Prescriptive Maintenance in Automotive Manufacturing: Concepts, Theoretical Benefits and Potential Outcomes

Mohamed El Aallami1 [0009-0001-6690-3638], Anass Cherrafi1[0000-0003-2654-0315], Khadija Echefaj2[0000-0003-0485-8672] and Said Elfezazi1[0000-0002-9410-5860]

1Cadi Ayyad University, Marrakesh-Safi, Morocco [m.elaallami.ced@uca.ac.ma](mailto:m.elaallami.ced@uca.ac.ma), [a.cherrafi@uca.ac.ma](mailto:a.cherrafi@uca.ac.ma), [selfezazi@gmail.com](mailto:selfezazi@gmail.com)

2Faculty of Sciences and Technique, Hassan First University, Settat, Morocco

[k.echefaj@uhp.ac.ma](mailto:k.echefaj@uhp.ac.ma)

**Abstract.** Prescriptive maintenance is an advanced maintenance approach that goes beyond forecasting potential anomalies and failures but also suggesting ef- fective actions to prevent them. Enhanced and superior maintenance leads to higher equipment reliability and reduced downtime. Meanwhile, automotive manufacturing recognizes maintenance as a crucial factor regarding operational efficiency and safe protocols. Accordingly, inefficient maintenance increases delays and costs. Moreover, automotive industry does not tolerate even minor anomalies and errors given its high precision requirements and safety demands. Automotive manufacturing industry is characterized by complex production systems, requiring optimized maintenance to maintain high efficiency and de- liver consistent product quality. Therefore, this paper outlines prescriptive maintenance concepts resulting in improved automotive manufacturing perfor- mance. The purpose of this paper is to provide a theoretical foundation for un- derstating the role of prescriptive maintenance in enhancing manufacturing and its associated outcomes in automotive fabrication processes. Furthermore, this study offers recommendations for digitizing maintenance by exploring the core concepts, components and potential advantages of this innovative practice.

**Keywords:** Prescriptive maintenance, Automotive industry, Digitalization.