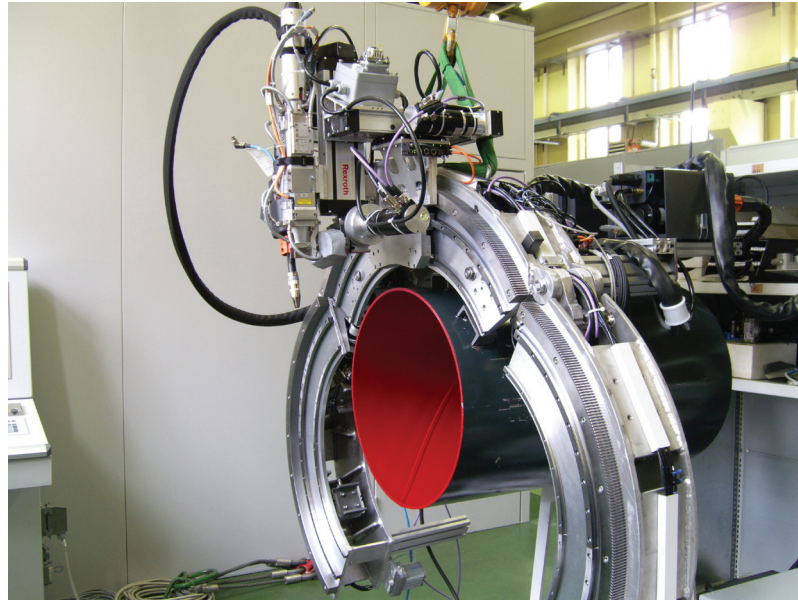


## Orbital GMA laser beam hybrid welding of large pipes

### Equipment

Girth welding process with hybrid welding head



### Hybrid welding process

Coupling of laser beam and arc in a common molten pool

thus

- higher tolerance compatibility compared to laser welding (gap, position)
- higher welding depth compared to GMA welding
- higher welding speed compared to GMA welding

Laser beam source (fiber laser) and GMA welding current source



### Advantages for pipeline construction

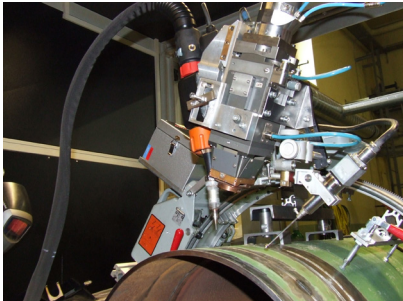
- reduction in number of passes and welding stations
- stable root formation without backing of the molten pool
- reduction in weld cross-section
- reduction in fabrication time

Developments on equipment and welding technology on laser beam GMA orbital hybrid welding

**Equipment**

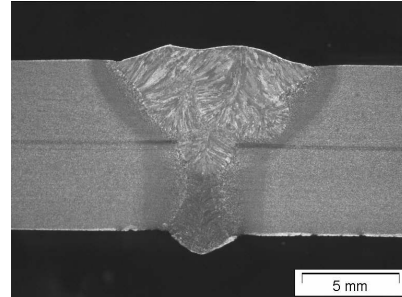
**State**

**Technology**



Laboratory trial with equipment available on the market

2007

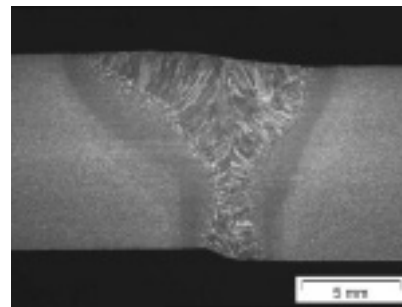


3 passes in 3 orbits at  $t = 8 \text{ mm}$



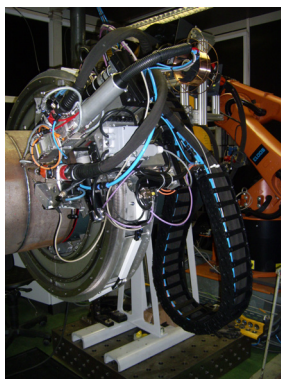
Field trial with equipment available on the market

2008



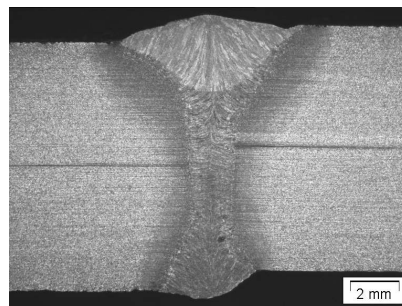
2 passes in one orbit at  $t = 10 \text{ mm}$

$v_s = 0.6 \text{ m/min}$



Specialised prototype

2009



2 passes in one orbit at  $t = 10 \text{ mm}$

$v_s = 1 \text{ m/min}$

Co-operation partner



**Contact**

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