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Assembling wall panels with robotic technologies

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Introduction

- Introduction
- Assembling Wall Panels
- Robotic Technology
- Robot and Curtain Wall
- Integration
- Goal

Introduction – Assembling Curtain Wall Panels – Robotic Technologies – Robot and Curtain Wall – Integration – Goal

Introduction

The problems of (dis)assembling curtain wall panels at the construction site

- Neither safe nor labour-friendly
- Climate conditions make production times uncertain
- Taking a big part of the capacity of the tower cranes.
- Difficult to find people
- Curtain Walls are replaced at an early stage



Introduction – Assembling Curtain Wall Panels – Robotic Technologies – Robot and Curtain Wall – Integration - Goal

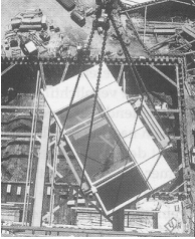
Assembling Wall Panels

Rembrandt Tower in
Amsterdam
Wall panel assembly steps



Introduction – **Assembling Curtain Wall Panels** – Robotic Technologies – Robot and Curtain Wall – Integration - Goal

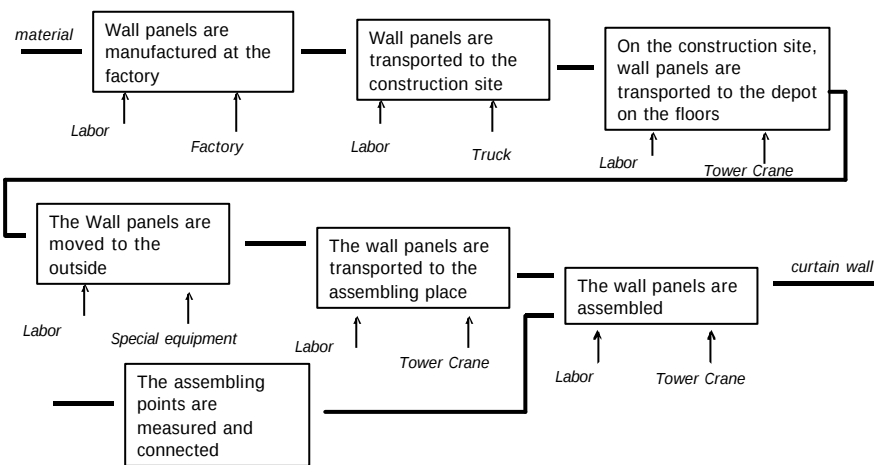
Assembling Wall Panels

1.  Wall panels are transported to the floor where they are required
2.  Wall panel depot on the floor where the panels will be installed
3.  Wall panels are moved outside
4.  Wall panels are connected to tower crane
5.  Wall panels are assembled

