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Optimisation of manufacturing execution systems using a standards developed reference architecture

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ABSTRACT

Competitive manufacturing enterprises seek to efficiently coordinate the manufacture and distribution of products and are therefore required to integrate plant and business systems. A key enabler of this aim is Information Technology (IT), specifically Manufacturing Execution systems (MES), which offers several benefits including increased operational efficiency. However, often existing MES don't integrate manufacturing processes and systems; also MES projects are sometimes unstructured and rely on heuristics for successful implementation. The informal approach to optimisation, results in a longer development time and often systems implemented are inefficient. Considering these issues, this research report has addressed the research question "How can Manufacturing Execution Systems (MES) be optimised using a reference architecture developed from standards?" The methodology used to answer this question consisted of an MES optimisation approach developed from authoritative sources. The approach consisted of an original MES reference architecture developed from relevant standards and key requirements of IT (Information Technology) frameworks. This approach was applied in a case study at Sasol, resulting in proposed improvements to manufacturing processes and MES technologies. Due to expected increases in operational and technology efficiency cost benefits were expected. Considering the challenges of existing MES and projects, this research report answered the research question, showing how MES can be optimised using a well defined reference architecture.