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Ingenuity for life*

Quality Assurance in Procurement System of Siemens

19-20 October 2016, Moscow, Atomex 2016

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*Изобретательность для жизни

QA in Procurement of Siemens Steam Turbines

- Table of content -

QA in Procurement of Siemens Steam Turbines

- Business Unit Key Figures -

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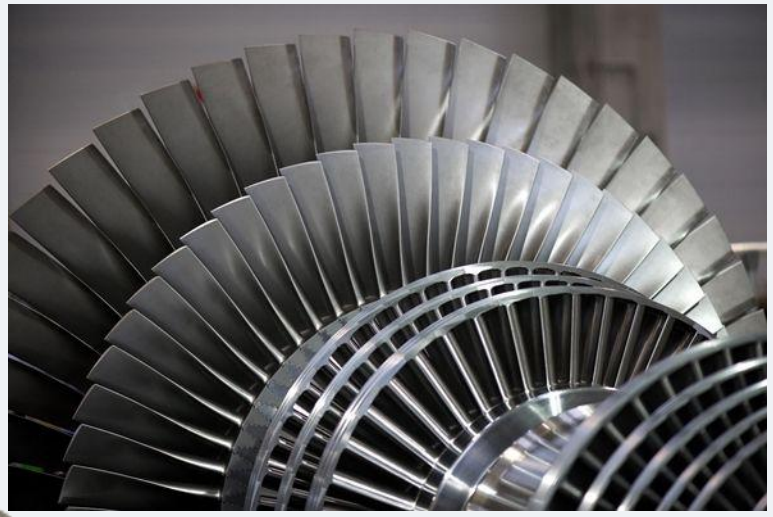
- Steam Turbines in the power range of 40 kw to 1900 MW
- 6000 employees
- 17 locations all over the world



Siemens Steam Turbine: Procurement

- Main Commodities in Procurement -

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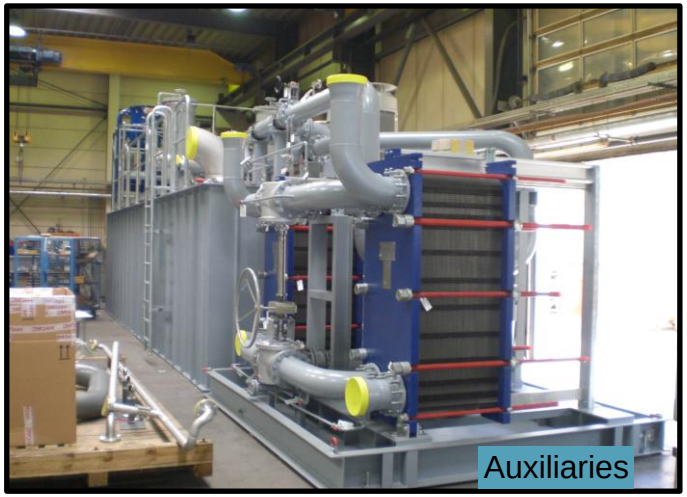
Main Commodities:

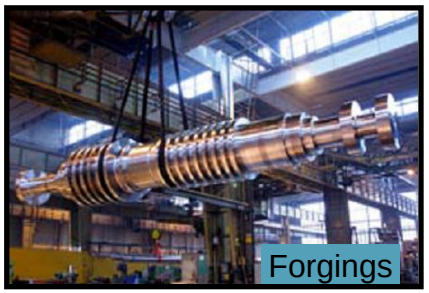
- Large Steel Fabrications, e.g. Low Pressure Steam Turbines Casings
- Castings, e.g. High Pressure Turbine and Valve Casings
- Forgings, e.g. Turbine Rotors
- Bearings
- Auxiliaries, e.g. Supply Oil Module


