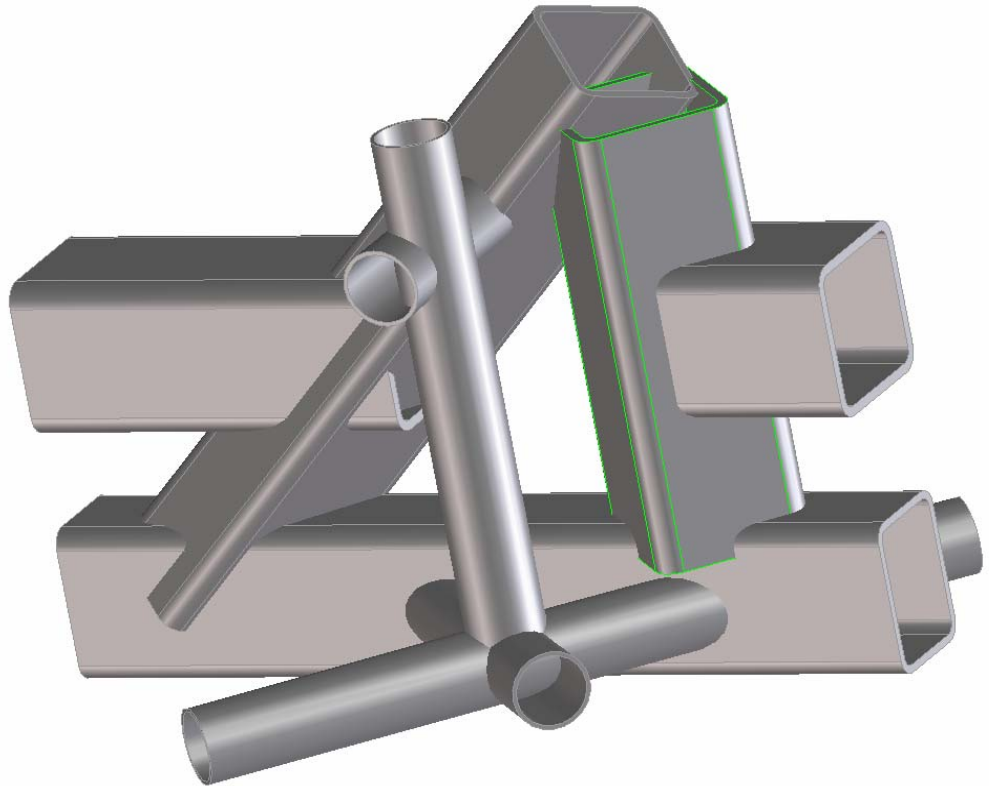




Innovative Tube Designs



Ohio Laser Team for Tube Processing



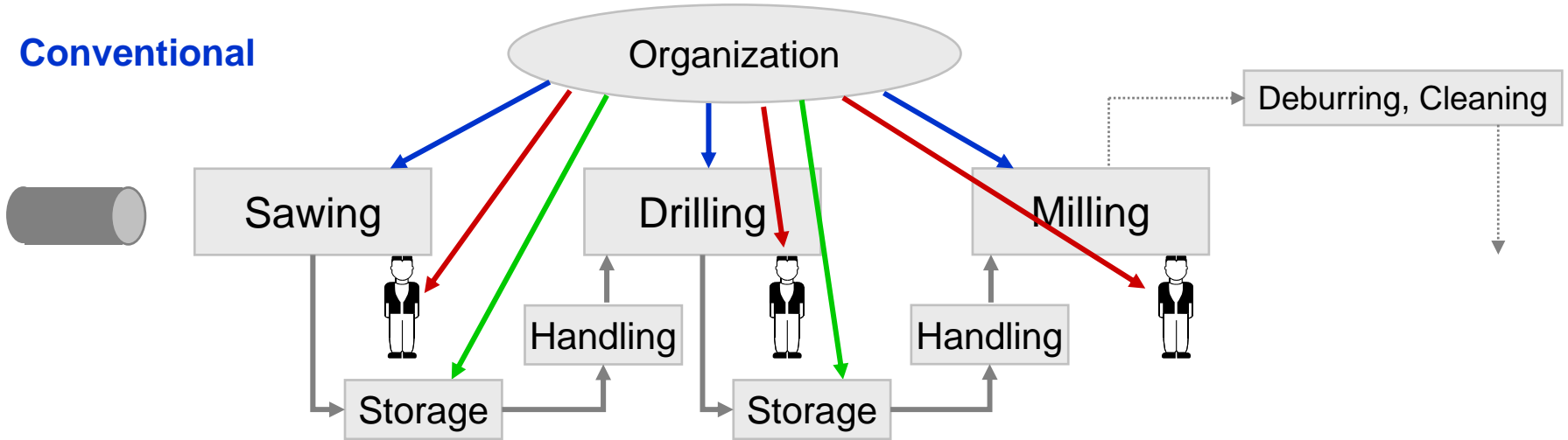
Today tubes and profiles can be accurately processed with laser cutting technology



