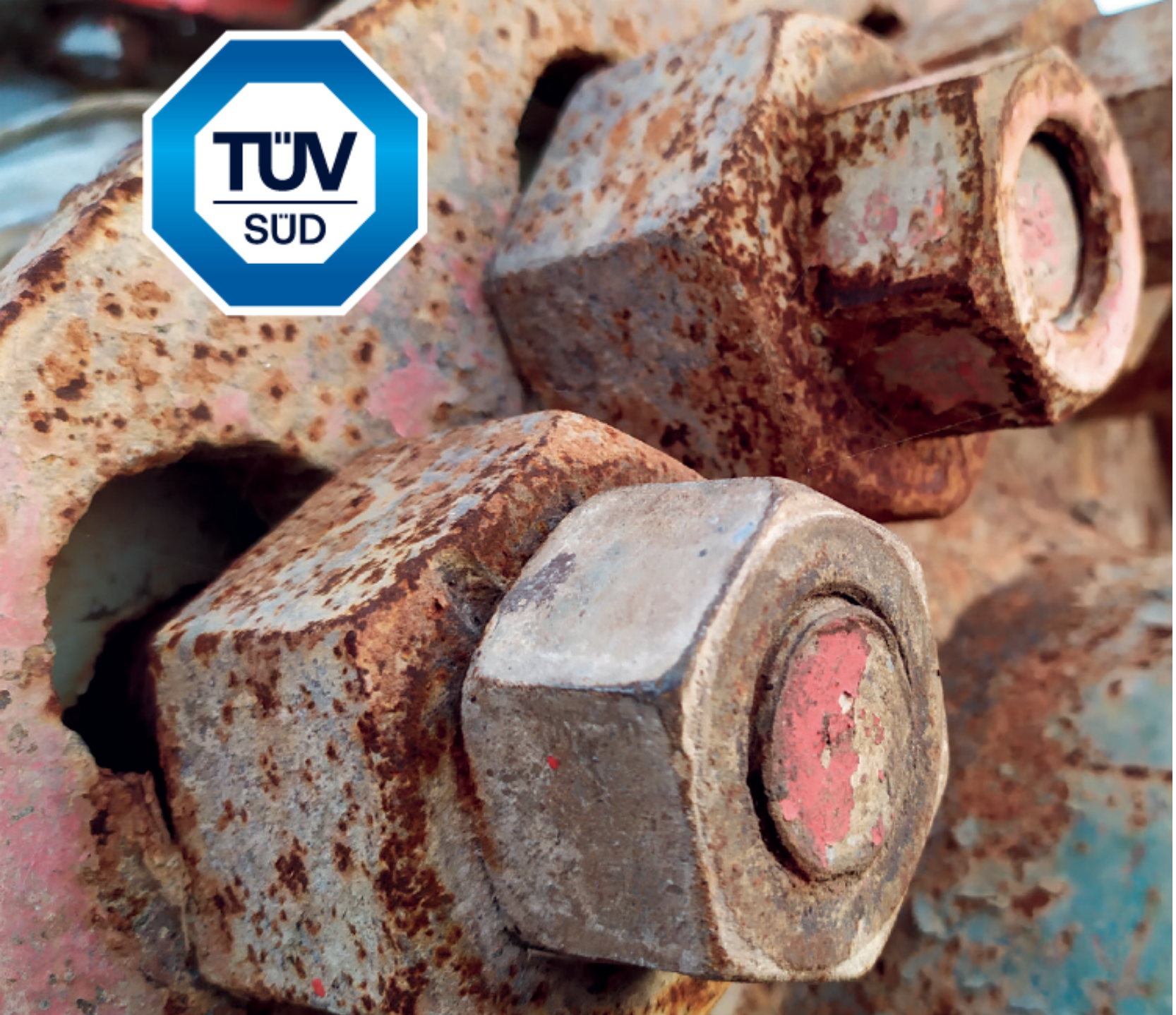


International Bolting Engineer

Your expertise for secure bolted connections

11.05.2026 // Anika Lamm

Add value.
Inspire trust.

PROGRAM OVERVIEW
Holistic training in three specialisation modules

WHO CAN PARTICIPATE?

✓ Engineers from industry (manufacturers, OEMs, quality managers, expert assessors, etc.)
✓ Technicians and foremen (supervisors)

STRUCTURE:

✓ Up to 10 days-day basic training
✓ 3 specializations, each 4 days
✓ 50% practical exercises, calculations, and workshops
✓ Speakers´ language is English or German with English interpretation
✓ Training materials will be provided in English

WHAT IS TAUGHT?

