

Flexible automation in furniture manufacturing using dual-armed manipulators

Case study and future research

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Changes

(“Trends, Developments and State-of-Play in the Furniture and Others Sectors in the EU”)

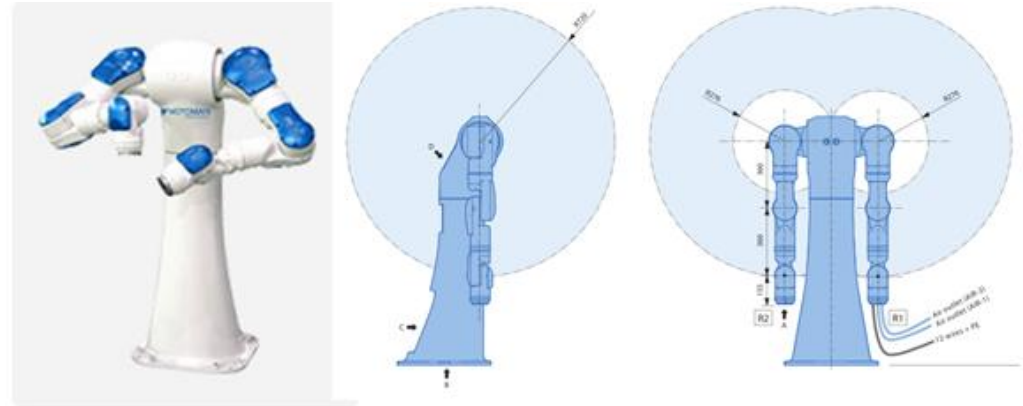
- There is an ongoing restructure in the industry segment
- New competence is needed
- Manual operators ↔ Automated solutions

Industrial robots and automation (Brogårdh, 2007)

- It is not much done in today's academic research regarding automation of assembly of products with smaller lot sizes.
- SME (Small and Medium sized Enterprises):
 - No robot family on the market at the necessary price level for all the applications and requirements for SMEs

Yaskawa SDA10

- Payload: 10 kg/arm
- Repeatability: +/- 0.1 mm
- 15 axis => 7 DOF
 - One in the waist
 - 7 in each arm
- Motors:
 - developed for fast ramp-up in speed within short distance
 - placed within the arms