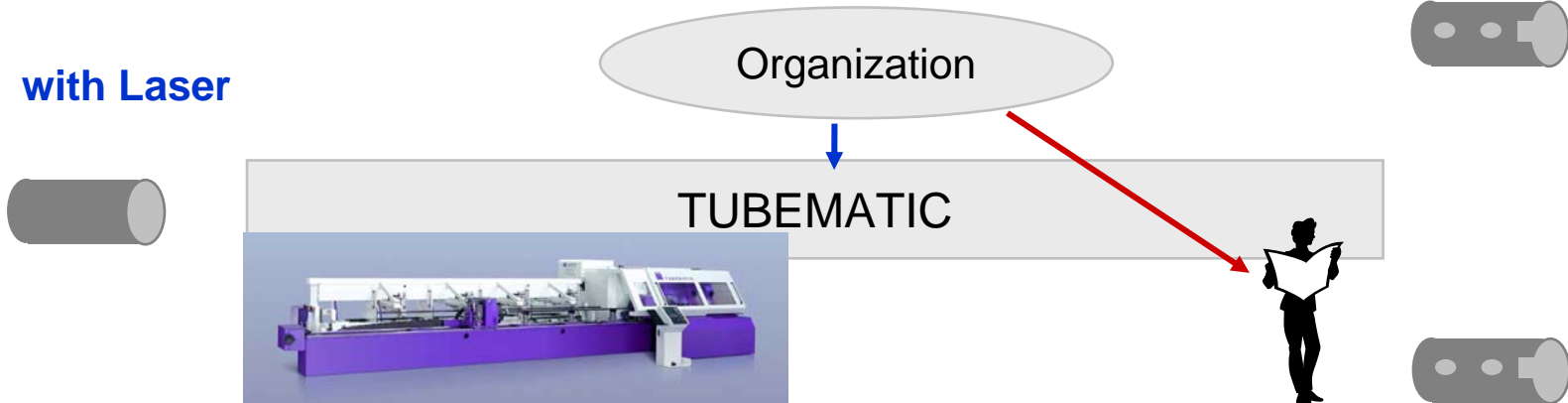


Tube Processing - Conventional vs. Laser

Conventional



with Laser



Production costs can be considerably reduced in comparison to conventional processing.



