WELDING TECHNOLOGY 4.0

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AGENDA

/ Industry 4.0. My personal definition and impressions.

/ Welding technology 4.0. What does this imply on welding technology made by Fronius?

/ Challenges. What obstructive factors are currently present?

/ Conclusion. What has to be done?
Industry 4.0

My personal definition and impressions.
MY PERSONAL IMPRESSION

/ Industry 4.0 is a very successful marketing term in German-speaking countries. It is used to gain attention from politics and mobilize public funding. The customer response is yet unclear.

/ Industry 4.0 defines a certain kind of global product strategy. This strategy should be used by as many production equipment manufactures as possible to finally enable smart production.

/ Industry 4.0 awakened the marked. Every tech company wonders, whether or not all ICT-trends are incorporated correctly and in a sufficient way.

/ Industry 4.0 became quite annoying as a term, due to the fact that it is used always and everywhere by everyone.
Industry 4.0 is basically the demand to introduce team work!

What proofed to be right for humans should now be introduced between machines and humans and machines.

Production lines should be constructed of intelligent sub-components which are able to network, exchange data and finally cooperate perfectly.

These production lines should be able to handle a huge variety of products at production costs equal to those currently achieved by mass production.

The team work idea is not limited to the production itself. It also incorporates the suppliers and the customers.
MY PERSONAL DEFINITION

What constitutes team work?

- All members of the team understand each other – i.e. they speak at least one common language.
- All members of the team know the common goals and pursue them.
- All members of the team estimate their own skills and state correctly and communicate this information to the whole team. Work load is balanced accordingly.
- Team members help each other to solve problems – especially if common goals are endangered. Even unpredictable difficulties are solved as a team.
- There exists a team leader who is in charge of inducing these properties to his team.

→ All these properties have to be transferred to machine<>machine and human<>machine collaboration.
Welding technology 4.0.

What does this imply for welding technology made by Fronius nowadays?
(R)EVOLUTION - INVERTER WELDING MACHINES

Standard Inverter

Digital Revolution

Intelligent Revolution

1980

1998

2013
TPS/I – THE PERFECT TEAM

- New applications
- New processes
- Connectivity
- Future-proof
- Modular expandability

NO LIMITS
SPEED NET – THE TEAM LANGUAGE

/ ProcessBus
/ ControlBus
INTEGRATION, CONNECTIVITY, DATAMANAGEMENT
Challenges.

What obstructive factors are currently present?
SOME GENERAL QUESTIONS

/ Why does such a huge amount of different AC power socket standards exist? Not even within Europe we have a single standard - despite using 230V/50Hz!

/ The first, second and third industrial revolution happened a long time ago. Why do we have so many different standards for screws? Aren’t they used for the same purpose all over the world?

/ Homo sapiens left Africa roughly 100.000 years ago and spread all over the world. Why wasn’t it possible to establish a single, optimal language for all humans over this rather long period of time? Every human is, with regard to anatomical prerequisites, able to speak every existing language!
SOME GENERAL STATEMENTS

/ Humans by nature don’t want to be compatible!

/ Being **compatible implies** in some sense being **equal** – at least at the **interface**.

/ What’s **compatible** can be **compared** and subsequently **replaced**.

/ The *Babylonian confusion of tongues* is not God-given – it is **man-made**!
LINGUISTIC CONFUSION – INDUSTRY BUSSES:

IEC 61158

*Digital data communication for measurement and control - Fieldbus for use in industrial control systems*

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CONSEQUENCES

/ Standards at the interfaces enable communication (i.e. it has to be the same language). Limits in the communication content and speed limit innovation (e.g. field bus images).

/ Manufacturers of industrial equipment will stick to their own, probably optimal communication standards. As humans – they don’t want to be compatible.

/ The I4.0 requirement to interconnect all devices in a production place will only work out, if the devices are properly chosen – not all devices on the marked will be compatible! As soon as a single colleague in a team speaks a different language, the team will not work. The team leader has to take care.

/ Consequently the main challenge of Industry 4.0 from my point of view is to establish communication between a huge amount of industrial devices without sacrificing the overall system performance.
Conclusions.

What has to be done?
CONCLUSIONS

Communication requires compatibility in

- the physical layer (human: air pressure variation)
- the used protocol (human: one common language)
- the content transport (human: the content of spoken words has to be transported correctly)

Industrial devices have to be multi-lingual in the future. Simultaneous translators will help.

Manufactures of industrial devices have to build partnerships to establish the correct content transport. R&D collaborations between different companies will gain much more importance.

The demand to introduce team work on the shop floors will finally cause all well known issues from human interaction to reappear in our production equipment.

Well organized teams of devices and humans will revolutionize the way production takes place in the future. Fronius will be part of it!
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