A METHOD FOR ESTABLISHING AN OPTIMAL WORKFORCE DISPATCHING MODEL BALANCING BOTH PSYCHOLOGICAL AND PHYSIOLOGICAL CONDITIONS

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Labor shortages have become increasingly severe in Taiwan, particularly within traditional industries. In shift-based operational environments, the design of workforce dispatching and job rotation systems plays a critical role in balancing employees' psychological and physical workloads. Achieving such balance is essential for reducing turnover, improving operational stability, and enhancing organizational competitiveness.

This study investigates a chemical manufacturing plant in southern Taiwan operating under a three-shift system, where each shift involves multiple tasks with varying mental and physical demands. Imbalanced task assignments may lead to worker fatigue and inefficiencies, which contradict the principles of lean management. To address this issue, this research integrates multiple decision-making and optimization methods. First, the Analytic Hierarchy Process (AHP) is employed to capture shift workers' perceptions of workload across different shifts and task types. The aggregated results are then used, in conjunction with managerial input, to construct alternative dispatching models. These models are treated as controllable factors and evaluated using the Taguchi method. Subsequently, the Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) is applied to identify the optimal dispatching model, with psychological and physical workload balance defined as dual optimization objectives.

The results indicate that the proposed model effectively improves the balance of psychological and physical workloads among shift workers. Sensitivity analysis further confirms the robustness and reliability of the model. The findings provide practical guidance for workforce scheduling in shift-based industrial settings.

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