Traditional Tube Designs



„Simple“ tubes with holes



Complex tube geometries

- Less reworking
- Increased accuracy
- Reduced costs

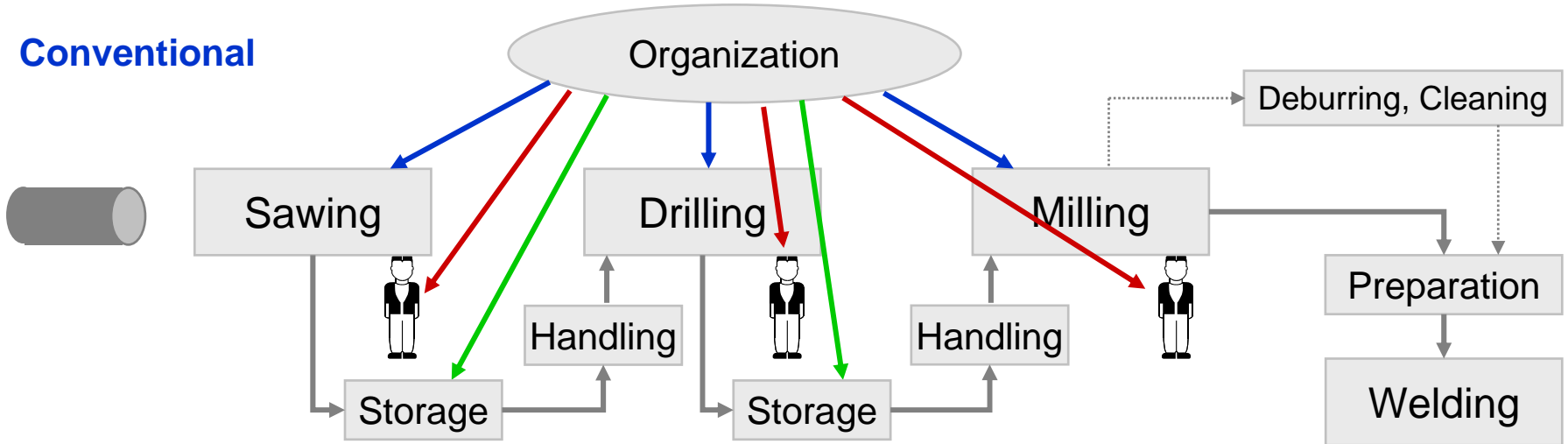
Heavy sections



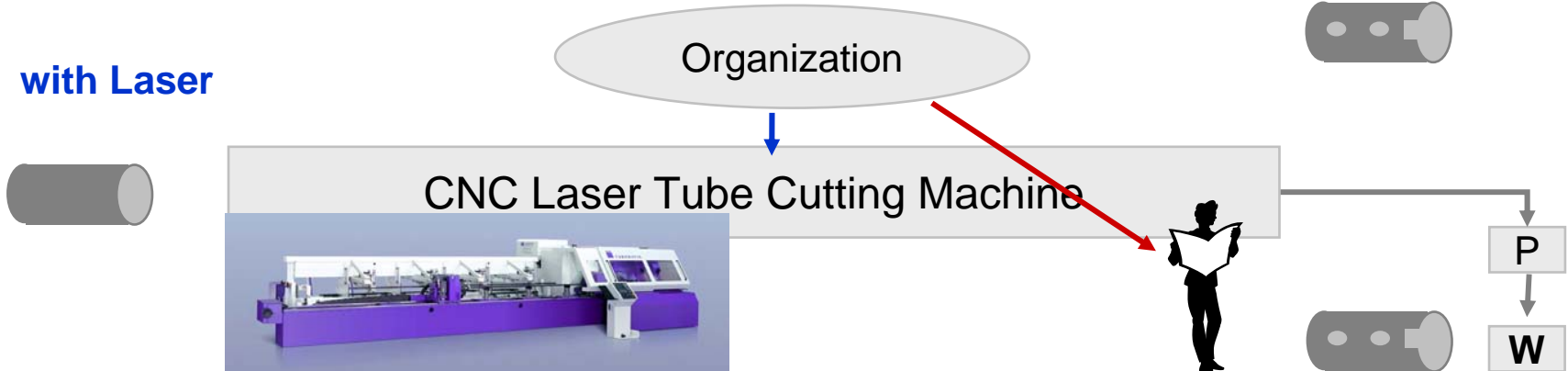


Tube Processing - Conventional vs. Laser

Conventional



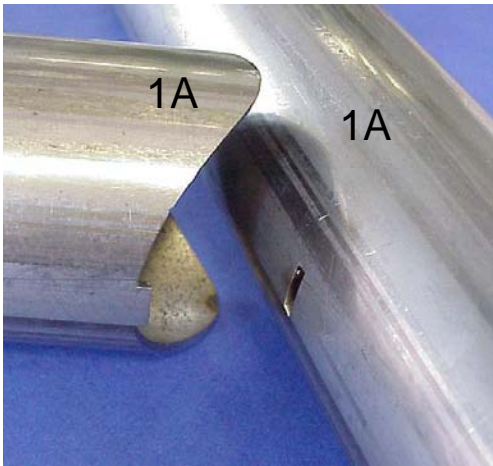
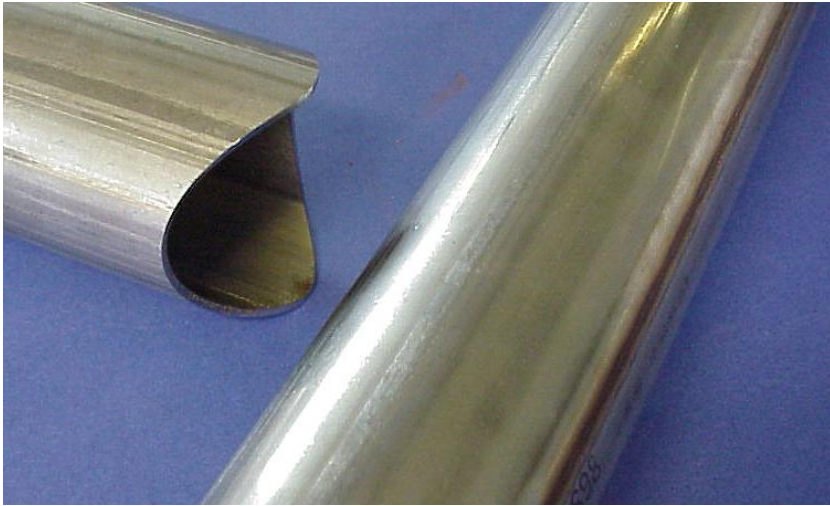
with Laser



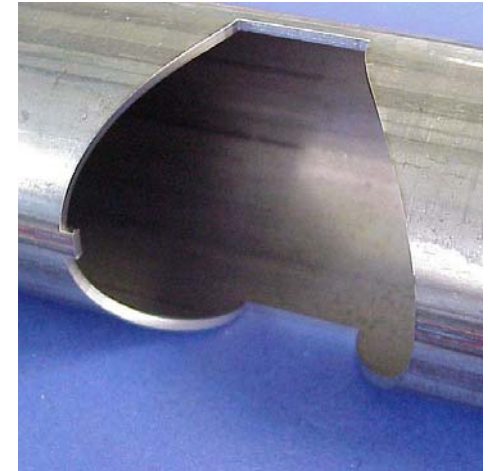
Innovative tube designs with a laser reduce subsequent process steps.



Innovative Tube Designs with Laser

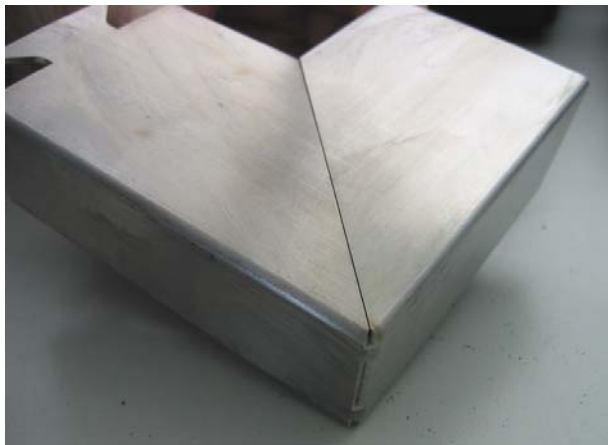


- ... simplify the preparation for welding
- ... prevent mistakes
- ... reduce or eliminate welding related efforts and/or costs