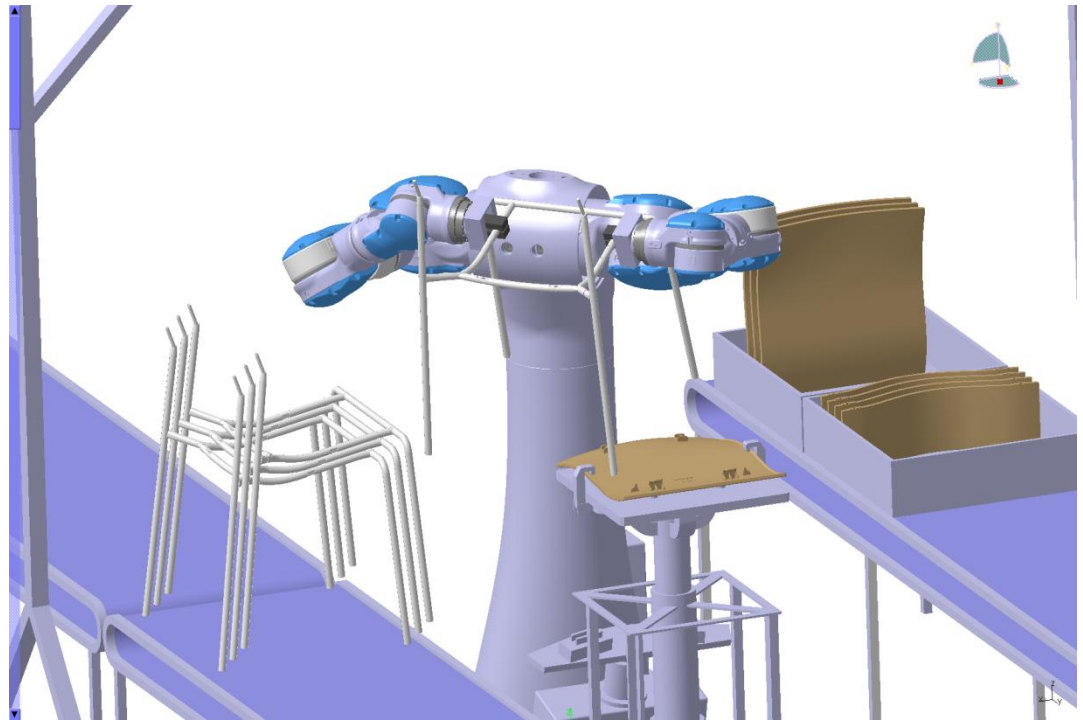


Simulation

- Model-based problem solving method
- Support the engineers to plan the early product development phases
 - Safe environment to work with clash detection and range analysis
- OK – we try simulation for a SME product!

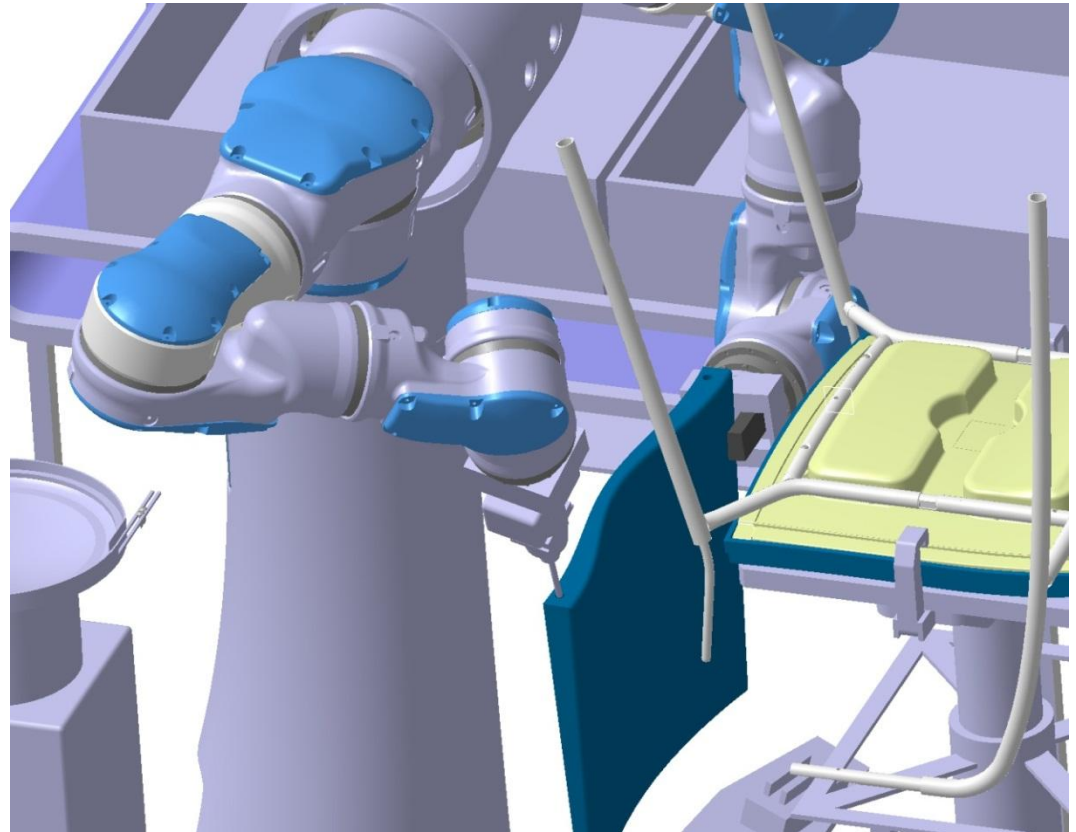
Authentication

- It was shown that the two-armed industrial robot was very advantageous in this application – assembling a chair.
- Synchronised arm movements
 - Flexible gripper

