Pick and Place Module

RAMI4.0 architecture layer vertical integration

Carlos Josue Rene Avila Carrillo

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This project aims to show how to digitize and digitalize the pick and place module as an asset in the context of Industry 4.0.

The fundamental purpose of Industry 4.0 is to facilitate cooperation and collaboration between technical objects, which means they have to be virtually represented and connected. In this context, a technical object is an object that is of value to an organization [1].

The reference architecture model Industrie 4.0 (RAMI4.0) is a tool that allows the representation of an asset as a technical object in an organization's functional hierarchy and through its entire lifetime [1]. It is a reference for creating Industry 4.0-compliant digital twins.

3.1 Asset position in the RAMI 4.0

The RAMI4.0 describes three dimensions orthogonal to each other. Navigating the RAMI4.0 allows US to determine the relevant data and information to digitalize. » in a few words describe here how the RAMI is navigated «

3.1.1 Position in the Hierarchy Levels Axis

The "Hierarchy levels" axis is used to describe an asset at a particular level in a functional hierarchy based on the activities it performs in an organization. This functional hierarchy includes business planning and logistics, manufacturing operations management, and batch,

continuous or discrete control. The levels provide different functions and work in different timeframes.[2]

The pick and place module is a **station**.

3.1.2 Position in the Life Cycle & Value Stream Axis

The "Life cycle & value stream" axis is used to describe an asset at a particular point in time during its lifetime, from its conception and design, to its production and value-added use right up to its disposal. [1]

The business and use case in consideration is operational usage. Thus the asset is an **instance in its Maintenance/Usage phase**.

3.1.3 Architecture Layers

The "Architecture Layers" axis describes the architecture in terms of properties and system structures with their functions and function-specific data in the form of layers.[1]

While the Hierarchy Levels axis and the Life Cycle & Value Stream axis are useful to determine **what** information is relevant given the context of a business and the specific asset, the Architecture Layers axis is useful to determine **how** the information can be digitized and digitalized, this is, how to translate the physical data into digital data and information (digitization) and how to use this digital information to provide value to a business (digitalization).

As mentioned before, the asset is a station instance in its maintenance/usage life cycle phase. Figure shows its positioning in the RAMI4.0.

3.2 Digital Factory

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4 Results

5 References

[1] "Reference Architecture Model Industrie 4.0 (RAMI 4.0)," Deutsches Institut für Normung, Berlin, Germany, {DIN} {SPEC} 91345, 2016. [Online]. Available: https://www.din.de/resource/blob/229091/38ec5291c94e5d7e5e7bce7b3fc4c06e/din-spec-91345-pdf-data.pdf.

[2] *IEC 62264-1: Enterprise-control system integration - Part 1: Models and terminology*. International Electrotechnical Commission; IEC, 2013.