

PEMAMEK

Lågserietillverkning – möjligheter till effektiv svetsautomatisering av små serier

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Kimmo Ruottu

- Area Sales Director for Scandinavia & German speaking Europe at Pemamek
- IWE, B.SC
- 25 years in welding and welding automation business



Half a century of global excellence.



PEMAMEK

World's best and most productive welding and production automation solutions already over 50 years.

- Pemamek Ltd, founded in 1970, is a Finnish AAA-rated family-owned company
- 250 employees
- Headquarters, sales, engineering, R&D and production in Finland. Local sales offices in USA, Brazil, Denmark, Germany, Poland, Russia
- Over 90% of the annual production is exported worldwide
- Over 15,000 deliveries globally
- Modern factory, total of 20,000 m²

PEMA SALES AND SERVICE WORLDWIDE



Finland

- USA
- Brazil
- Denmark
- Germany
- Poland
- Russia



7

Global offices

+

Local partners





General fabrication



Wind energy



Shipbuilding



Power generation



Offshore and
Process equipment



Heavy equipment



PEMA AUTOMATION

*Customized solutions and proven technology
for heavy welding and production industry*

- From single stations to whole steel production facilities
- Turnkey solutions from feasibility studies to life-cycle management
- Experience in welding, material handling and control systems for various industries
- Forerunner in adapting new technologies
- Most advanced applications tested in-house

*More productivity.
Future competitiveness.
Fast return on investment.*



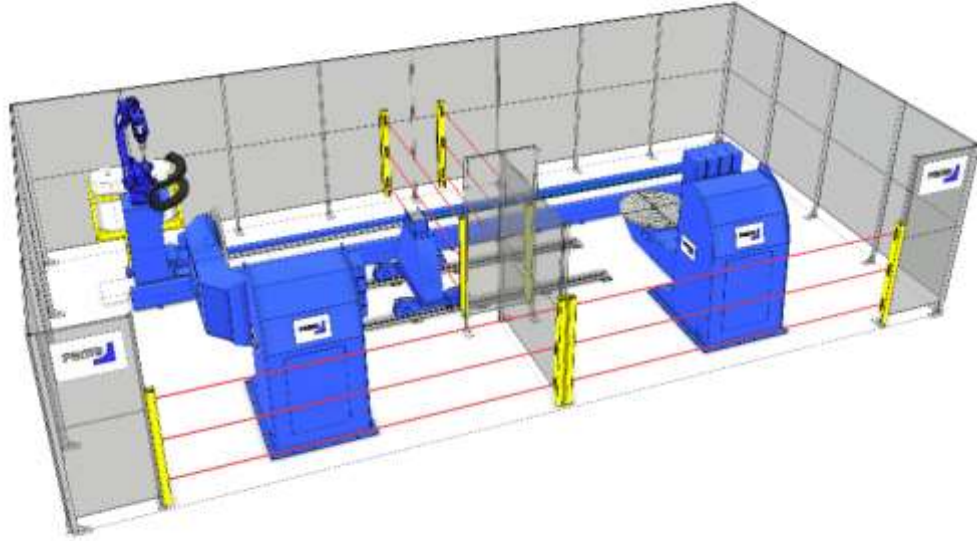
LOW VOLUMES – HIGH MIX IN PRODUCTION

- Where most typical; project companies , subcontractors , smaller fabricators
- Today it possible to automate production which has short series and high mixture of products
- Major factors that have an impact on robot welding productivity in small series
 - Arc-on time
 - Programming ratio
 - Deposition rate



LOW VOLUMES – HIGH MIX IN PRODUCTION

- **What can we do to improve the above**
 - Careful planning of the lay-out
 - Jigg / clamping arrangement
 - Programming method
 - Education & support for operators
 - Plan the logistics in & out cell carefully
 - Design the products more suitable for automation
 - Pay attention to tolerances for prefabrication (manufacturing & assembly tolerances)
 - Process testing and optimization

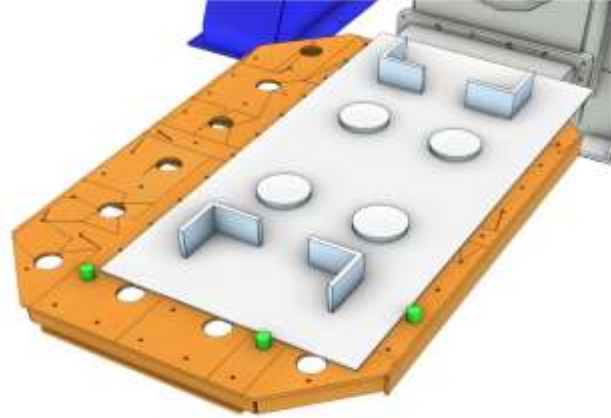


LOW VOLUMES – HIGH MIX IN PRODUCTION

Careful planning of lay-out

- customized robot station gives you more possibilities to utilize the station, when dimensions and weight of the workpiece changes
- Two cell solution with different manipulators and possibility to combine the cells is an additional benefit
- Floor track vs portal vs XYZ gantry
 - big influence also for programming