Innovative Tube Designs with Laser

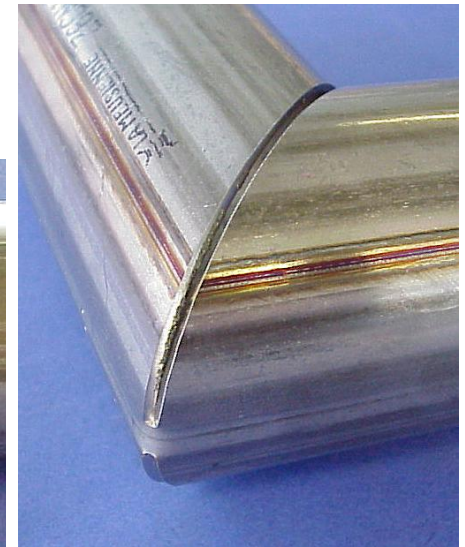
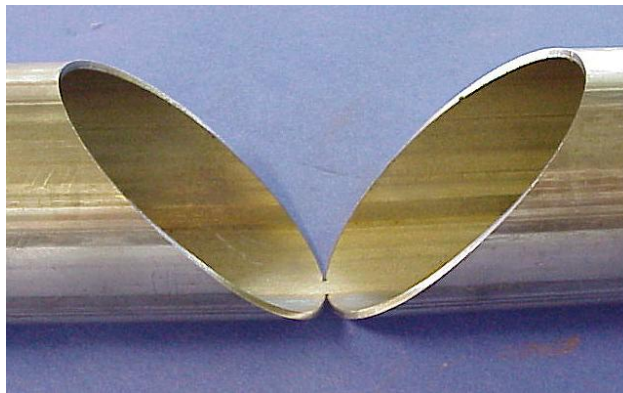


Locking tab connection (Micro-joint)

- ... reduce reworking (delay)
- ... allow new designs



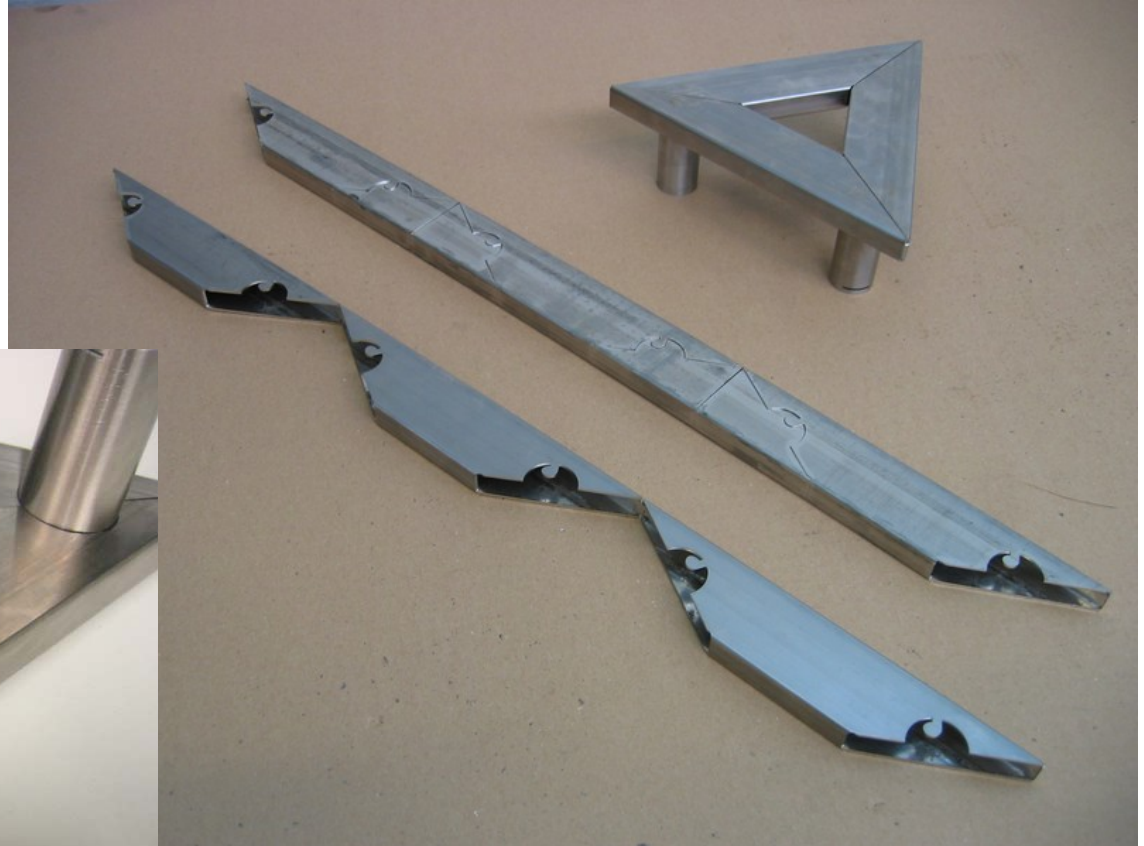
Time and cost savings for the entire production process