Auxiliaries


Large Steel Fabrications


Bearings


Castings


Forgings

QA in Procurement of Siemens Steam Turbines

- Supplier Qualification & Monitoring of qualified suppliers -

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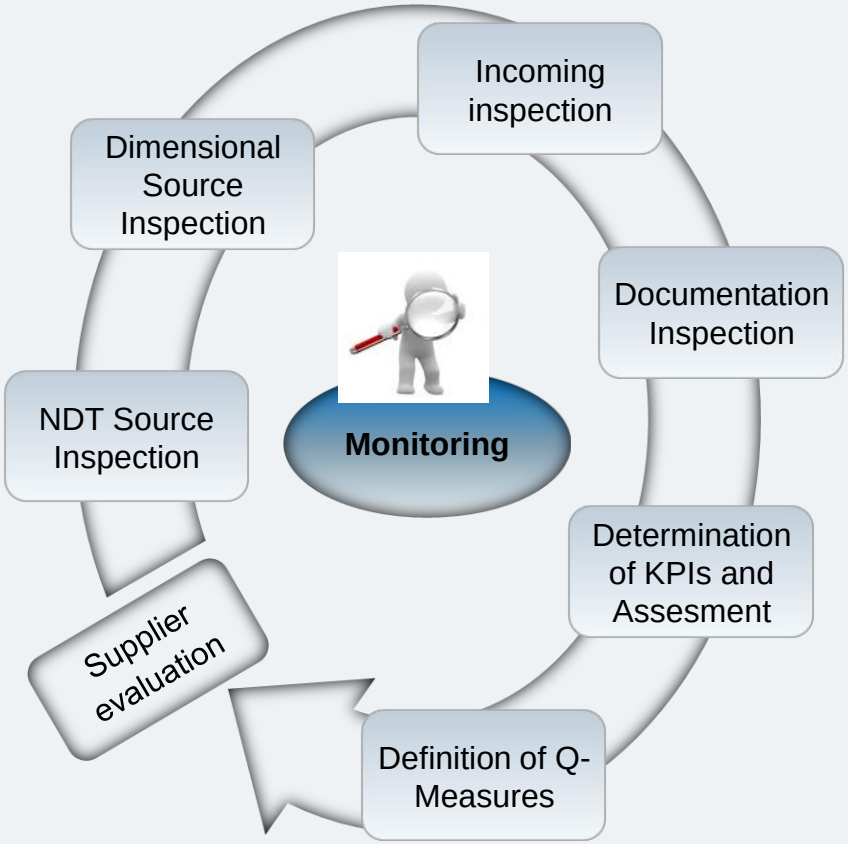
Supplier Qualification

Product & Process Qualification

Qualified supply base

Inspections & quality monitoring



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- Supplier Qualification Processes -

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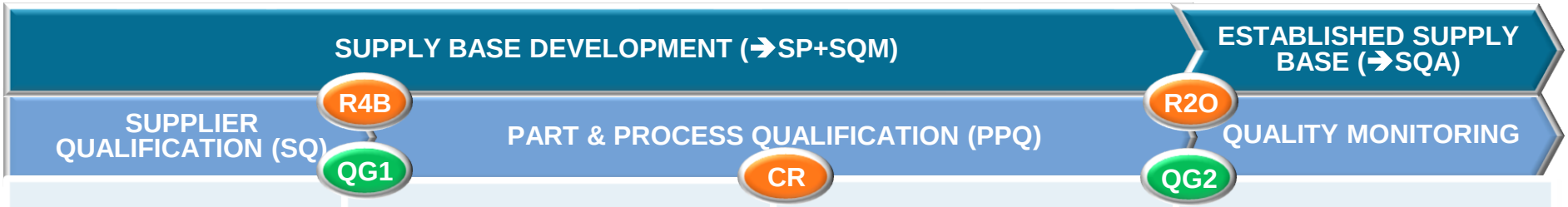

- Market analysis
- Non-disclosure agreement
- Request for quote
- Supplier self description
- Initial supplier visit
- Assessment of supplier capabilities
- Risk assessment (supplier and product risk)
- Supplier audit (ISO 9001)

➔ ***Status: Ready 4 Business***

- Definition of risk mitigation measures (QTA) and PPQ scope
- **Quality Gate 1:** internal approval of PPQ scope and reason for PPQ
- PPQ Kick-off meeting at supplier: explanation of specs and definition of witness
- Training on documentation and NDT requirements
- Assessment of the part-specific manufacturing process and approval of MQCP
- Manufacturing of the 1st PPQ part
- 100% Siemens FAI (MT/PT, UT, VT) and dimensional inspection
- Update of MQCP and definition of further PPQ action items
- Freezing of manufacturing process

➔ ***Status: Conditional Release (for that specific part)***

- Manufacturing of the potential following PPQ parts
- Reduced Siemens source inspection scope (MT/PT, UT, VT)
- **Quality Gate 2**: internal evaluation of the supplier's performance (quality, OTD and documentation); closure of PPQ and handover to Operational Procurement

➔ ***Status: Unconditional Release (for that specific part)***

- Constant evaluation of quality-relevant information from suppliers
- early detection of non-conformances
- alignment of inspection scope and frequency to supplier`s quality performance