LOW VOLUMES – HIGH MIX IN PRODUCTION

Jig and clamping arrangement

- flexible clamping method
 - Easy fixing of workpiece
 - Adapters for workpiece vs manipulator
- Same jig as for assembly and tack-welding (2 cell solution)
- Frame for multiple workpieces, with easy changeable reference points



PEMA WELDCONTROL OFFLINE

- One-off and mass production
- Simulation of the production
- Quick and easy to learn, NO SPECIAL SKILLS

PEMA WELDCONTROL SCAN

- Large prepared grooves and thick plates
- Adaptive multipass pattern generation
- Laser scanning
- 3D-model can be created in the software

PEMA WELDCONTROL CREATE

- Repetitive and predefined features
- Pieces can be scaled



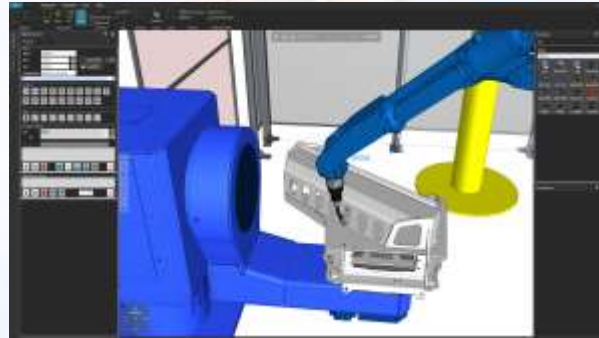
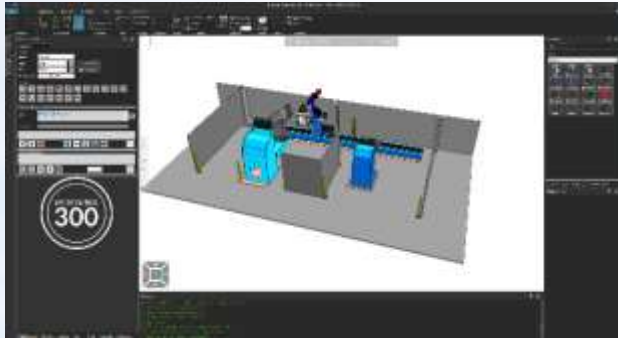
LOW VOLUMES – HIGH MIX IN PRODUCTION

Programming method

- Offline a must here
- Depending on what is the quality of you 3D design data and workpiece ? Options in PEMA WeldControl 300
 - Pure offline
 - Scan add on
 - Create add on
- Simulation possibilities

PEMA WELDCONTROL

Pema
WELDING AUTOMATION



WeldControl
300

OFFLINE

- One-off and serial production
- Simulation of the production
- Parametric path creation
- **Copy, mirror and macro creation**
- Quick ramp-up period - easy to learn
- **Visual multi layer weld tool**
- Development **only** for welding use
- **R&D done in own daily production**



*...Robotic welding
of BUCKETS*

HIGH MIX – LOW VOLUME



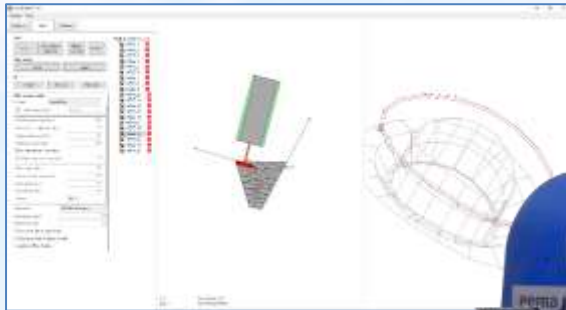
PEMA WELDCONTROL

Pema
WELDING AUTOMATION

WeldControl
300

SCAN

- For workpieces contain large prepared grooves and thick plates
- **Adaptive multipass pattern generation**
- Laser scanning
- 3D-model can be created in the software
- Quick ramp-up period - easy to learn