Innovative Tube Designs with Laser

- Locking tab connection
- Insertions with bayonet connector





Innovative Tube Designs with Laser

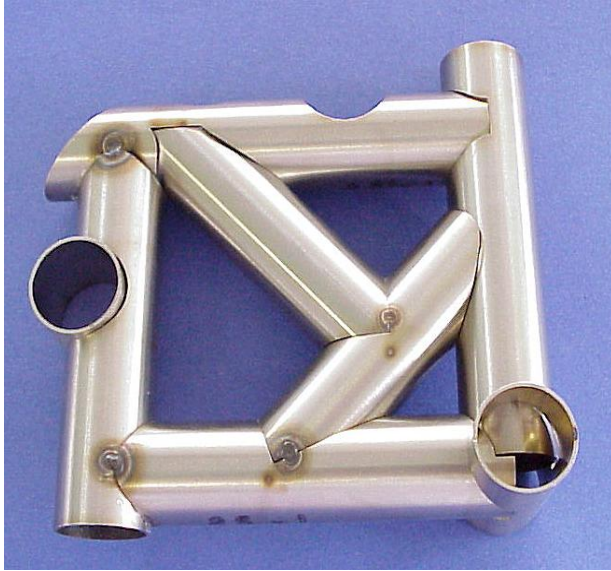


Fastening of a mounting plate

- Buttresses in tube for positioning
- Right- and left-handed positioning possible