➔ Quality Assurance Agreements (QAA) or Self Releases in case of sustainable quality performance

R4B ***Ready for Business:*** *All necessary documents have been set up and signed. A first trial order can now be Placed at the appropriate supplier.*

CR ***Conditional Release of PPQ:*** *The manufacturing process has been developed, documented in the MQCP and verified by at least one part/ set and frozen for all further parts/ sets.*

R2O ***Ready to Order (= Unconditional Release of PPQ):*** *The documented and frozen production process has been validated by at least one further part/ set. This leads to an unconditional release of the PPQ. The supplier is handed over to op. purchasing and serial production started.*

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- Time for completion of a PPQ -

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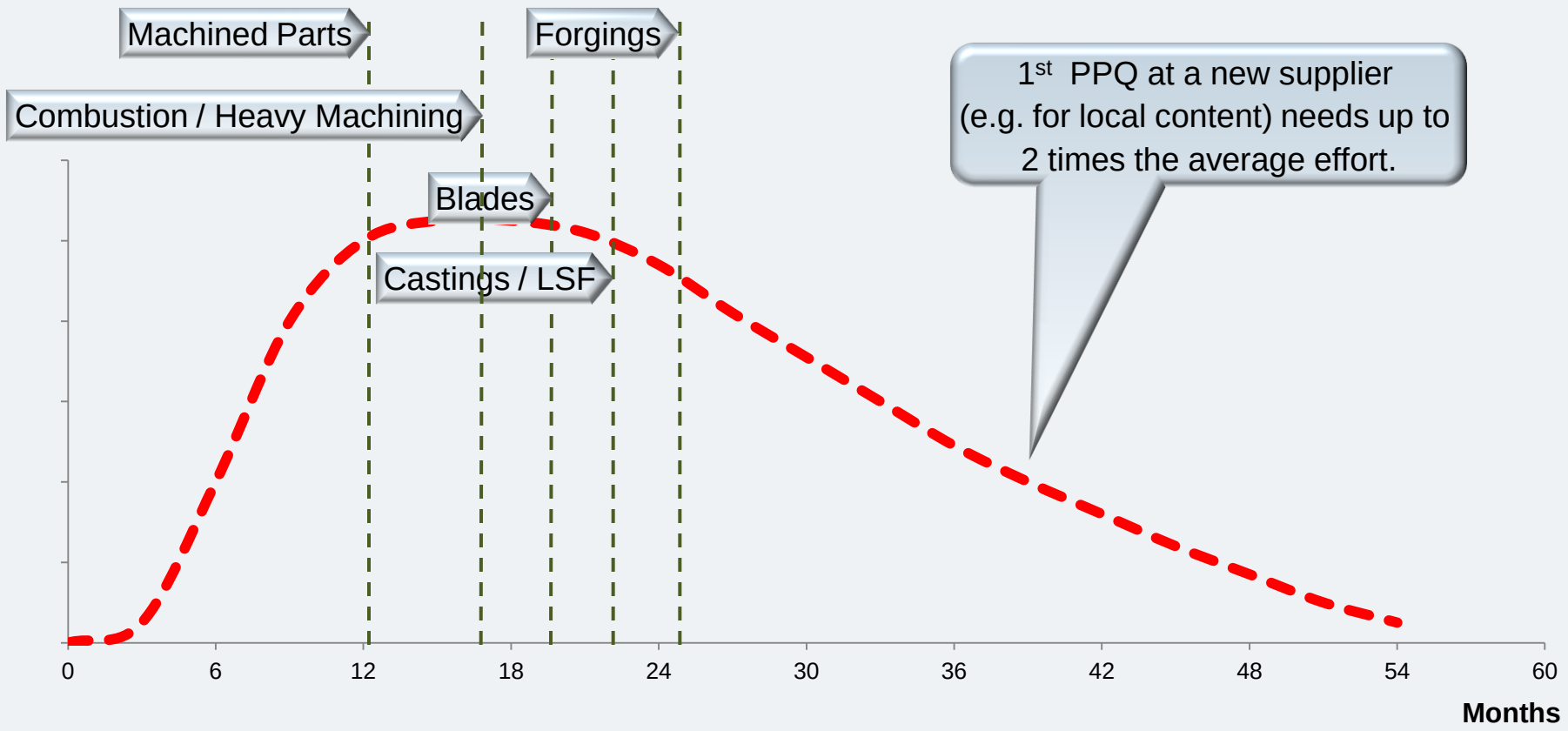

Cycle time per PPQ differs from 6-48 months, average value at 18 months.