✓ Comprehensive understanding of holistic interrelationships (basic + specialization modules)
✓ In-depth knowledge of what, how, and why tasks are performed, including liability & documentation (specialization module)

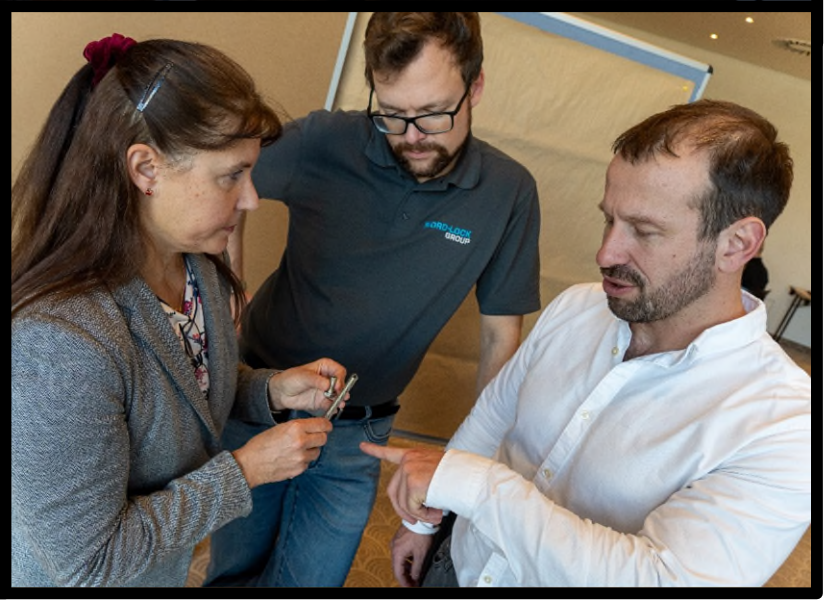
WHY IS IT NECESSARY?

✓ Qualification to act as a responsible person in design, calculation, planning, and quality assurance (basic + specialization modules)
✓ Competence to be appointed as a supervising person and act as a link between responsible parties and executors (specialization module)

The speakers (IN ALPHABETICAL ORDER)

- ✓ Prof. Christian Denkert* PhD (Engineering) | Duale Hochschule Sachsen | Rail Vehicles - Design & Calculation
- ✓ MEng Marc Beutelspacher | Innovandom | High-torque bolting technology – Bolting Supervisor Level 3
- ✓ MEng Markus Fischer* | SCS Concept S.r.l. | Rail Vehicles - Assembly & Tools
- ✓ MSc Frank Götz* | Nord-Lock GmbH | Steel Construction - Design & Calculation, locking security for bolted joints
- ✓ MEng Carmen Hebestreit* | Matjeschk-Power Tools GmbH & Co. KG | Steel Construction - Assembly & Tools
- ✓ PhD (Engineering) Cornelia Heermant | Böllhoff GmbH & Co. KG | Failure analysis
- ✓ Rainer Janecke* | Stahlwille GmbH & Co. KG | Basic & Specialization - Assembly & Tools
- ✓ PhD (Engineering) Robert Kauer | IWE | TÜV SÜD | Flanged Joints - Inspection & Evaluation
- ✓ MEng Thorsten Kokot* | IWE | SLV Halle GmbH | Steel Construction - Inspection & Evaluation
- ✓ MSc Anika Lamm* | IWE | TÜV SÜD | Trainigsdesign & Fundamentals
- ✓ PhD (Engineering) Manfred Schaaf | AMTEC GmbH I Flanged Joints - Design & Calculation
- ✓ MSc Stephan Schöckle | AMTEC GmbH I Flanged Joints - Design & Calculation
- ✓ MSc Denny Schwotzer** | IWE | TÜV SÜD | Guidelines, Laws, Standards
- ✓ MEng Jörg Skoda | IDT Dichtungstechnik GmbH I Flanged Joints - Design & Assembly

*** Certified Fastener Engineer (DSV)® / Certified Fastener Technician (DSV)®**
**** International Bolting Engineer TÜV SÜD**



Contents - Basics: Design & Calculation 3 days

Design & Calculation

- Terms: Torque, Preload & Clamping Force
- Failure mechanisms
- Influencing factors between target and aim
- Calculation method according to VDI 2230-1
  - Evidence against gaping, slipping, tightness, fatigue, interfacial pressure
  - Spring model & tension diagram (assembly and operating status)
  - Compliance – Changes in the Tension Diagram

