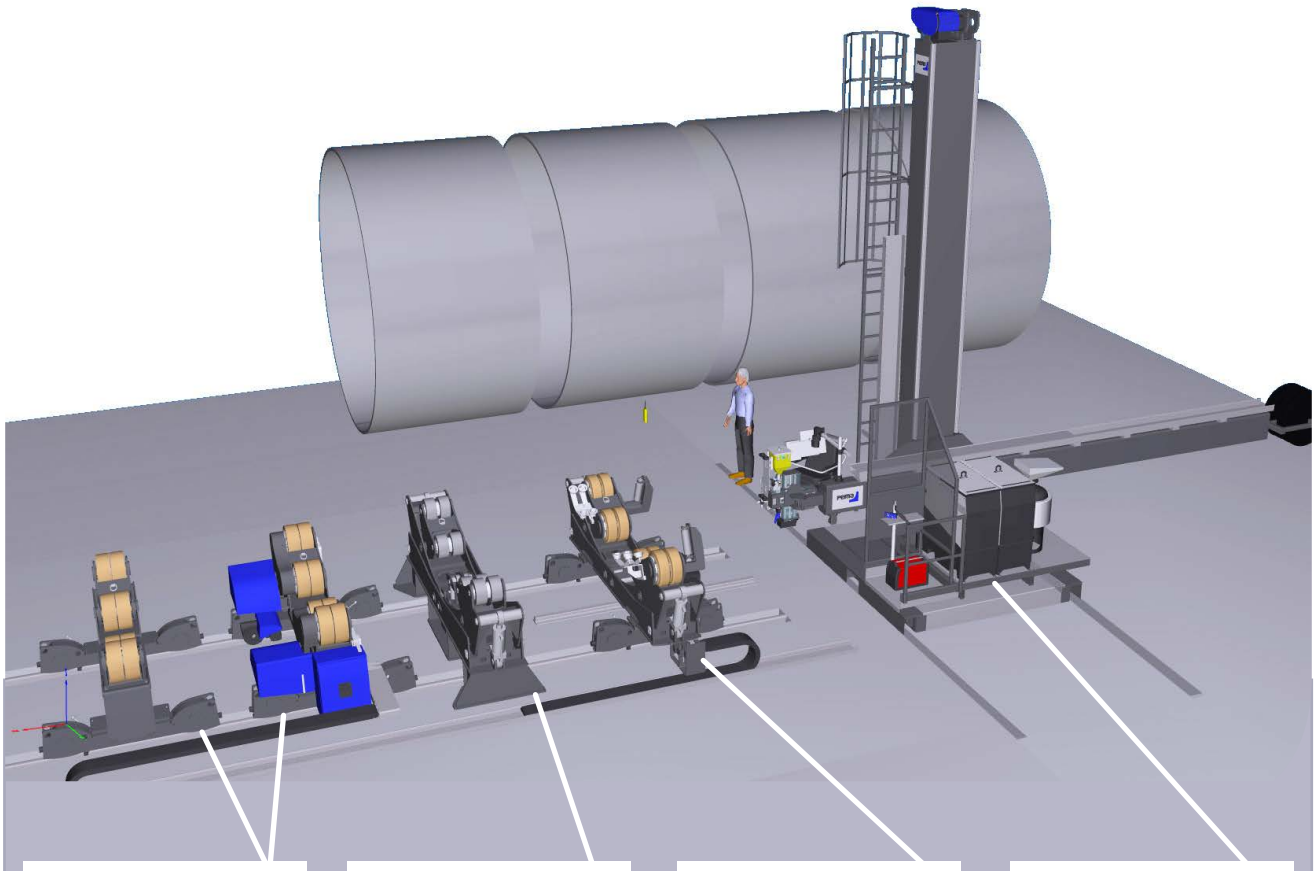
pema
WELDING AUTOMATION

TPS
WeldTech

Assembly Station for Tubular Structures

PEMA TW Assembly Station

The new-generation PEMA TW series assembly stations based on self-aligning PEMA rollerbeds significantly improve the efficiency and quality of the production of heavy tubular structures, like vessels and windmill towers. The assembly station consists of a jig-type assembly unit with powerful hydraulic adjustments and a set of rollerbeds. Together with a PEMA column & boom, automated welding of work pieces can be carried out reliably and to highest standards of productivity and welding quality.



