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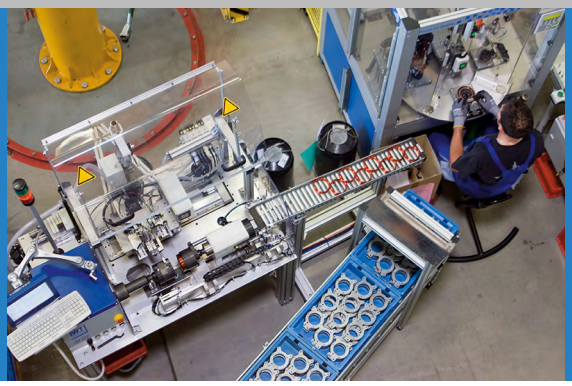

AUTOMATION POTENTIAL ANALYSIS IN ASSEMBLY PROCESSES

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www.ipa.fraunhofer.de/en/assembly-automation

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Status quo

In many manufacturing companies, assembly processes are still performed manually. The reasons for this are high numbers of variants with small batch sizes, extremely diverse assembly processes and parts supply methods that are difficult to automate. Nevertheless, automation can be used to rationalize many assembly processes and thus make production more cost-effective. The method developed by Fraunhofer IPA for analyzing the potential to automate systematically identifies the possibility of automating previously-manual assembly processes. It has already been applied in numerous customer projects throughout the world.

Our approach and methodology

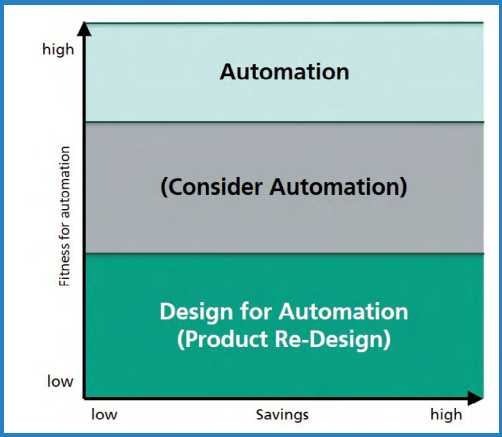
Together with the customer, the automation experts at Fraunhofer IPA analyze the automation potential in workshops. The following approach is taken:

Determine and weight the assessment criteria

The assessment criteria developed by Fraunhofer IPA are jointly discussed, adapted to the situation concerned and weighted according to their impact on the assembly process.

Appraise the status quo

After determining the range of tasks to be analyzed, the various assembly processes are listed in chronological order. For each step, both the type of parts supply as well as the assembly process itself are documented.



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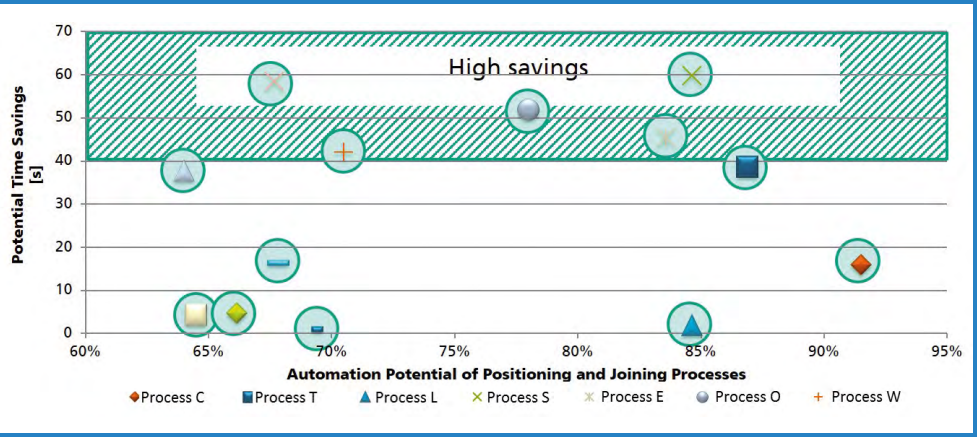

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Assess the technical and economic automation potential

With the aid of the analysis tool, not only is the technical feasibility of each assembly step/process examined with regard to singularization (S), handling (H), positioning (P) and joining (J), but also the financial savings that can be achieved (see Figure 2). This results in comprehensible well-documented information about the feasibility of automating each of the assembly processes examined.

Identify automation concepts

For the assembly processes classified as suitable for automation, first of all rough concepts for automating both parts supply and the assembly process itself are developed.

Design for Automation (DfA) and Human Robot Collaboration (HRC) open up new possibilities

If any assembly steps are considered unsuitable for automation, the experts recommend modifications to the design of products and processes in order to automate them (DfA).

Sub-processes which are difficult to automate are also examined for their potential for an HRC application. This allows assembly tasks to be performed hand-in-hand by humans and robots

Assess the Return on Investment (ROI) for the automation solution

Costs are estimated for implementing the developed rough concepts, so that an investment can be recommended or not based on its returns.

Result

The results obtained from the automation potential analysis are:

- Information on the technical and economic feasibility of automating each assembly step
- For assembly steps which can be automated: a rough concept of an automation solution, as well as an assessment of the ROI
- For assembly steps which cannot be automated: recommendations for HRC solutions, or for modifications to the design of products and processes to enable them to be automated.

Your advantages

The method developed by Fraunhofer IPA for analyzing the potential to automate assembly steps makes it possible to systematically identify processes that can be automated. Since not only technical but also economical aspects are considered, the analysis provides a sound basis for deciding whether to implement an automation solution.

Get in touch with us

Are most of your company's assembly processes performed manually and are you looking for ways to rationalize your production processes? Do you want to manufacture your products more cost-effectively in the long term? We'd be delighted to hear from you! We would welcome the opportunity to meet you personally to discuss a possible cooperation.

1 *Automation Potential Analysis (APA).*
2 *Integrating the analyzed processes into the APA matrix.*