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# Material handling operation analysis of tandem and conventional bidirectional guide path network configuration of automated guided vehicle (AGV) system

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Material handling is an unavoidable task and one of the fundamentally important operations in a manufacturing system. The current trend of production that require the use of highly effective technology of reducing operational cost and improvement of the overall system performance lead to growth of Automated Guided Vehicle (AGV) system improvement. This study analyses the operational effectiveness of tandem and conventional bidirectional network AGV system in FMS and job shop environment. Tandem configuration is highly less flexible in terms of routing and scheduling flexibility compared with the conventional bidirectional configuration. The main merit of tandem AGV configuration over conventional network AGV configuration is simplicity of traffic control as there is only one AGV serving each segment. Traffic control of automated guided vehicle system is one of the main AGV management functions. Conflict in route assignment may result in deadlock, livelock or collision. Deadlock is a situation where two AGV in opposing direction block each other in the same path segment while livelock. Tandem AGV configuration can work effectively in some group technology manufacturing systems where the movement of work-in-progress is rigidly restricted to a certain group of machines. However, in a flexible manufacturing system setup where high production flexibility is required, tandem AGV configuration is incapable of satisfying the system requirement. Flexibility of automated guided vehicle system is an important quality of any network AGV configuration. The dynamic tandem zoning strategy was developed to overcome the shortcoming of the traditional tandem AGV configuration system.

## Biography

M K A Ariffin is currently an Associate Professor and Head of Department of Mechanical and Manufacturing, Universiti Putra Malaysia. He earned his BE degree in Manufacturing System Engineering, Northumbria University, UK, MSc in Manufacturing Engineering, Universiti Putra Malaysia and PhD from University of Sheffield, UK. He obtained his professional qualification in Industrial Engineering in 2013. His research interests include System Optimisation, Advanced Manufacturing Technology, Automation and Robotics and CAD/CAM.

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