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- Quality inspection @ supplier -

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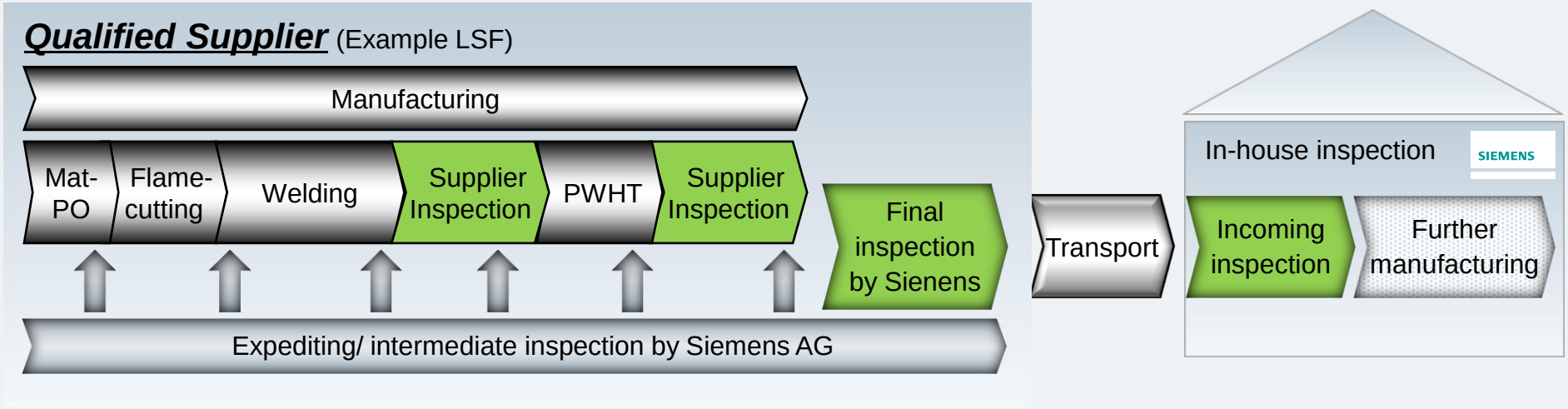

Typical content of source inspections:

- Dimensional inspection
- Surface crack inspection: PT, MT
- UT Test
- Visual inspection
- Documentation Check

Handling of inspection indications:

- Defects from inspections are documented in inspection protocols as well as quality notifications
- Presence of Quality Notifications prevents delivery of the component

Correction of defect is guaranteed

QA in Procurement of Siemens Steam Turbines
- Inspection of Quality Documentation -

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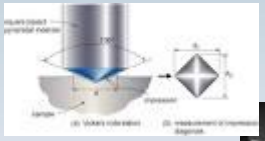
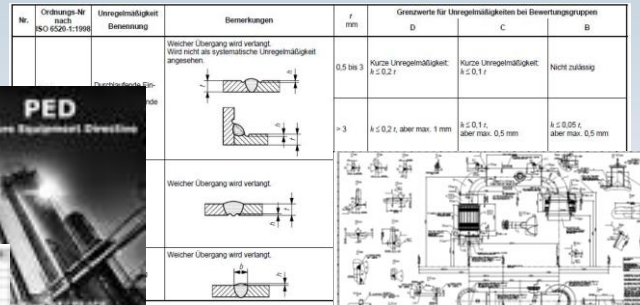
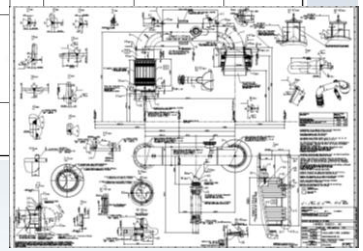
Check of conformity between order specifications and delivered component documentation

- Compliance with required codes and standards
- Dimension records
- Material properties: e.g. chemical composition, mechanical properties

  heat treatment records
- NDT results etc.