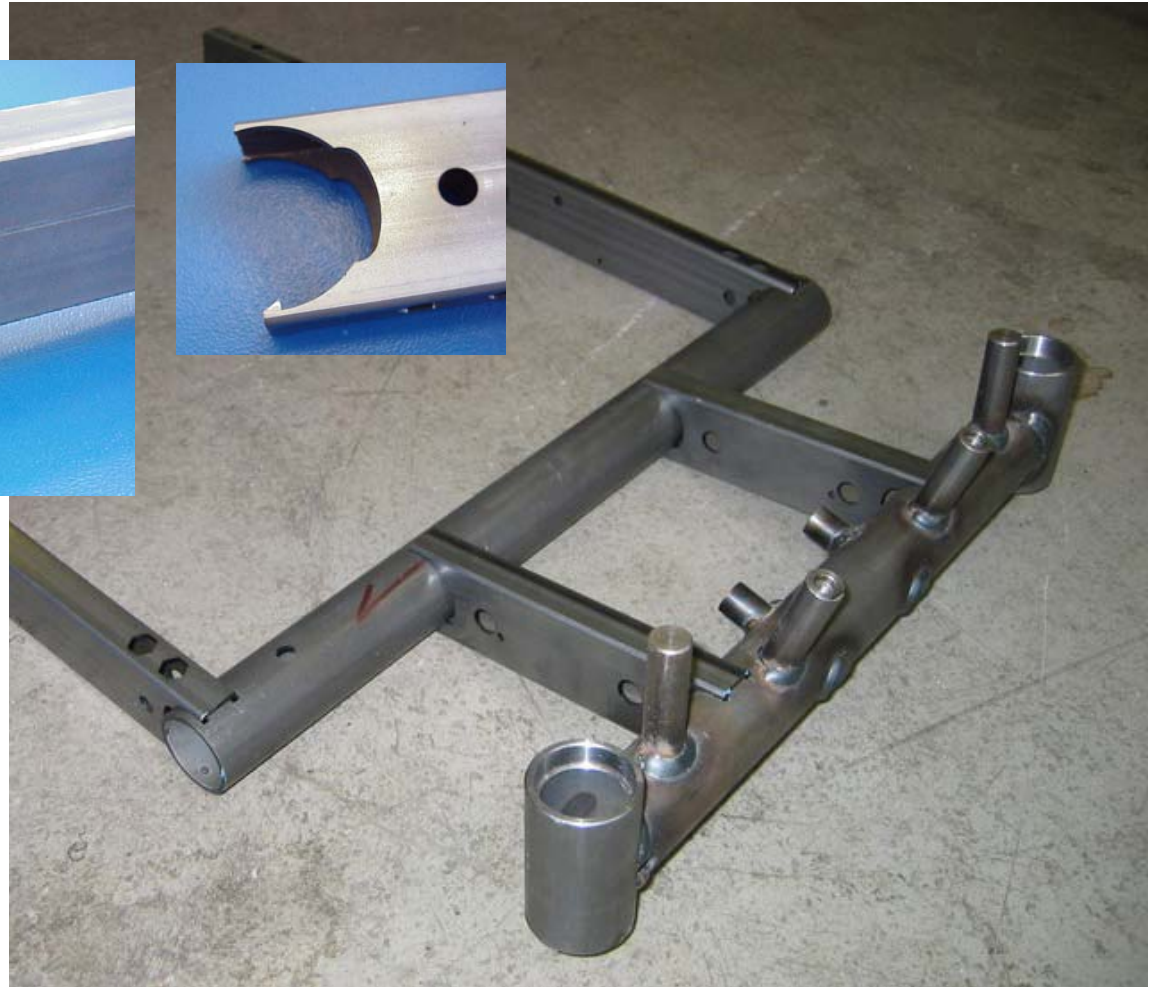
Innovative Tube Designs with Laser



- Tube insertions and tube attachments
- Tube-in-tube connection



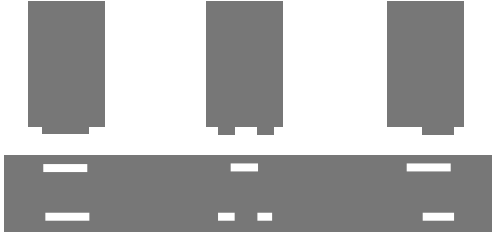
Innovative Tube Designs with Laser



- Attaching of tubes with different profiles
- The latches clip into the notches



Innovative Tube Designs with Laser



„Coding system“ to avoid assembly mistakes



Innovative Tube Designs with Laser

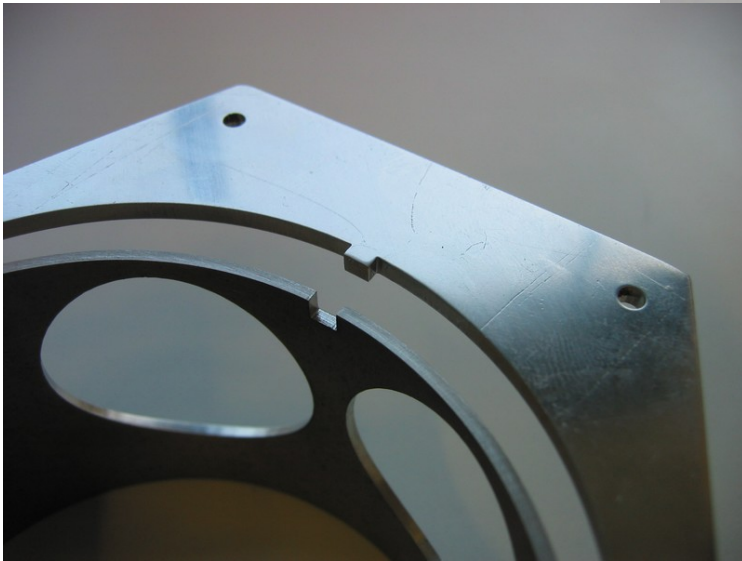
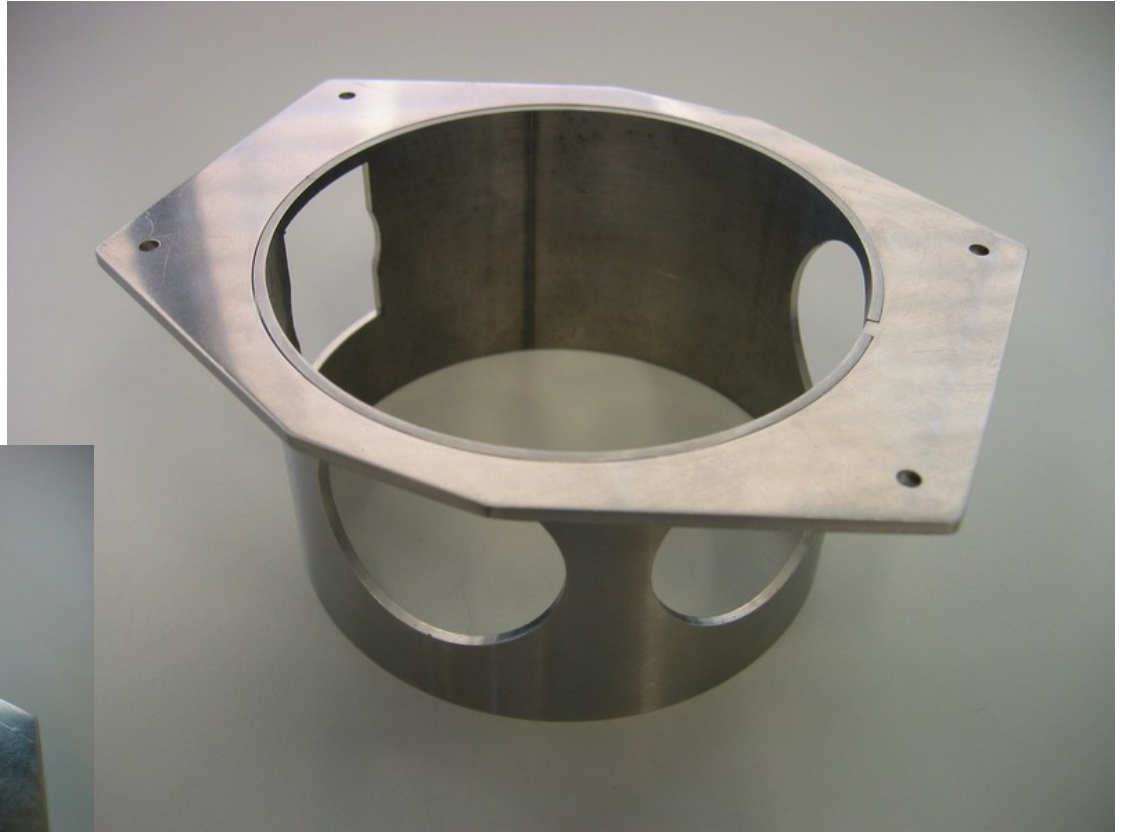