Set of PEMA rollerbeds

- PEMA A-series with automatic adjustment of the rollers to the diameter of the work piece
- High quality polyurethane rollers
- Equipped with rail cars

Fixed assembly jig unit

- Independently adjustable steel roller bogies on both sides to align shells horizontally and vertically
- Hydraulically operated cylinders to match shell edge and roundness differences

Idler / Fit-up unit

- Standard idler unit or fit-up unit depending on the workpiece shape
- Hydraulic function for pressing two shells together
- Equipped with rail cars

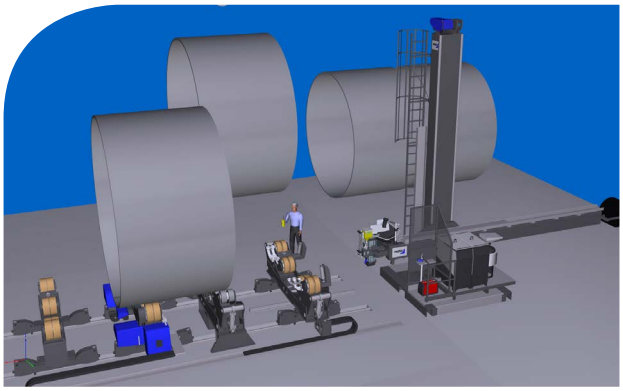
Column & boom

- Ideal for multi-wire SAW welding processes
- Synchronized with the rollerbeds
- Certified operator's seat as an option

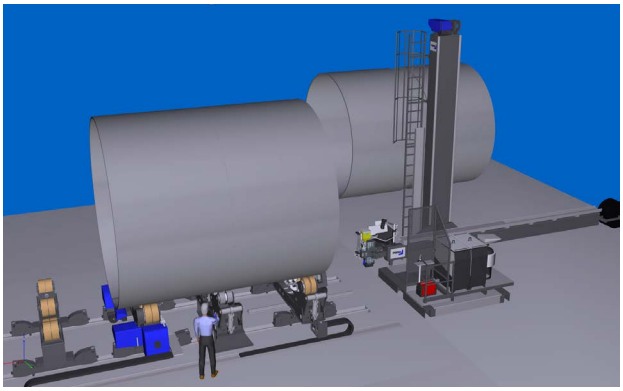
Process Description of PEMA TW Assembly Station

PEMA assembly line enhances efficiency of the production material flow. Tubular workpieces are growing shell by shell so the required crane capacity is minimised. One operator can use all the functions of the assembly station by a remote controller.

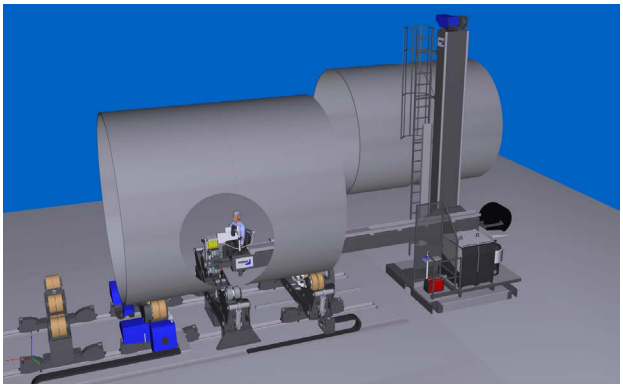
The modern control system of the PEMA column & boom integrates the controls of a column & boom, welding power sources, rotation of rollerbeds and welding parameters to a clear-cut, easy-to-use system.



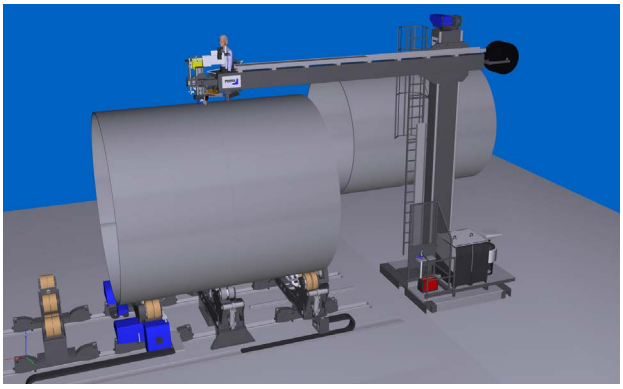
1. *Assembly starts by lifting the first shell to the PEMA assembly station. The second shell will be lifted on rollerbeds next to the first shell.*



