

# Improvement of the Mizusumashi System in an Electrical Devices Company: a Case of Transdisciplinary University-Business Cooperation

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**Abstract.** In the 1st year of the Master in Industrial Engineering and Management of the University of Minho (Portugal), teams of students develop semester-long UBC (University-Business Cooperation) projects involving four course units, according to the PBL (Project-Based Learning) methodology. This paper focuses on the project developed by a team of eight students in an electrical devices company, more specifically in the *mizusumashi* system (logistic train), responsible for supplying components to the assembly lines/cells, whose performance revealed some problems. The team carried out a detailed analysis/diagnosis of the current system, gathering data through surveys, interviews, and direct observations on the shopfloor. Several problems were identified, namely in the loading process of the *mizusumashi*, which takes place in the so-called dynamic warehouse (e.g., disorganization of components and picking inefficiencies), as well as in the routes travelled (e.g., imbalances and deficient/absent signaling). Cases of overloading the *mizusumashi* and problems in its physical structure were also revealed, with consequences at the ergonomic level. All this causes delays in the supply of components to the assembly lines/cells. To tackle these problems, the team developed and evaluated several improvement proposals, including modification of the routes signage (using visual management techniques), reorganization/adjustment of the *mizusumashi* carriages, reorganization of the location of components in the dynamic warehouse, and introduction of an RFID (Radio Frequency Identification) system to streamline the picking processes. These proposals are expected to eliminate *mizusumashi* overload and component-scanning times, decrease the number of transports and movements, reduce route delays, and reduce the risk of work-related musculoskeletal disorders (WMSD).

**Keywords.** Mizusumashi, visual management, ergonomics, warehouse management, RFID

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