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Assembling Wall Panels

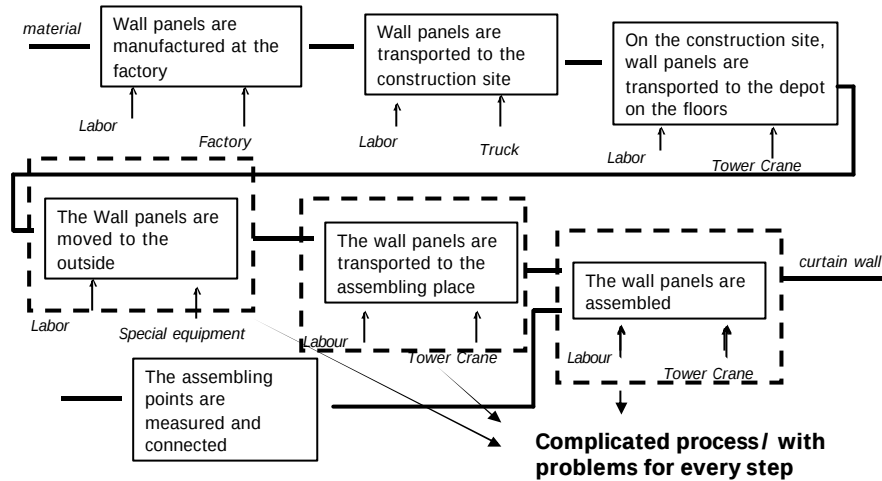
SADT diagram



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Assembling Wall Panels

SADT diagram



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Assembling Wall Panels

Use of Robotic Technology in assembling of wall panels

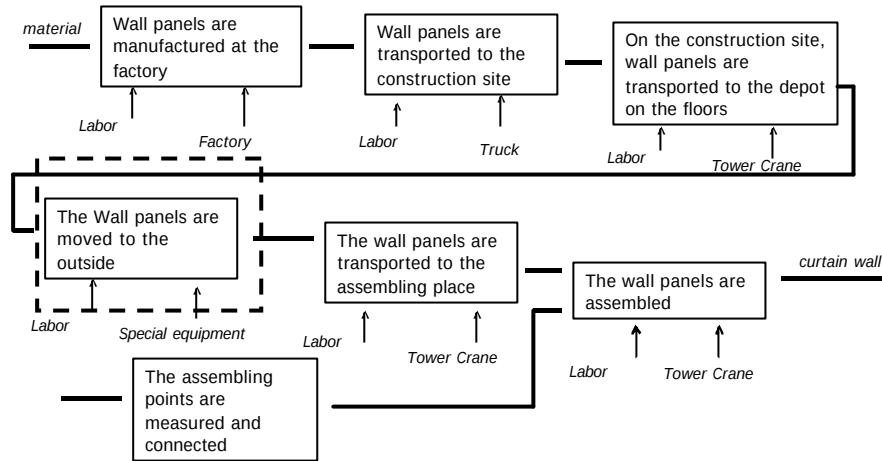


Human control

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Assembling Wall Panels

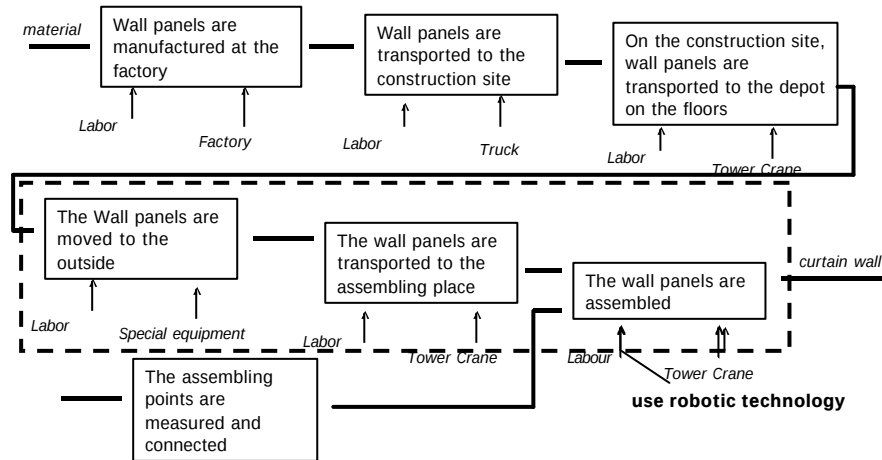
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Assembling Wall Panels

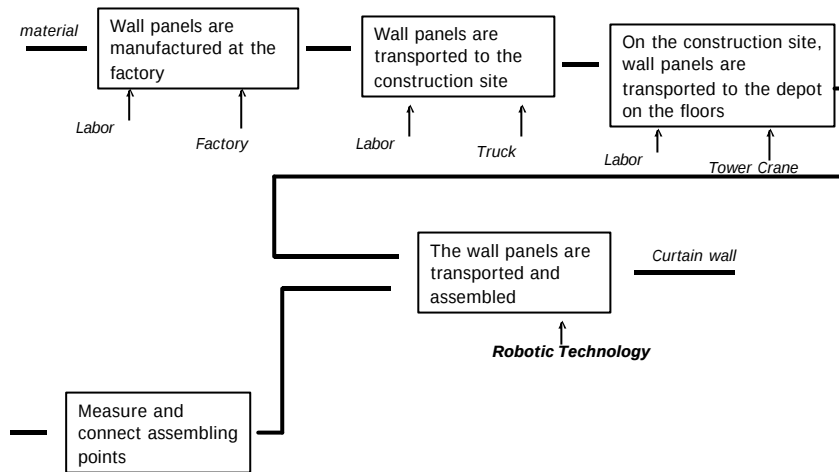
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Assembling Wall Panels

