

PPE 2.0 – A Tool towards Equipment Reliability and Maintenance Engineering Success

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Abstract

Equipment reliability is a cornerstone of operational efficiency in industrial settings, directly impacting productivity, safety, and cost management. Traditional maintenance programs often focus primarily on equipment or processes in isolation, overlooking the critical role of human knowledge and organizational learning. This paper introduces PPE 2.0 - a conceptual framework that emphasizes the interconnected triad of People, Process, and Equipment. The term PPE 2.0 is deliberately chosen to distinguish it from conventional *Personal Protective Equipment* (PPE) while serving as a memory pointer to the essential elements that drive reliability. Within PPE 2.0, the knowledge of team members forms the foundation for proactive maintenance. Skilled personnel can identify early signs of equipment degradation, implement corrective actions, and adapt processes based on experiential learning. Well-defined processes standardize maintenance workflows, enabling consistency, reducing errors, and supporting predictive maintenance strategies. Simultaneously, a deep understanding of equipment characteristics, historical performance, and failure patterns allows maintenance activities to be precise, targeted, and efficient. By integrating these three elements, PPE 2.0 fosters a culture of knowledge sharing, continuous improvement, and informed decision-making. Organizations adopting this approach experience measurable benefits, including reduced unplanned downtime, extended equipment life, and optimized maintenance costs. This paper demonstrates how leveraging the synergy between people, processes, and equipment can transform maintenance programs from reactive to reliability-centered, establishing a strategic advantage in operational performance.

Keywords

PPE 2.0, People, Process, Equipment, Reliability, Maintenance

Biographies

S. Salim received his PhD in Mechanical Engineering from the University of Sheffield, United Kingdom. He has been working in Reliability & Maintenance Engineering (RME) domain for more than 23 years now. Currently, he is serving as the RME Director of Wastewater Operations at the Great Lakes Water Authority in Detroit, Michigan.

Navid Mehram is the Chief Operating Officer for Great Lakes Water Authority. He has a Bachelor of Science in Civil Engineering. Navid is a registered professional engineer with the state of Michigan. Navid has extensive background in wastewater treatment design and construction, with over 20 years of experience in the water sector and over 10 years of leadership, management of variety of facilities in effort to protect public health.