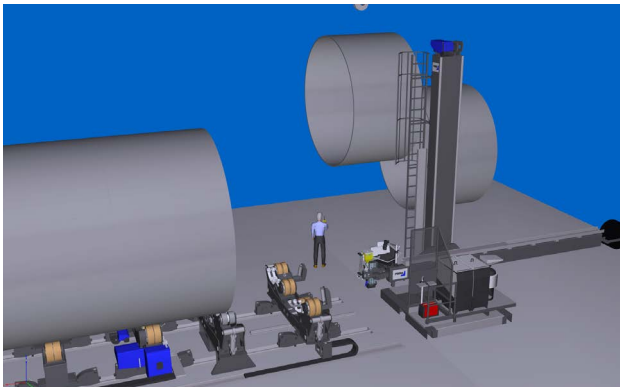
2. *The operator presses the shells together and matches the shell edge and round differences by means of a jig unit. Then the shells are tack welded manually.*



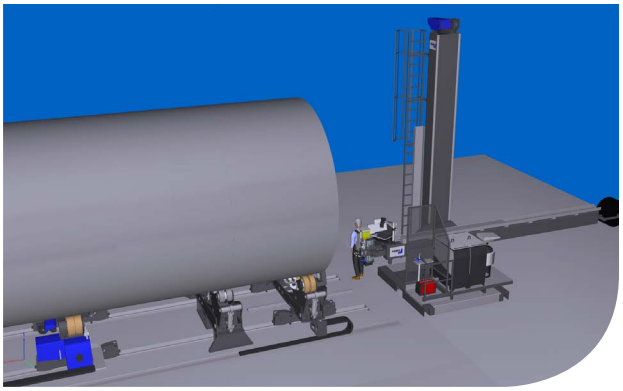
3. *Next, the shells are joined by continuous internal circumferential welding with the PEMA Column & Boom.*



4. *Continueing with external circumferential welding of the shells. Operator controls the rotation of the work piece with the control system of the PEMA Column & Boom.*



5. *Welded shells are moved forward with powered movement of rail cars. New shells are lifted to the assembly station until the tubular structure is completed.*



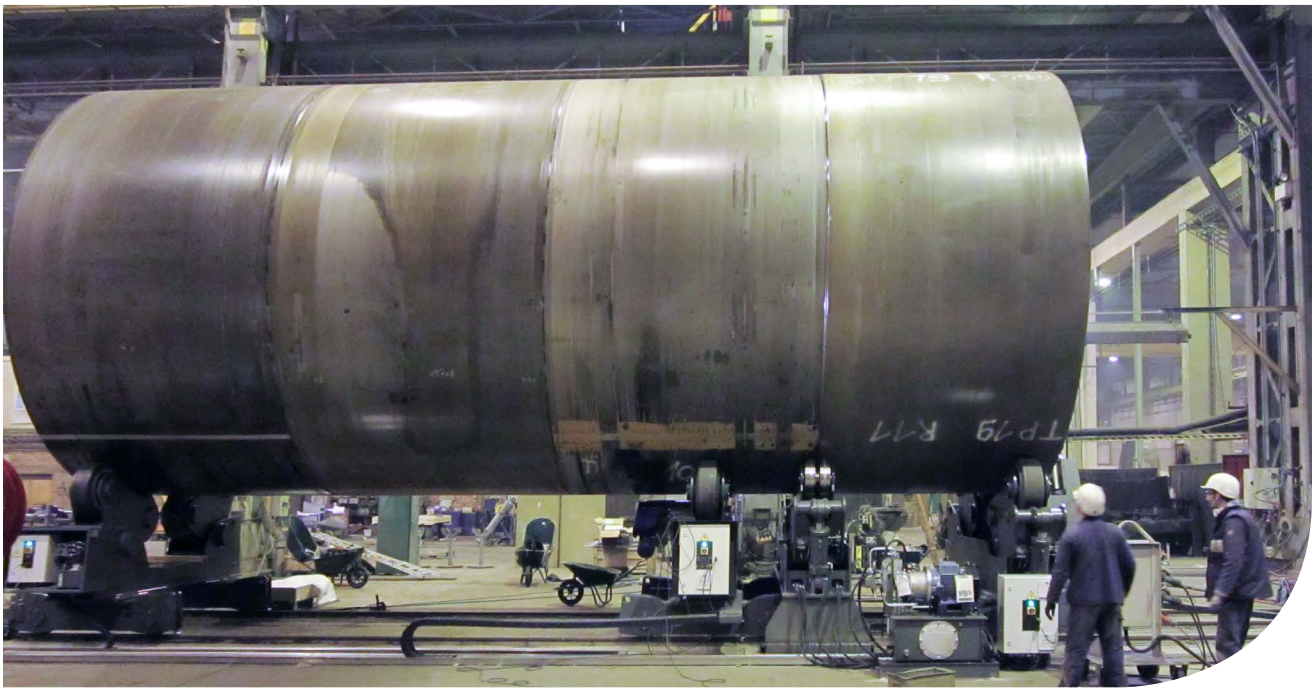
6. *The completed workpiece can be moved to final welding and quality control area on the same rail cars.*

Applications

PEMA Assembly Station increases productivity, quality and efficiency in welding to the next level. This has been proven several times in industries like wind tower, tank, process and pressure vessel manufacturing being definitely the key element in production.

