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A practical method for the maintainability assessment in industrial devices using indicators and specific attributes

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Abstract

The objective of this paper is to describe a procedure to obtain maintainability indicators for industrial devices. This analysis can be helpful, among other cases, to compare systems, to achieve a better design regarding maintainability requirements, to improve this maintainability under specific industrial environment and to foresee maintainability problems due to eventual changes in a device operation conditions. This maintainability assessment can be carried out at any stage of the industrial asset life cycle.

With this purpose, this work first introduces the notion of maintainability and the implementation of assessment indicators, including some important requirements to perform that. Then, a brief literature review is presented, including the definition of the main concepts, which are later used in the paper. After studying the maintenance levels and the maintainability attributes, both terms are linked, leading all this analysis to the assessment of the maintainability indicators. It follows a discussion about the information obtained through the maintainability assessment process and its computation into several maintainability indicators. The paper includes a case study, which implements the defined assessment into a practical scenario. Finally, the work concludes summarizing the more significant aspects and suggesting future researches.

Keywords

Maintainability; Maintainability assessment and indicators; Maintenance; Dependability

Figures and tables from this article:

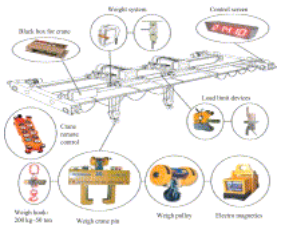

Fig. 1. Bridge crane components.

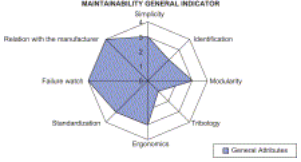

Fig. 2. Graphical representation of general maintainability indicator.

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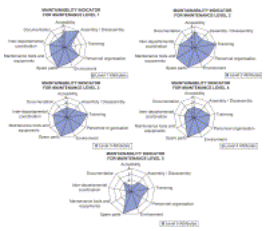

Fig. 3. Graphical representation of maintainability indicators.

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Table 1. Accessibility (S1) and Assembly/disassembly (S2).

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Table 2. General maintainability indicator.

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Table 3. Maintainability indicators for maintenance level 1 to 5.

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Table 4. Poorly scored indicators from Maintenance Level 4.

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Table 5. Poorly scored indicators from Maintenance Level 5.

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