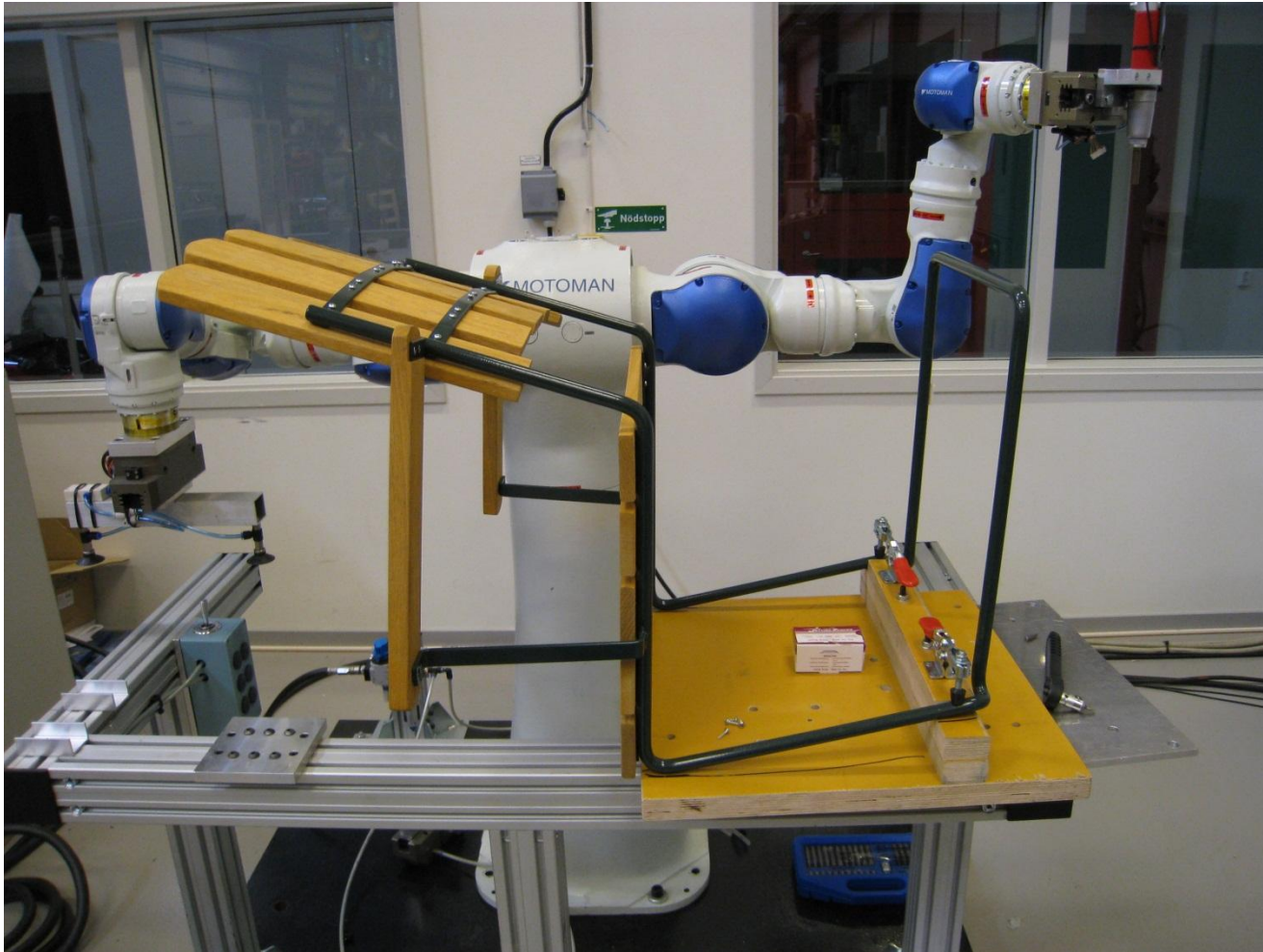


Authentication

- Large flexibility
 - Flexible fixture
 - Work in narrow spaces



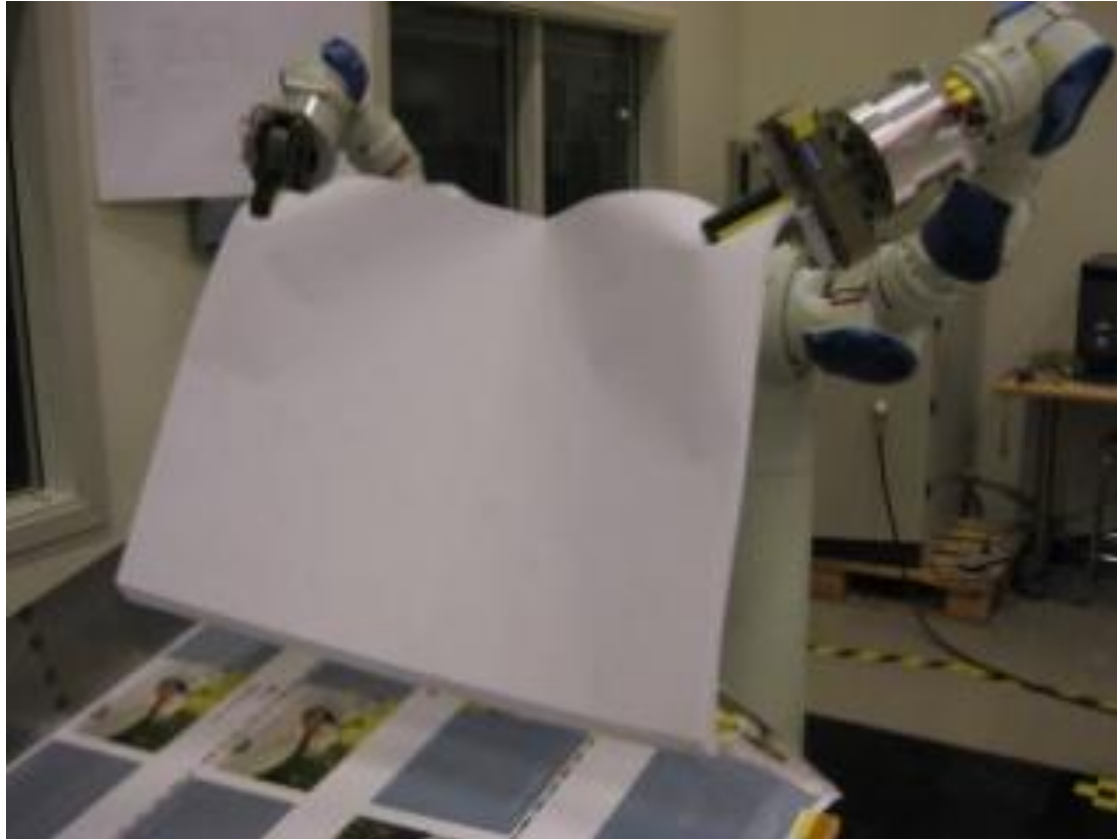
Demonstrators



Future research

- Increase automation in final assembly for furniture
 - Adaption to SME conditions
 - High flexibility / Reconfigurability
 - “Right” combination of craftsmanship and automation
- Assembling of modern composite components, since they are as flexible in its shape as thin wood used for veneer
- Design for Asssembly for furniture
- Furthermore, using a robot managing flexible material

Demonstrator



Thank You for Your Attention!

Questions



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