Positioning help for
welding jobs





Innovative Tube Designs with Laser



Accurate alignment for welding jobs -
without a fixture



Innovative Tube Designs with Laser



Flange for gas tight weldment
- milling of flange plate is not required

Interior view





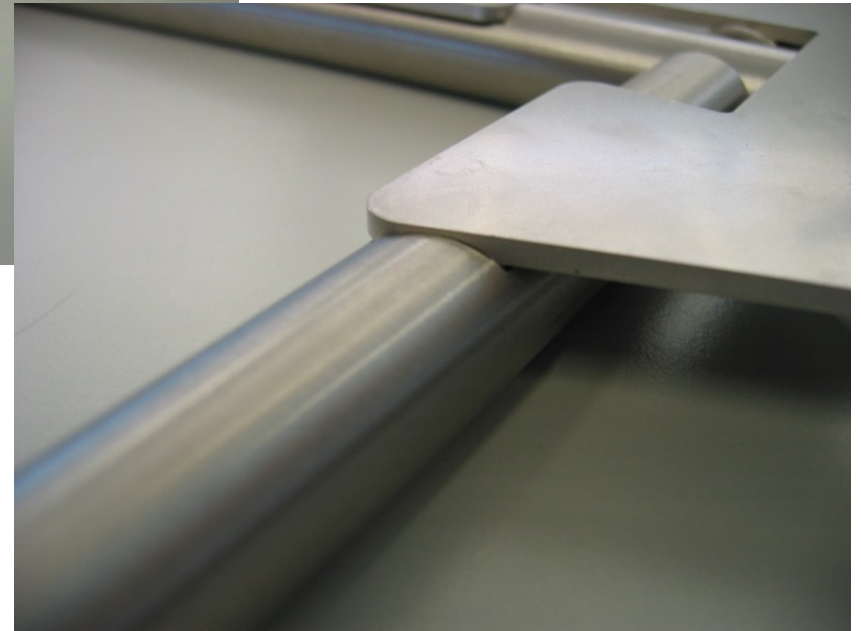
Innovative Tube Designs with Laser



Exact alignment between the flange and the tube



Innovative Tube Designs with Laser



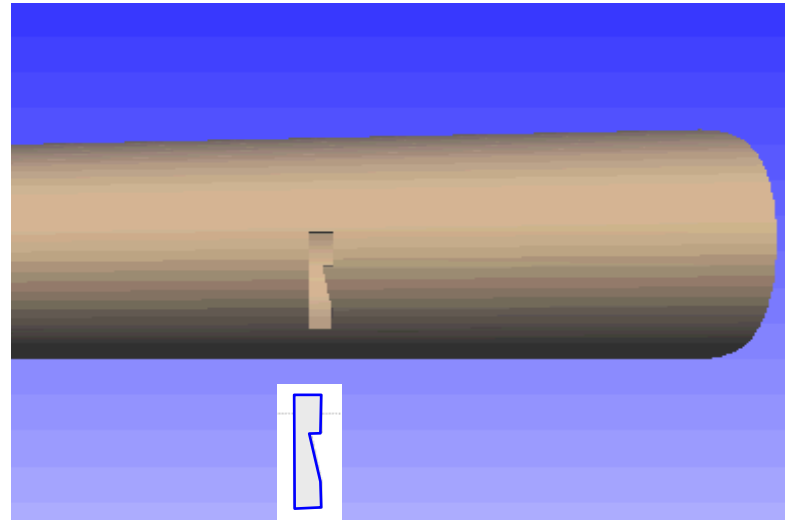
Strengthening of design with the use of sheet metal



Innovative Tube Designs with Laser



Durable connection
without welding





Innovative Tube Designs with Laser



Cable duct in aluminium
and stainless steel





Innovative Tube Designs with Laser



Punch / bending parts (small batches) cut from tubes with laser

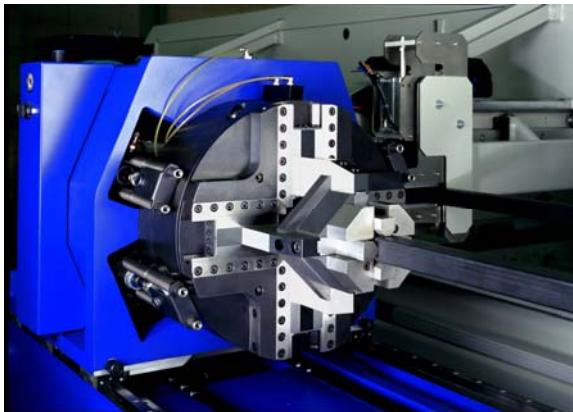


Innovative Tube Designs...