SADT diagram



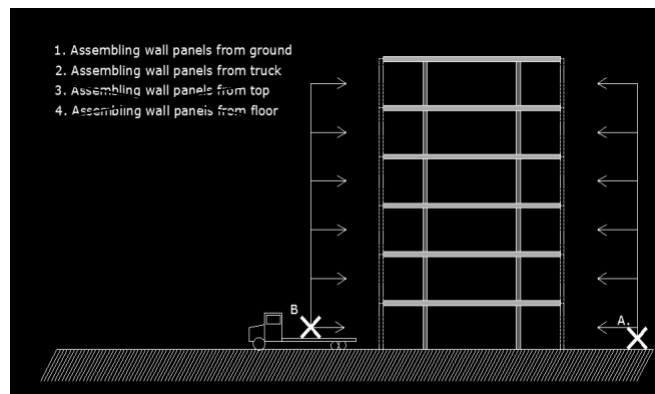
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Assembling Wall Panels

The possibilities for depots on the construction site if we use robotic technologies

Reduce the load on the capacity of the tower crane

Assembly from depots A and B without using the tower crane

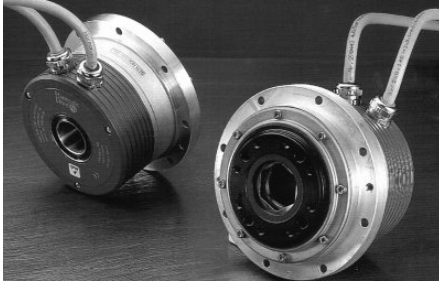


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Robotic technologies

Robotic technology at the moment

Mini-actuators



Volume of 50 mm³

Sensors



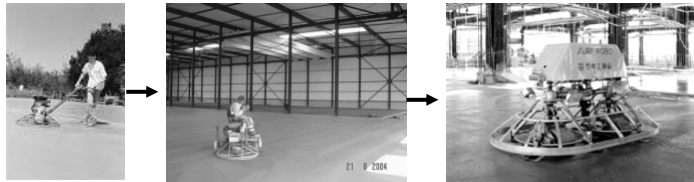
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Robotic technologies

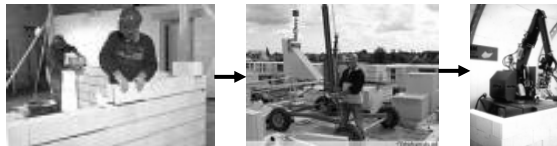
Robotic technology in the construction industry

Robotic technology is being used in existing methods.

Power trowelling
of concrete



Laying sand-lime
bricks

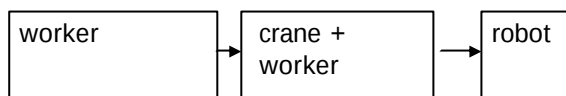


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Robotic technologies

Robotic technology in the construction

Improve the equipment

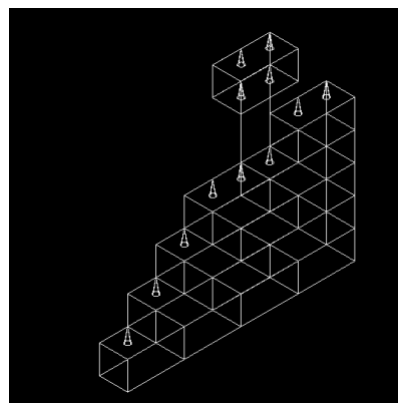
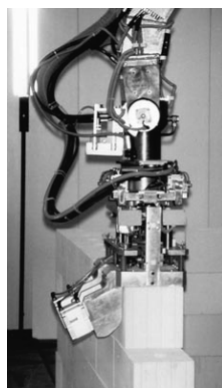


Product stays the same !!!!

