

Design for X – design for excellence

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Abstract

Purpose: *This monograph aims to provide a concurrent engineering approach to integrate engineers and managers during the different steps of the product development life cycle, taking in account materials and manufacturing issues, but also ecological aspects and quality management for an intelligent use of human resources, raw materials and financial means.*

Design/methodology/approach: *The proposed Design for Excellence (DFX) integration of the product development activities is illustrated by some case studies of the automotive industry. The methodology integrates a concurrent engineering approach with emphasis on the aspects of Computer Integrated Manufacturing (CIM), Design for Manufacturability and Assembly (DFMA), lean manufacturing and quality management (six sigma and continuous improvement (KAIZEN) together with a “green engineering design” like: Design for Disassembly (DFD), Design for Recycling (DFR) and Design for Environment (DFE).*

Findings: *The results obtained in the course of the case studies presented here have confirmed the benefits of the proposed integration of the quality systems in the product design and manufacturing. The costs of the proposed were covered by the gains on the quality improvements, compliance to project schedule, intelligent use of human resources and profitable return of the investments*

Research limitations/implications: *The research reported in the monograph is based on the author’s experience and cooperation with some world class car manufacturing plant in the state of Sao Paulo, Brazil. It is possible to expand the DFX approach also for others branches of the mobility industry, ex.: aeronautic industry as for future research. The compliance with local laws and standards and the requirements of standardization and fewer parts can be identified as limitations for the application of the proposed DFX methodology.*

Practical implications: *The proposed DFX approach to integration of the CIM, DFMA, Lean Manufacturing and six sigma methodologies in the early stage of design process has been confirmed as a profitable integration of the design, manufacturing and management for the case study of a world class forging company. The implemented DFX approach has also offered a good solution for the development the sheet metal forming of automotive side panels, doors and a fuel intake cover, as well the integration of a design for life cycle approach for the modelling of the fatigue behaviour of electric resistance spot welding (ERSW) of those components.*

Originality/value: *The monograph describes an original use of real parts to demonstrate the positive synergy and feasible integration of different methodologies like DFMA, CIM, lean manufacturing and quality management to solve real practical case studies of the automotive. The value of those contributions is shared and confirmed by industry partners whose support shall be acknowledged.*

Keywords: *DFX; DFMA; CIM; Concurrent engineering; Manufacturing; Life Cycle*

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