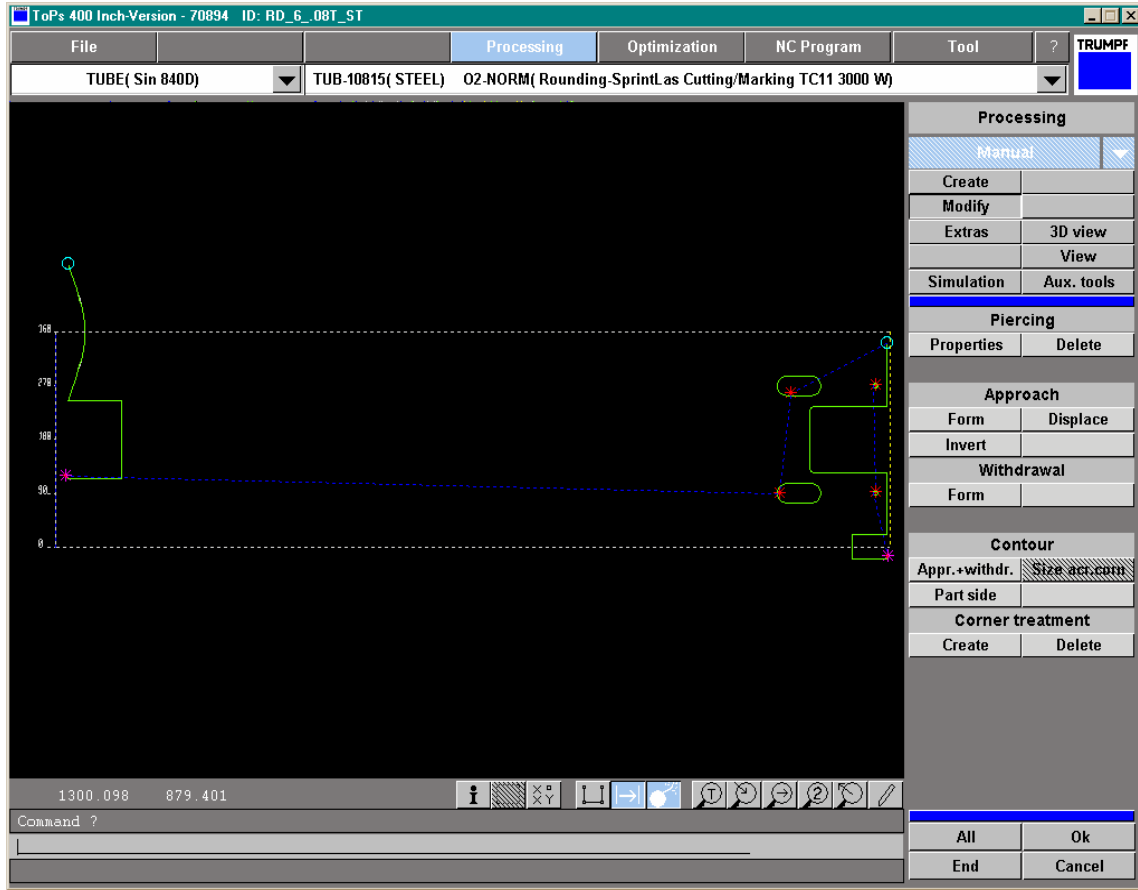
... allow

- new product designs
- process simplification
- reduced organizational expenses
- shorter response times
- reduced product costs





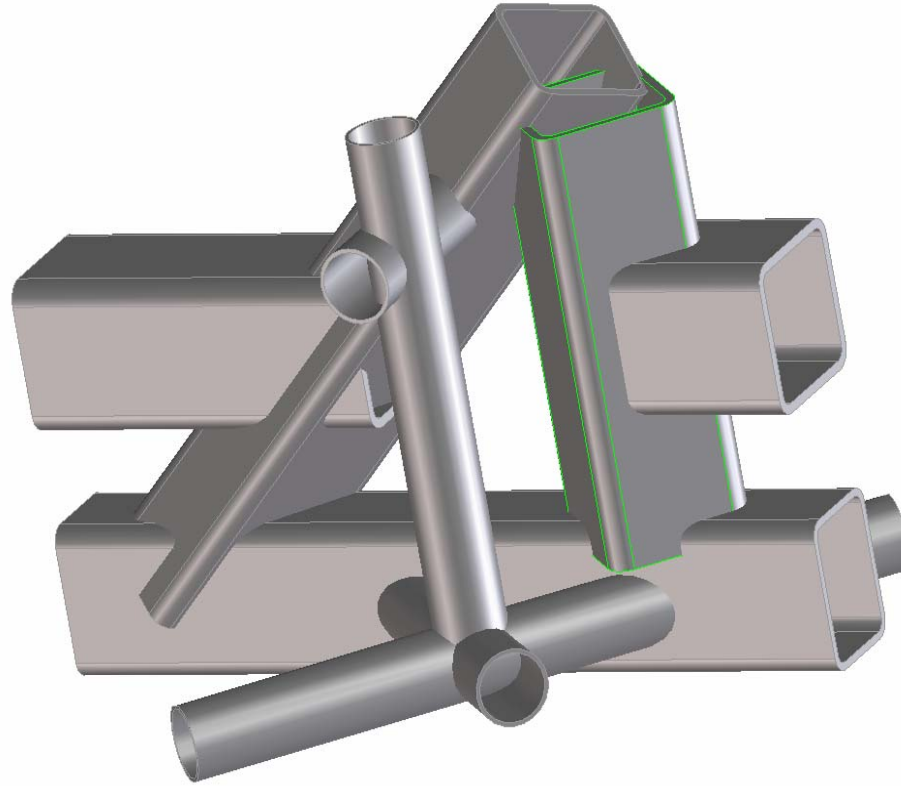
... with the laser tube cutting machine



- Easily processes Tube-to-tube interactions
- Miters, copes, tabs, cut-outs, and through projections are easily accomplished
- 3-D viewing of part



SolidTube - 3D Tube Assembly Design



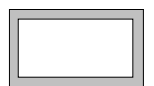
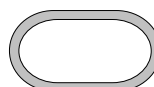
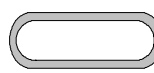


- Seamless tube design-to-programming



Profile possibilities

Standard cross-sections

Round tubes		Dmin = .75 in Dmax = 6.0 in
Square tubes		min = .75 x .75 in max = 6.0 x 6.0 in
Rectangular tubes		W/L ≥ 0.3 Wmin = .59 in Lmin = 1.18 in
Round oval tubes		W/L = 0.5 .59 ≤ W ≤ 2.56 in 1.18 ≤ L ≤ 5.120 in
Flat oval tubes		W/L = 0.25 .59 ≤ W ≤ 1.375 in 2.36 ≤ L ≤ 5.512 in

Max. Outside Diameter: 6-in. (150mm) Wall_{max} = .375" (10mm)