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Robotic technologies

For example



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Robotic technologies

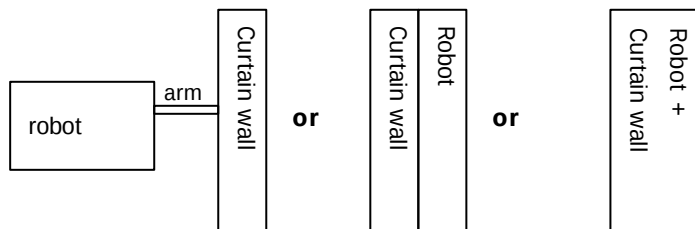
New Product

- Changing the product could make it easier to use robots on the construction-site
- For this you have to think about the possibilities and limitations of the robot.

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Curtian Wall and Robot

Possibilities Curtain Wall and Robot



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Curtain Wall and Robot

Robot +
Curtain wall

The added value of integration compared to other options is that the robot is one with the Curtain Wall

The advantages :

- Easy adoption to the demands of the user, the curtain wall panel will be easy to replace
- The non-performing parts will be easy to replace

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Curtain Wall and Robot

Robot +
Curtain wall

When the robot is not necessary for the assembling or disassembling of the curtain wall panels. The robot can be used for other functions, such as user functions

For example

- Window-cleaner installation
- sunblind
- Visual radiation

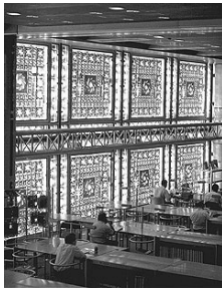
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Curtain Wall and Robot

Examples user functions



Window-cleaner installation

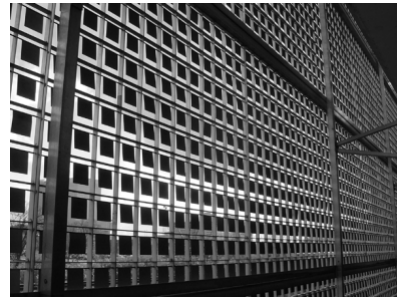


sunblind

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Curtain Wall and Robot

Active Wall



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Curtain Wall and Robot

Robot +
Curtain wall

Should it be possible???

- Yes, at the moment actuators are made smaller and stronger
- Sensors become better and smaller

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Integration

Integrate a Robot in a curtain wall and use robotic technology for the entire life cycle

Life cycle of a Curtain wall with robotic technology

assembling	user function	disassembling
Curtain Wall + Robotic Technology		

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Goal

Demands

- Assembling from the ground
- Assembling by a machine in or on the panel without direct human control.
- Panels should be easily replaceable during their life cycle, without having to disassemble the whole curtain wall.
- Using standard frame so there are more options for the visualization, user functions and so on.
- Fixed connecting points
- Standard size panels
- Using the robot for user functions or visualization during the curtain Wall life cycle. Creating a active wall.
- The panel should be easy to assemble able

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Goal

So you get a Curtain Wall

A self assembling Wall

- You don't have to use the crane
- No working on dangerous places anymore

An easy adaptable wall.

- Adaptable to the user demands.
- Adaptable to technical and visual changes

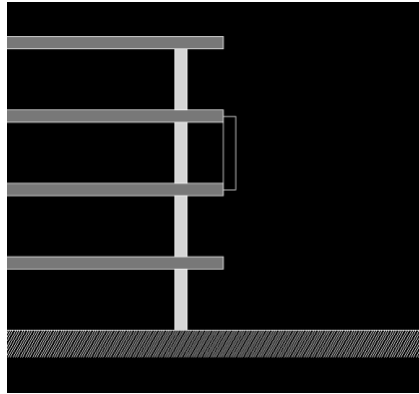
Creating an Active Wall

- Adaptable to the surroundings, sun blind
- Self maintaining, window-cleaner installation
- Visual image

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Goal

Integrate a Robot in a curtain wall and use robotic technology for the entire life cycle



Wall Panel

Self Assembling

Adaptable

Active Wall

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Questions!