*...Robotic welding
of nozzles*

TRUE ADAPTIVE WELDING



PEMA WELDCONTROL

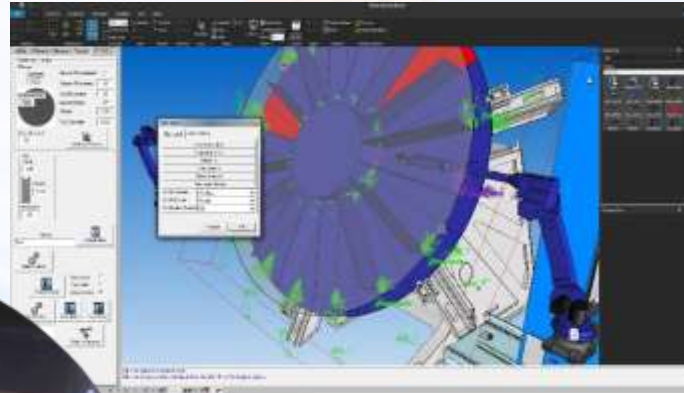
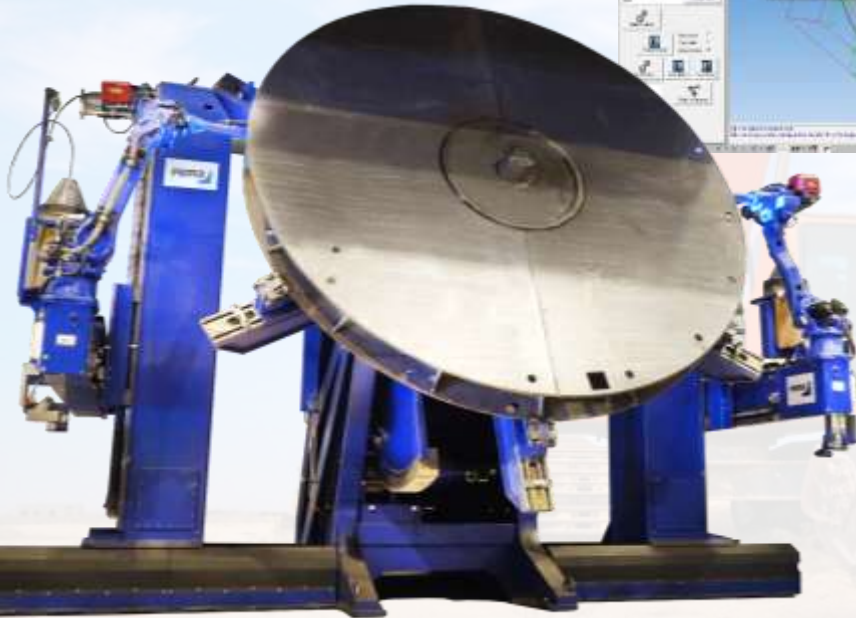
Pema
WELDING AUTOMATION

WeldControl
300

CREATE

- Workpieces that vary in size but contain repetitive and predefined features
- **Parametric operating, pieces can be scaled**
- 3D model of the product created in the software
- Automatic weld creation
- Quick ramp-up period - easy to learn

*...Robotic welding
of offshore winch
Manually → 36h
Robotic welding → 6h*





Pema®
WELDING AUTOMATION

PEMA WELDCONTROL 200

- 2d welding model created with help of scanned images
- Possibility to use also 3d welding model on top of scanned images, 2d drawing or dimension grid
- Fast modelling from parametric element library
- Horizontal, vertical and overhead welds
- Automatic post-processing
- Control for single or dual robots



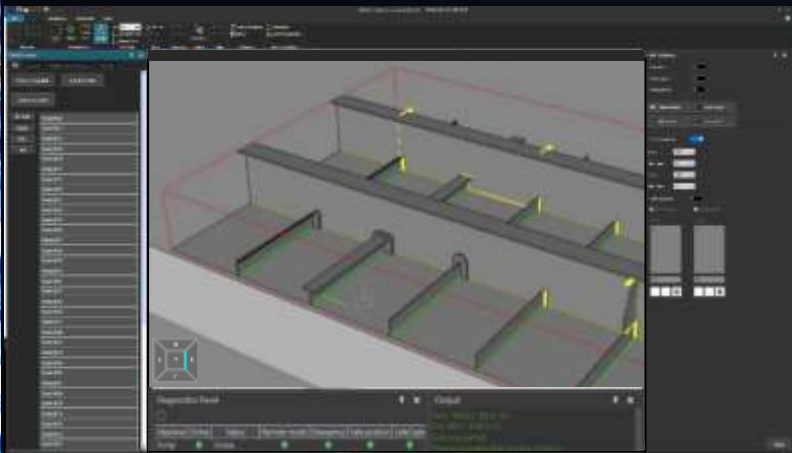
LOW VOLUMES – HIGH MIX IN PRODUCTION

Programming method

- Only 2D , possible to utilize PEMA WeldControl 200 Vision
- Simulation possibilities

VISION

Pema®
WELDING AUTOMATION





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 - Process testing and optimization
 - **AND TALK TO PEMA**

Make More.

@PEMAWELDING



THE WELDING AUTOMATION COMPANY.

