Bachelor-/ Master-Thesis

Development of a data structure model for the control system of an agile assembly in the context of industry 4.0

Initial situation:
Today's automotive production is characterized by few volume factories, located centrally in core markets. These production systems are not able to meet future requirements as their rigid structure is not able to provide the needed flexibility. New approaches for a flexible and economic automotive production with market-oriented value chain structures are required.

In this context, the research project LoCoMo (Agile Low-Cost Assembly) envisions an innovative assembly concept for a highly flexible, low-invest and decentralized assembly of electric vehicles with the aim of validating the concept by demonstration. The concept breaks the rigid linkage of assembly stations and thus enables full flexibility in the sequence of assembly operations only limited by precedence constraints. As a result, each electric vehicle will be assigned to an independent, order-specific assembly route through the assembly system without the need for any conveyor system due to the autonomous abilities of each electric chassis.

Your tasks:
To utilize the potential of agile assembly, a new production control is essential. Due to the highly flexible and adapting assembly structures, there are new and unexplored degrees of freedom in sequencing assembly operations. As part of the assembly control, the vehicle routing runs situationally and depends on the availability of resources such as assembly stations and material supply.

Your thesis will be focused on identifying information requirements, flows and interfaces that are necessary for the implementation of a real-time capable and adaptive control of assembly orders in the agile assembly. The further classification and visualization of data structures in the relevant planning layers contributes to the transparency of the smart assembly control and will enable production 4.0.

The thesis is related to the research project LoCoMo which is funded by the BMWi and conducted in collaboration with the electric vehicle manufacturer e.Go Mobile AG and other industrial partners. Therefore, the relevance of your topic and intense support are ensured.

Required:
- Studies in mechanical engineering, business engineering (or equivalent)
- High motivation and commitment
- Independent and structured working methods

What we offer:
- Fast processing
- Intense support and exchange with associated partners
- Active contribution to the project contents
- Free and independent work
- Expert insights into assembly planning at WZL
- Involvement in the research project LoCoMo

Did we caught your interest?
Please send a current overview of grades, CV and references to the e-mail address below.

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