Wind Tower and Tower Foundations

The highest demand for efficient mass production of tubular structures is in wind tower and tower foundation industry. For tower manufacturers the solution is PEMA Assembly Line combined with Column & Boom. PEMA Assembly Line family has the correct model even for the heaviest structures in offshore tower foundation industry like monopiles and transition pieces.



Tanks and Thin Wall Process Vessels

In tank and thin wall process vessels PEMA Assembly Station based on self-aligning rollerbeds helps to maintain roundness of thin-wall shells during fitting-up. This is the key for faster and more accurate assembly.

Pressure and Thick Wall Process Vessels and Offshore Componenets

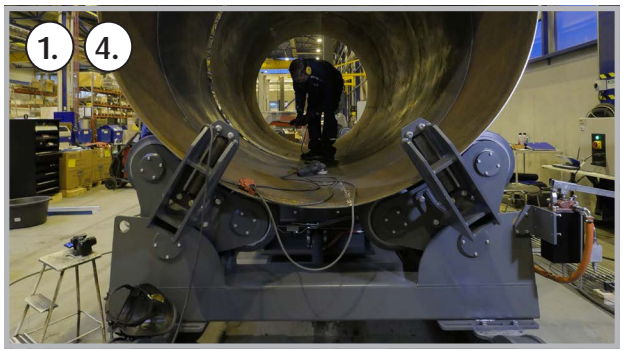
In pressure vessels manufacturing flexible solution for large diameter and thickness is needed. PEMA Assembly Station has specially developed functions for these products. Using of PEMA assembly line quality and defect free welding is guaranteed from day to day.

Technical Advantages and Features

PEMA Assembly Line is a unique concept in the market. It is based on the self-aligning rollers, fixed jig unit and "growing line" function. These together with technical knowledge and experience are showing completely new way of thinking in assembly of shells into the full sections.

PEMA Assembly Line Advantages

1. **Self-aligning rollerbeds** ensure better roundness and faster joining of the shells
2. **The shell is supported both sides** by the Fixed Jig unit and the centerline is always kept correct
3. **Own individually moving cylinders for both sides of the joint** for accurate fitting-up of the shell edges
4. **The last rollerbed is equipped with the end stoppers** and the shell underway can be operated hydraulically against the whole section
5. **All functions of the assembly unit are controlled by a handy remote control**



