISTORY

Received: 30 June 2025

Revised: 7 July 2025

Published: 19 July 2025

ABSTRACT

This study examines the impact of four key production factors-Manpower, Machine, Material, and Method (4M) on defect rates in the plastic mat manufacturing process. Conducted at a plastic mat factory in Khon Kaen province, Northeastern Thailand, the research employed a quantitative approach with data collected from 100 operational staff through structured questionnaires. Descriptive statistics and multiple regression analysis were used to analyze the data at a 0.05 significance level. The findings indicate that Manpower, Material, and Method significantly affect defect rates, while Machine does not show a statistically significant influence. Among the significant predictors, Material has the greatest impact, followed by Manpower and Method. The results underscore the critical role of skilled labor, consistent raw material quality, and clearly defined production procedures in minimizing defects and improving production efficiency. The study provides practical insights for manufacturers aiming to enhance product quality and operational performance through systematic quality management and workforce development.

Keywords: 4M, Defect, Waste, Lean, Manufacturing, Plastic Mat, Production

CITATION INFORMATION: Ponjutturut, P., & Ruangchoengchum, P. (2025). Application of the 4M Framework in Reducing Defect Rates: A Case Study from Thailand's Plastic Mats Manufacturing Sector. *Procedia of Multidisciplinary Research*, 3(7), 118.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.



Copyright: © 2025 by the authors. This is a fully open-access article distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0).