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Extended process failure mode and effect analysis (PFMEA) for the automotive industry: The FSQC-PFMEA

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ABSTRACT

This paper mainly addresses constraints of the PFMEA for the automotive industry. The safety and cost aspect are integrated into traditional severity index. Therefore, for this purpose, three new indices are invented – safety severity index; quality severity index and cost severity index. For both safety severity index and cost severity index, new tables with crisp values belong to the interval (1-10) were invented. While for quality severity index was kept traditional severity table for the automotive industry. The relative importance of these three indices is stated by the fuzzy pair-wise comparison matrix. The weights vectors are calculated by applying the extent analyses. In order to overcome these constraints, but to keep traditional framework of the PFMEA for automotive industry, new fuzzy PFMEA with respect to safety, quality and cost (FSQC-PFMEA) is presented. It can be denotes as the main findings of this paper. At last, the proposed model is tested by real-life data which come from one automotive company supplier and compared with traditional way in the case study. Chosen company use IATF 16949 standard for automotive industry and reference manual presented by Automotive Industry Agency Group (AIAG). Therefore, use of the PFMEA is obligated in this company.

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