Deciding the Level of Automation 
for the design of Assembly systems: 
Systems modelling and profitability considering

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Abstract

This project aims at defining a procedure and tool to orient assembly manufacturers in the decision about automation for their assembly processes design with optimal LoA since the early conceptual design phase.

The purpose is to fulfill with a least cost the production requirements, considering product parts design and characteristics, assembly sequencing, and manufacturer’s exigencies from different point of views such as quality level, ergonomics, reliability, and preferences about certain tasks executing technologies. Different manufacturer’s constraints have also to be also taken into account in the decision such as social, financial context, as well as the location.

A state of the art of the topic was realized and has shown that the literature about LoA deciding is not abundant (Lindström & Winroth, 2010). This need to support LoA deciding and delicacy of such process were also recognized by several assembly manufactures and researchers (Feldmann & Slama, 2001).

A multi-criteria LoA decision methodology was then defined involving several identified decision criteria.

A new graphic Assembly Sequences Modeling Language (ASML) allowing concretizing the defined methodology was presented in (Salmi, David, Summers, & Blanco, 2014). Rules and time standards were also developed allowing assembly systems ASML modelled time estimating based on standardized motions, corresponding time standards, and process’ architectures. ASML represents also a promising tool and support of assembly processes modelling and different alternatives and scenarios of assembly processes generating with easiness, better visibility and intuitiveness for the sake of LoA deciding. Actually, a time-based cost model handling ASML models is under development for cost estimating and profitability justifying for the different assembly systems to be generated and evaluated with regard to the different decision and performance criteria.

References