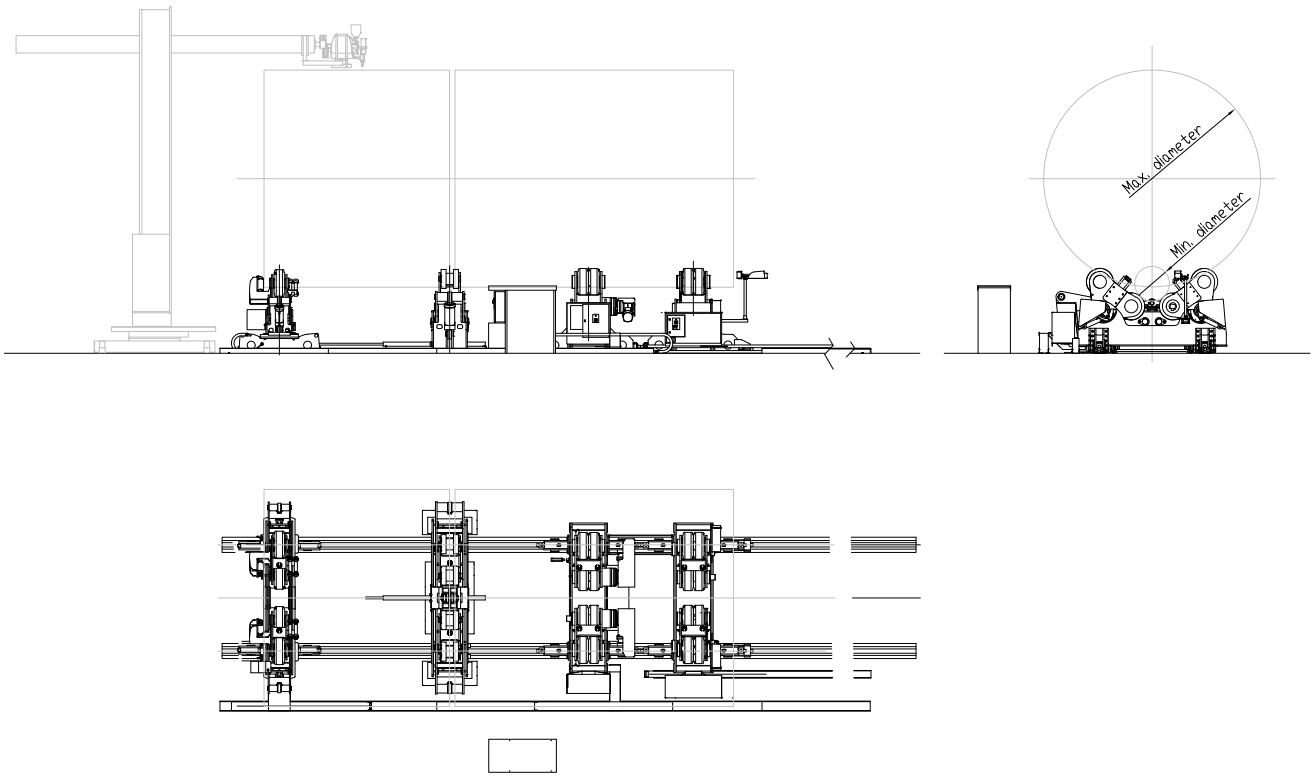
PEMA TW Assembly Station is

- essential for automated welding of tubular structures
- giving more production capacity with a single operator
- improving quality - less finishing and repairing
- reducing set-up and handling times as well as required crane capacity to minimum
- increasing working safety

Optional Equipment

1. **Entrance stairs**
   fixed in movable fit-up unit to enter easily inside section
2. **Assistant jib**
   for tools and hand welding machine fixings
3. **Grounding brushes**
   for welding
4. **Long distance energy chain for power unit**
   in case of moving section out from the station with rail movement
5. **Interface to PEMA Column & Boom**
6. **Anti-Creeping function on the idler unit**
   to avoid work-piece longitudinal movement during rotation
7. **Height adjustable jig support rollers**
   This option is needed in the case if outside thickness difference between the shells is more than 7 mm

Technical Specifications



PEMA TW Series

		TW5000-25	TW5000-50	TW5000-80	TW6000-100	TW8000-150	TW8000-200	TW8000-300	TW8000-400
Diameter range	mm *inch*	1500 - 5000 *59 - 196*	2000 - 5000 *79 - 196*	2000 - 5000 *79 - 196*	2000 - 6000 *79 - 236*	2500 - 8000 *99 - 315*	2500 - 8000 *99 - 315*	2500 - 8000 *99 - 315*	2500 - 8000 *99 - 315*
Length of a shell	mm *inch* mm *inch*	1200 – 3000 *47 - 118* 1200 – 4000 *47 - 157*	1200 – 3000 *47 - 118* 1200 – 4000 *47 - 157*	1200 – 3000 *47 - 118* 1200 – 4000 *47 - 157*	1400 – 3000 *55 - 118* 1400 – 4000 *55 - 157*	1400 – 3000 *55 - 118* 1400 – 4000 *55 - 157*	1400 – 3000 *55 - 118* 1400 – 4000 *55 - 157*	1400 – 4000 *55 - 157*	1500 – 4000 *59 - 157*
Maximum weight of a shell	ton *lbs*	12,5 *27.560*	25 *55.115*	40 *88.200*	40 *88.200*	100 *55.115*	100 *220.460*	150 *330.700*	150 *330.700*
Maximum weight of a full section	ton *lbs*	25 *55.115*	50 (ø3-5m) *110.230* *(ø118" - 197")* 40 (ø2-3m) *110.230* *(ø79" - 236")*	80 *176.370*	100 (ø3-6m) *55.115* *(ø118" - 236")* 80 (ø2-3m) *176.370* *(ø79" - 118")*	150 *330.700*	200 (ø5-8m) *440.920* *(ø197" - 315")* 150 (ø2,5-5m) *440.920* *(ø99" - 197")*	300 *661.390*	400 *881.850*
Recommended model of PEMA Column & Boom		HD 6x5,5	HD 6x5,5	HD 6x5,5	HD 7x5,5	HD 9x5,5	HD 9x5,5	HD 9x5,5	HD 9x5,5

Due to continuous R&D, Pemamek Oy reserves the right to change the specifications without notice.

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