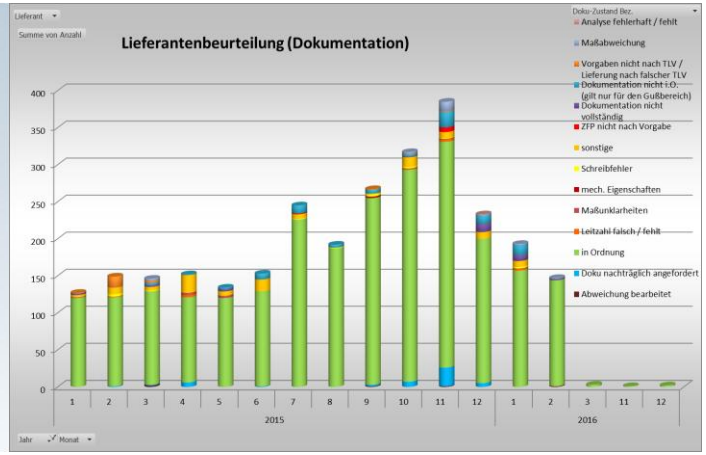






Analyse deviations and define counter measures for future projects

- Definition of corrections, corrective and preventive actions in case of quality defects
- Improve manufacturing and quality processes at supplier base



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- Evaluation of inspection results: NDT-Scorecard -
(Example: LSF Commodity, all suppliers)

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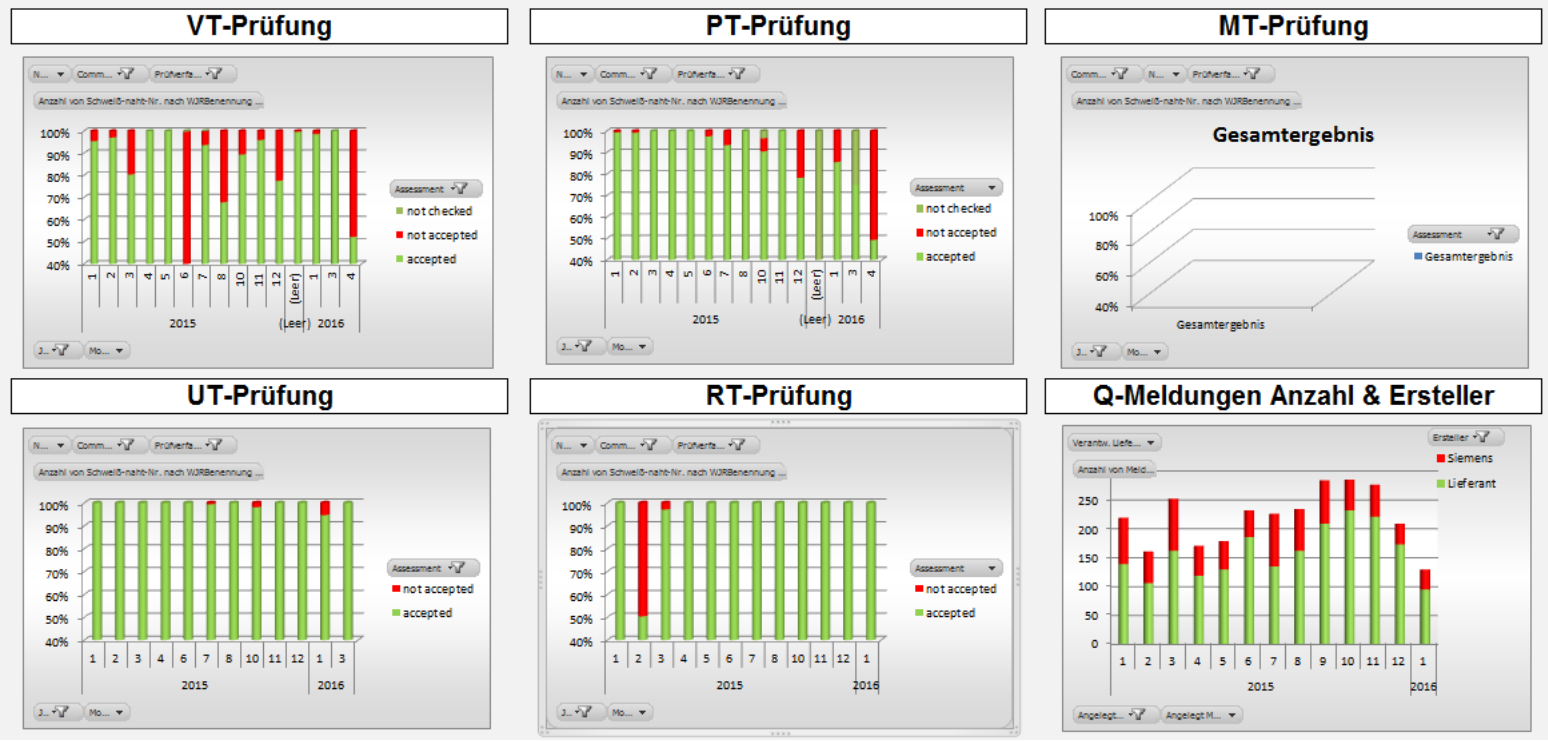

