Fronius
SHIFTING THE LIMITS

ARC WELDING – INDUSTRIAL CHALLENGES

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Perfect Welding
Froniusplatz
4600 Wels



WE HAVE THREE DIVISIONS
AND ONE PASSION:
SHIFTING THE LIMITS.



FRONIUS: Three divisions, one goal: technological leaps that set standards.

WHAT WE DO

/ We create new technologies and solutions for monitoring and controlling energy by shifting the limits of what is possible.

PERFECT CHARGING

Economical, flexible, unique

PERFECT WELDING

We master the arc like no other

SOLAR ENERGY

We must revolutionise the energy supply of our planet

THE SEEDS OF OUR NEW IDEAS



- Austrian based company
- 20 international Fronius subsidiaries
- Sales partners / representatives in more than 60 countries

/ As of December 31st, 2013

Fronius
SHIFTING THE LIMITS

1981
/ Worldwide launch of the first primary transistor switched inverter power source Transar 500

1993
/ Worldwide launch of the first primary switched inverter battery charging systems.

1995
/ Launch of the first grid connected photovoltaic inverter, Sunrise.

1998
/ Worldwide launch of the first digitally controlled MIG/MAG power sources. Beginning of the "digital revolution".

2005
/ Launch of Active Inverter Technology.

2005
/ Launch of CMT (Cold Metal Transfer).

2007
/ HyLOG (hydrogen powered logistics).

2012
/ Launch of the Fronius Agilo central inverter with revolutionary transport and installation system.

2013
/ Market launch of the innovative Fronius Galvo and the transformerless Fronius Symo.

2013
/ Launch of the first series production hydrogen-based fuel cells for intralogistics.

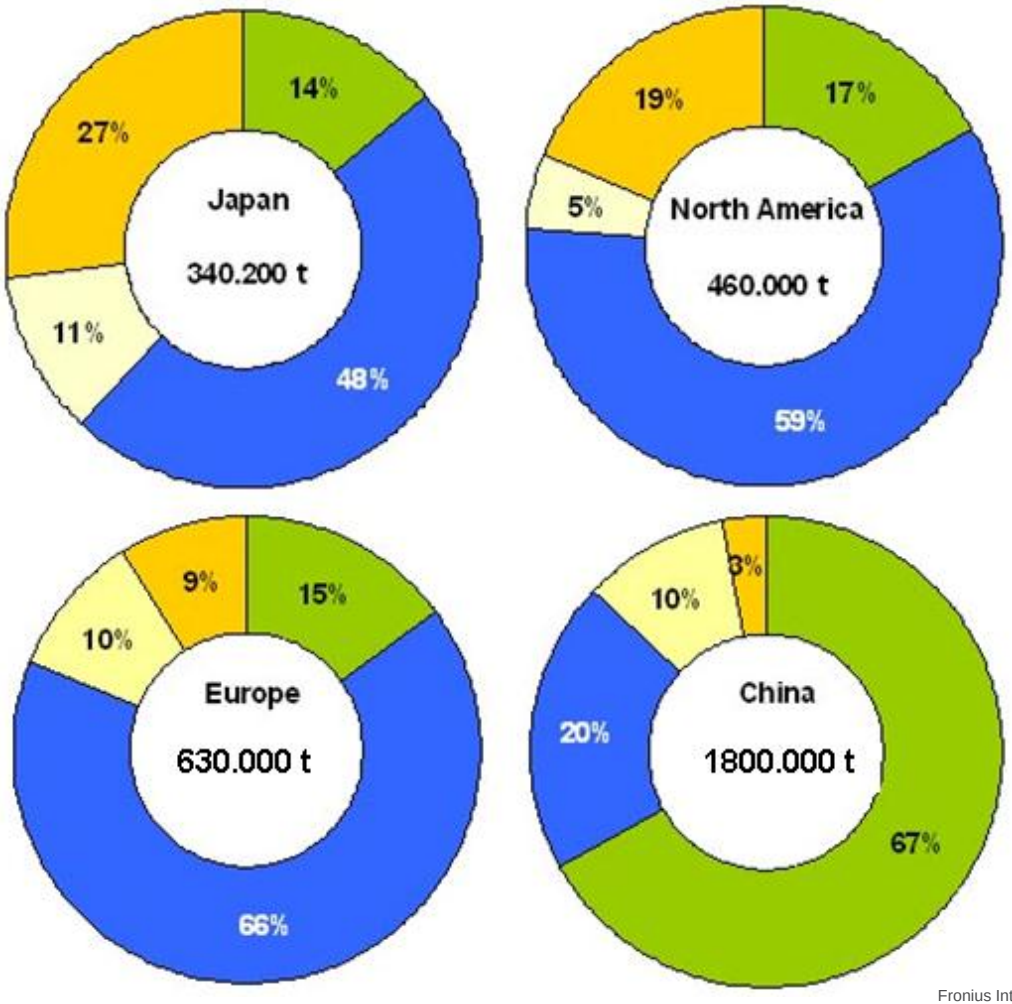
2013
/ Launch of the Intelligent Revolution: the TPS/i platform, with individually adjustable, expandable devices.

