

ACCIDENT RISK ANALYSIS USING THE FAILURE MODE AND EFFECT ANALYSIS (FMEA) AND HAZARD AND OPERABILITY STUDY (HAZOP) METHOD IN THE PT. XYZ INDUSTRIAL ENVIRONMENT

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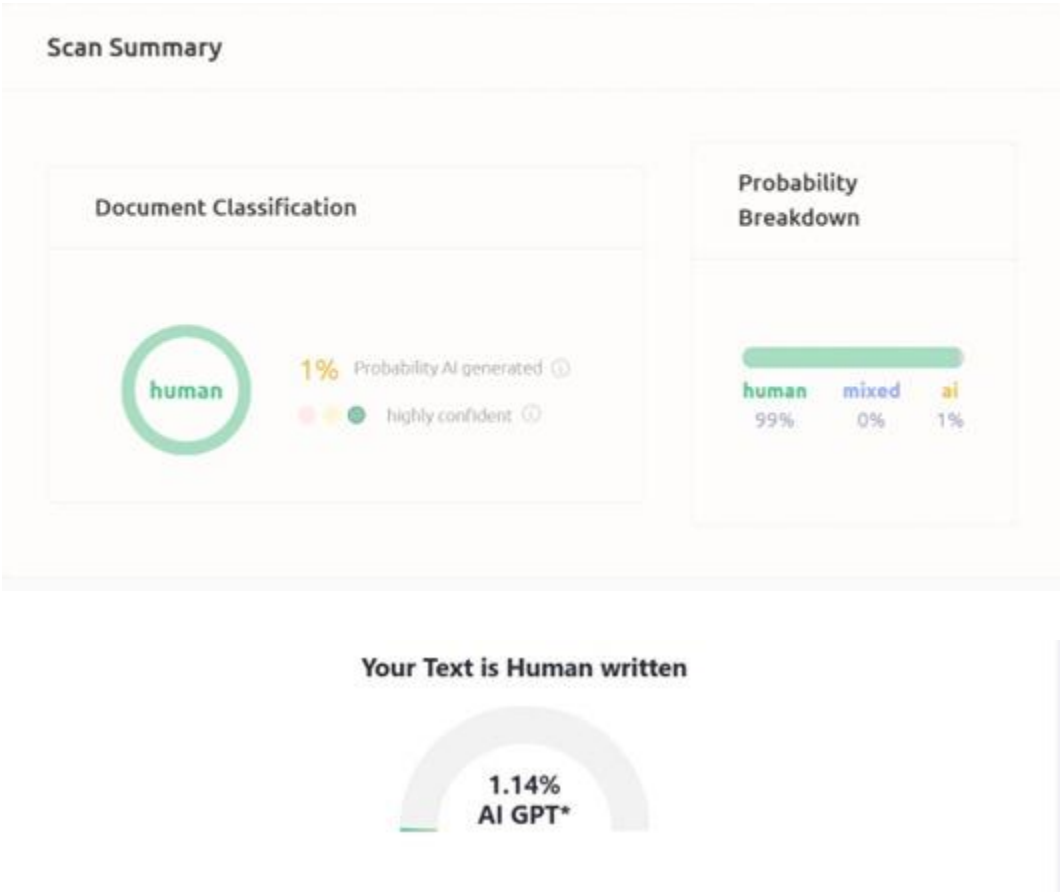
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ABSTRACT

Accident risks in steel production or fabrication activities, which involve extensive use of production machines and magnetic cranes, have the potential to cause serious injuries or fatalities. These risks can result from machine failure, being struck by heavy materials, direct contact with rotating machinery, exposure to high temperatures generated by machines, or contact with scrap steel surfaces. When a workplace accident occurs, the company must identify the root cause to minimize the likelihood of a similar incident happening again. According to company data, the number of workplace accidents increased from January to October 2023. Therefore, this research aims to determine the priority for addressing workplace accidents and preventing future incidents in the production process at the Steel Manufacturing Company. The study analyzes workplace accidents at PT. XYZ using Failure Mode and Effect Analysis (FMEA) to identify the priority areas for accident prevention and handling. Based on FMEA analysis and Risk Priority Number (RPN) calculation, three high-priority work accidents were obtained, namely a right shoulder fracture with RPN 45, the right index finger caught in a crane magnet with RPN 36, and the left leg caught in material with RPN 32. For work accidents that have not yet occurred, an analysis is carried out using HAZOP (Hazard and Operability Study) to prevent accidents from occurring in three production processes, namely cutting, machining, and operating magnetic cranes. Efforts made to prevent accidents from recurring include holding monthly safety talks, putting up posters about the impact of work accidents, patrols by supervisors or production leaders during the production process, periodic socialization of PPE (Personal Protective Equipment), reminders of work standards by group leaders before activities begin, and implementing 5K running activities after work. After increasing hazard monitoring from November 2023 to February 2024, the results of the hazard identification

and risk control documents showed a decrease in the number of work accidents to 0.

Keywords: Accident Risk, FMEA, HAZOP

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LIST OF TERMINOLOGIES

Failure Mode and Effect Analysis (FMEA)	:	Methods for analyzing potential failures in a system and evaluating their impact.
Hazard and Operability Study (HAZOP)	:	Methods for identifying and evaluating potential hazards in an industrial process.
Risk Priority Number (RPN)	:	The product of FMEA's three main parameters—Severity (S), Detection (D), and Occurrence (O)—is used to determine risk priorities.
Occupational Health and Safety (OHS)	:	Fields related to health and safety in the workplace.
Occupational Safety and Health Administration (OSHA)	:	The body that regulates occupational safety and health standards.
Severity	:	A measure of the consequences of failure when it occurs.
Detection	:	A measure of how easy it is to identify failure modes before an accident occurs.
Occurrence	:	A measure of how often a failure mode is expected to occur.
Risk Assessment	:	The process of identifying, evaluating and controlling risks.
Job Safety Analysis (JSA)	:	Analysis to identify potential hazards and control measures in specific job tasks.
Event Tree Analysis (ETA)	:	A method for analyzing the consequences of initial events that may have caused an accident.
Fault Tree Analysis (FTA	:	A method for analyzing the potential causes of a failure or accident.