Supplier Quality Scorecard:

- Individual Scorecard maintained for each supplier
- Scorecard captures monthly results of NDT-inspections
- Inspections results are recorded for each single weld joint

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- Cost and Process Scorecard -

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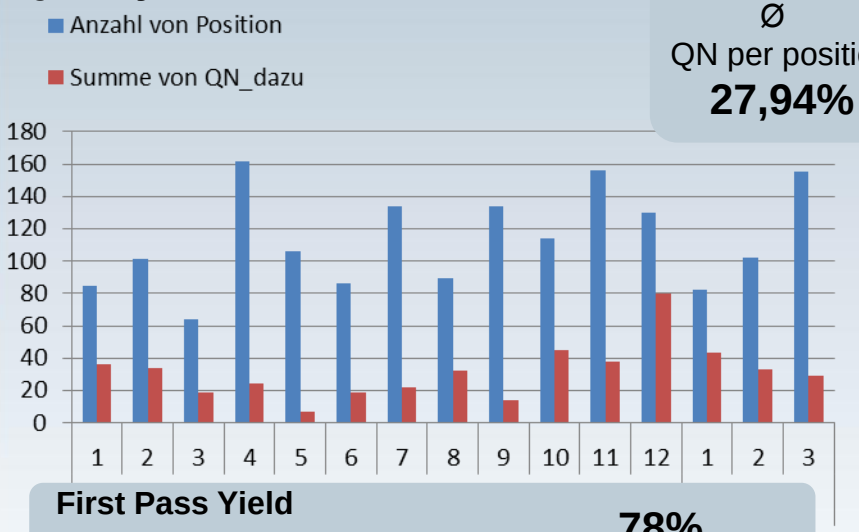
Quality Notifications:



Ø QN per position **27,94%**

First Pass Yield (Documentation quality) **78%**

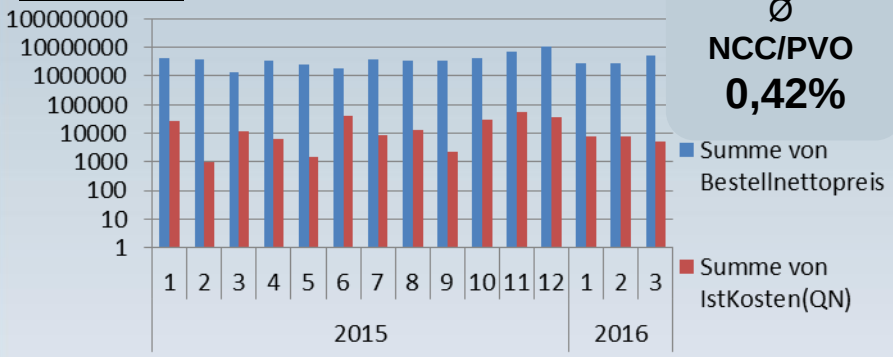
Processual observance:

Documentation upload on time (2 days before delivery, or earlier) **90%**

Inspection calls on time (14 days before delivery, or earlier) **88%**

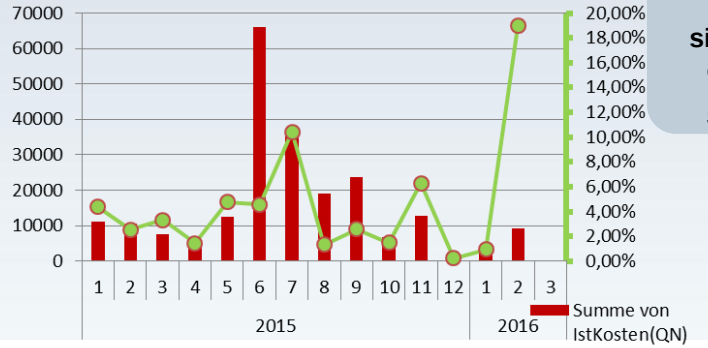
OTD (Source:Procurement) **95%**

NCC/ PVO:



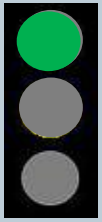
Ø NCC/PVO **0,42%**

Relative significance of defects:



Ø **Relative significance of defects** **5,22%**

Quality Index:
91 %



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