2013
/ Launch of the first MMA welding system, weighing a mere 11 kg and with a high-performance lithium-ion battery.

2013
/ Market launch of the Fronius Galvo and the transformerless Fronius Symo.

2013
/ Launch of the Intelligent Revolution: the TPS/i platform, with individually adjustable, expandable devices.

POTENTIAL OF ARC WELDING (2005)



Filler metal demands 2005

The Japan Welding News, Vol. 10; N

- covered arc welding
- gas shield/solid wires
- submerged wires/flux and others
- flux cored wires

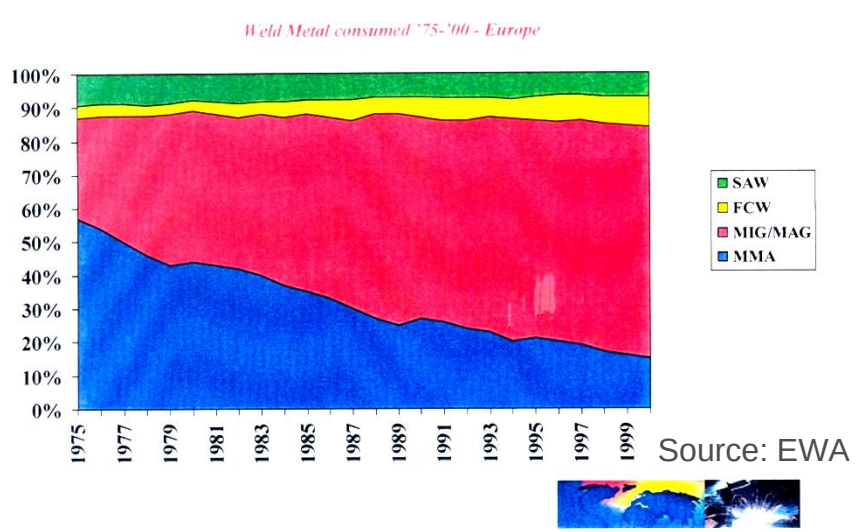
In total: 4,4 Mio. tons filler metal

equivalent to: ~650 Mio steel

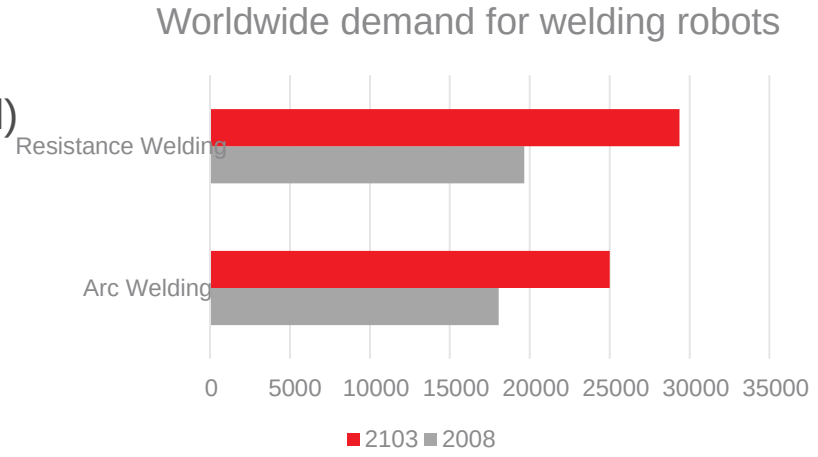
World steel production: 1 142 Mio. t

TRENDS IN ARC WELDING

- Shift in technology
  - Manual Metal Arc Welding will be replaced by Gas Metal Arc Welding
  - Hybrid processes (laser+arc) are improving
  - computerization of welding machines
- Shift to automation
  - increased use of welding robots
- Shift in metallurgy
  - new materials (High Strength Steels, Duplex Stainless Steels), new combinations (Steel/Al)
  - higher welding speeds (reflected in higher cooling speeds)
- Shift in know-how
  - end use based material and technology know how is significantly decreasing



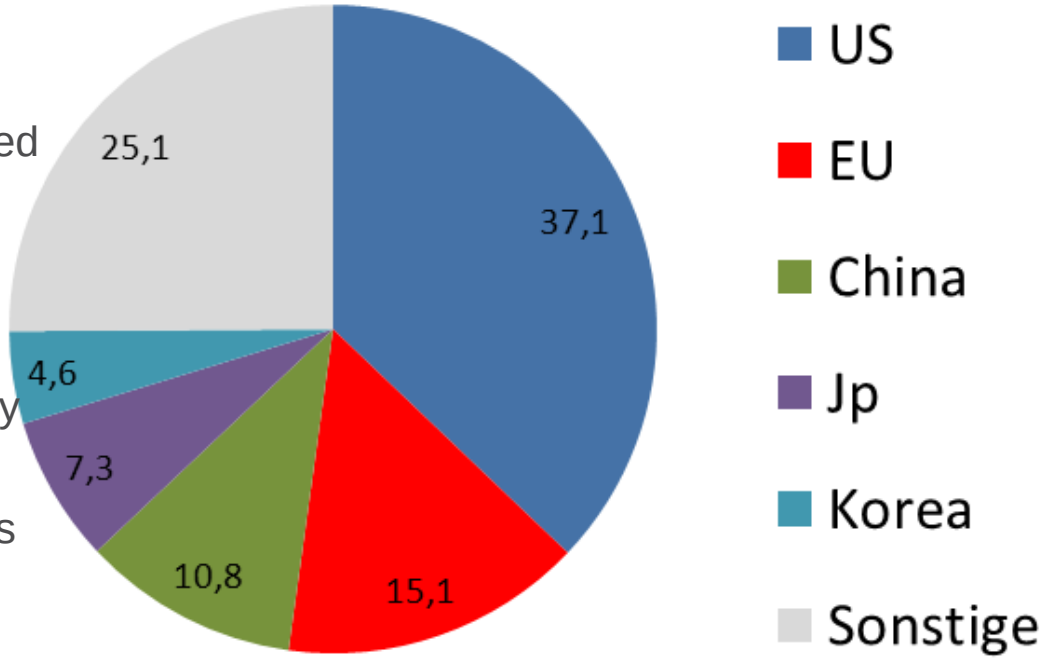
Source: EWA



WELDING EQUIPMENT & FILLER METALS: GLOBAL INDUSTRIES

- US-dominated market
  - Strong impact of US standards on European markets is expected
- China is catching up
  - Price sensitive competition is increasing
  - High and costly European quality level limits economic success
  - Savings based on know how loss
- Less scientific R&D in this field available

Market shares of equipment & filler metal companies



INDUSTRIAL CHALLENGES BASED ON ARC WELDING

- Gaining more process and metallurgical knowledge
- Online monitoring, process control and data documentation
- Sensotechnology for online detecting welding defects
- Sensotechnology for seam tracking
- Power electronics to increase the energy output and/or decrease design size of the welding power source
- „ Fit for purpose“ of welded steel/aluminum tailored blanks
- Development of automated welding solutions for new material grades in respect to static and dynamic loads
- Optimization of energy consumption of joining technologies
- Increase of workplace safety (reduction of hazardous fumes, radiation, electric shocks)
- Using high deposition rate of arc welding for Metal Additive Manufacturing







SHIFTING THE LIMITS

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