Practical Experience in Requirements Engineering: Report on an Intercultural Project

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My Connection to Project

- Engaged in Software Engineering Group of Prof. Bothe for last 4 years

- Voluntary support in an international software project with a Russian customer

- Married to project manager Prof. Dr. Hans Schiemangk from Software Company PSI Metals, Germany

- Native Russian speaker

Contents

- Project Customer – a Tube Plant, Russia

- Solution Provider – PSI Metals Group, Germany

- Project: PSI*metals* MES for the Coating Lines in a Tube Plant

- Project Experience

  - Understanding Customer's Technical Requirements

  - Requirements Changes after Delivery of Specification

  - Late Change of Basic Production Process

- State and Perspective

Customer: Tube-Rolling Plant, Russia
Product: Big Tubes

- **One of leading steel tube producers**
  Founded 1942, behind the Urals, 25.000 employees

- **New factory for big tubes**
  Maximum dimensions
  - Length: 18 m
  - Diameter: 1.400 mm
  - Wall thickness: 45 mm

- **Basic production process**
  - Forming plates to tubes by bending
  - Welding
  - Coating inside and outside

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Solution Provider: PSI Metals GmbH, Germany
Product: PSI*metals* MES

- **PSI Metals - Subsidiary of PSI Corporation, 250 employees**
  - PSI = **P**roducts and **S**ystems of **I**nformation Technology
  - World's largest software supplier for Production Management Solutions in the metals industry since 2009

- **PSI*metals* MES - Standard Manufacturing Execution System**
  - Supports the whole business process in metals industry
  - Includes planning, control and tracking of production
  - Framework for MES implementation projects

- **Project specification - Text document that describes**
  - Business processes as use cases/scenarios
  - Interfaces between MES and surrounding systems
        e.g. SAP and Process Automation systems
  - Contents of GUI screens and their usage

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Software Excellence in Metals

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- ‣ Production & Quality
- ‣ Automation
- ‣ Logistics
- ‣ Energy
- ‣ Cockpit
- ‣ System Technology
- ‣ SAP Integration

Locations

Production Management Solutions for the Metals Industry.

As a manufacturer of steel or non-ferrous products, you ensure your competitive edge by delivering the products to your customers in the agreed quantities and qualities as well as on schedule.

N E W ! **PSI***metals* **5** combines the former, in parallel existing solutions from AIS, PSI BT and 4Production into one new integrated solution.

ERP / SAP
Planning   Quality
PSImetals
Logistics   Production
Energy   Automation
Cockpit
Base Automation

The PSI*metals* 5 solution line is an end-to-end approach for the overall supply chain caring for all the needs of the metals industry. From your supplier to your customer, PSI*metals* 5 offers powerful and tailor-made products to support all processes from planning to execution within your supply chain always considering the complexity of metals production.
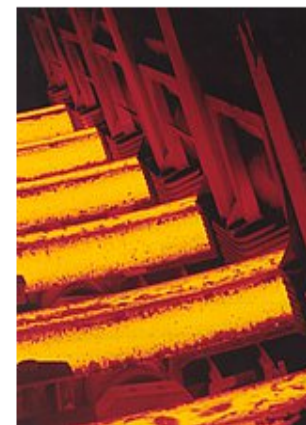
Steel production

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Project: Coating Line MES
Some Specifics

- Implementation of PSI*metals* MES for the Coating Lines in a new Tube Plant

- Customizing to project-specific needs
  - Highly configurable rule-engine
  - Predefined built-in functionality extension points
  - Extensible data model

- Time difference between Urals and Berlin: 4 hours

- Three languages: English, Russian, German
  - Official project language: English
  - Bilingual documents: English and Russian
  - Communication via translator: Ru←→Ge, Ru←→En

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Understanding Customer's Technical Requirements

- Translation-based problems
    - Customer's original Russian documents have been translated to English by the contractor for delivery to PSI
    - This introduced errors and created misunderstandings
    - Time consuming clarifications were needed

- An example:
    - My husband found an "impossible" material flow step in English version of technical requirements
    - I studied Russian version and translated it into German for exactly understanding the material flow
    - Copy-and-paste mistake in the English text detected

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Requirements Changes after Delivery of Specification

- In many projects new requirements and changes arise at that point in time when the customer shall sign-off the delivered specification.

- Root cause: Customer's experts retrace and check the specified business processes as a whole before final confirmation.
  Often they detect bugs and gaps only now.

- An example:
  - My husband asked me to translate a Skype-call from Russia
  - Russian project manager requested two new features
  - He explained his reasons
  - We negotiated specification changes

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Numbered e-mails
for Specification Changes

1. Change: A message must be fired at an earlier material flow event

Betreff: MALCLP-PSIBT-22: Remarks for chapter 6.1.5.1 of specification
Dear Hans!
Chapter 6.1.5.1 T_Porder - we propose that the following:

First tube of the production order was processed within the coating line	First L2-telegram T_ProcComplC and/or T_ProcCompOC	2 = started

Should be changed to

First tube of the production order was processed within the coating line	First L2-telegram T_TubeInfo($CustomizabilityFlag=1$)	2 = started

2. Change: Add a button for starting the work on an order manually

Subject: PSIBT-MALCLP-59: New Button 'Start PO' for the coating line
Hello Konstantin.
PSI will extend the specification for the coating line, chapter 4.2.2.
The screen "D2000 Production Order" gets a new button "Start PO".
If an operator pushes this button for a coating related production order
then PES automatically sends all necessary telegrams T_PrimaryData
to L2. The status of the production order will be changed to 2=started.

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Late Change of Basic Production Process

- Summer 2010 - Production process in customer's requirements:
    First inner and thereafter outer coating of tubes

- Spring 2011 - PSI visited the factory with plant engineers.
    IT persons learned that this process doesn't work:
        Heating that is needed for outer coating,
        would destroy inner coating

- Final specification considers the reversed order of the two coating steps:
        First outer and thereafter inner coating

Expert's Comment on Specification

line. The resulting material flow is as follows (<u>normal case</u>):	с помощью роликового конвейера на линию нанесения покрытий. Общий поток материалов выгляди следующим образом (нормальный случай):

• Arrival via roller conveyor	• Подача через роликовый конвейер	
• Inner coating	• Участок нанесения внутреннего покрытия	
• Outer coating	• Участок нанесения внешнего покрытия	**Kommentar [A4]:** Наоборот – сначала нвружка, затем внутрянка
• Final acceptance area	• Участок окончательной приемки	

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State and Perspective

- Start of specification phase: October 2010

- Confirmation of specification: June 2011

- First presentation of Coating Line MES to customer:
  August 2011

- User training: October 2011

- Software delivery and commissioning:
  End of 2011