Contents - Basics: Materials 1 day

Materials

- Mechanical properties of material
  - Chemical Basics, Microstructures & Lattice Structures, Stress & Strain
- Residual stresses and notches
- Solidification mechanisms
- Types of stress
- Materials Testing Methods
- Component Testing Methods
- Steel markings
- Heat treatment
- High-temperature materials

Contents - Basics: Failure analysis 1 day

Failure analysis

- Failure analysis according to VDI 3822
  - Terms, documentation, description of dimensions
  - Damage Hypotheses & Knowledge Management
- Fracture & cracking processes
- Failure Locations & Fracture Types
- Causes of damage in distinction
  - Design flaws
  - Manufacturing defects
  - Operational errors
- Prevention

Contents - Basics: Basic correlations 2 days

Basic correlations

- Coating systems and corrosion protection
- Friction coefficients and their testing
  - Static friction parting joint
  - Sliding friction assembly
- Fasteners and auxiliary joining parts
  - Mechanical Engineering & Automotive
  - Rail vehicles
  - Steel construction
  - Fuse Elements
- Guidelines, laws, standards

Contents - Basics: Assembly & Tools 3 days

Assembly & Tools

- Overview of assembly tools
  - 1-10,000 Nm Functionality and Manageability
- Framework conditions for tool selection
  - Area of application + selection criteria
- Confidence in the tool
  - Proof of Skill, MCT (machine capabilitiy test) vs. Calibration
  - Other Testing and Validation Methods
- Methods according to DIN EN ISO 6789-3
- PCT (process capabilitiy test) – Initial assembly

Contents - Specialization Mechanical Engineering and Rail Vehicles 4 days

Design & Calculation

- Requirements profile and special features
  - Materials & Design Principles
  - Areas of application (flying structures, railway applications, machine RiLi)
- Deviations in national and international implementation regulations
- Calculation procedure according to
  - VDI 2230-1/2
  - Railway applications EN 17976 vs. DIN 25201

Assembly & Tools

- VDI 2862-2 & VDI/VDE 2647 Screwdriving Systems and Tools
- VDI/VDE 2645 MFU
- Minimum Calibration Requirements - Certificates of Competence
- Assembly Methods and Test Methods
  - Coefficient of Friction & Lubrication
  - Compensation of settling phenomena
  - Special features of the use of safety elements
- Storage & handling of tools and aids

Inspection & Evaluation

- Security Needs
- Test Process Suitability and Application Guidelines for Further Torque according to VDA 5.2
- In-series testing & test process suitability (MSA)
- Documentation obligations and checklists
- Certificates and Qualifications
- Disassembly / Reassembly
  - Loosen, clean, rework
  - Permit to work & work instructions

Contents - Specialization Steel Construction 4 days

Design & Calculation

- Connection categories in steel construction
- Influence on load-bearing behaviour, planning and assembly
- Introd. to the DASt Guideline 024
- Target levels in steel construction (planning, execution, control)
- Design classes (EXC1–EXC4) according to EN 1090-2 and their significance for bolted joints
- Requirement profile and special features: materials, flanges / clamping parts, design principles, additional loads, corrosion, bending, bolted joint cases

Assembly & Tools

- EN 1090-2 and ÖSTV-RL 007
- Small vs. large torques
- Space-constrained bolted joint positions
- Tightening method according to EN 1090-2 / DASt 024 and measurement technology
- Operating behavior, loosening and releasing, locking security for bolted joints
- Measuring and displaying tools and auxiliary joining parts
- EN 1993-1-8 / EN 15048/ EN 14399
- Tolerances and pilot hole preparation

Inspection & Evaluation

- Building Regulatory Requirements & Proof of Conformity & Construction Products Regulation
- Bolting process test according to EN 1090-2 Annex H
- Small vs. large torques
  - Post-assembly process
- Measurement System Analysis (MSA)
- Permit to work & work instructions
- Ageing & Damage Admissibility Limits for Shape Deviations
- Documentation and checklists

Contents - Specialization Flanged Joints 4 days

Design & Calculation

- Types of flanges, gaskets, bolts and locking elements
- Differentiation AD 2000 B7/B8, EN 13445, EN 13480, EN 1591-1 and ASME B16.5
- Calculation method: Strength and tightness verification according to DIN EN 1591-1
- Introduction to the Amtec calculation program
  - Load cases, influence of seals, materials, ...
  - Pressure-temp. relationships, additional loads, settling behaviour

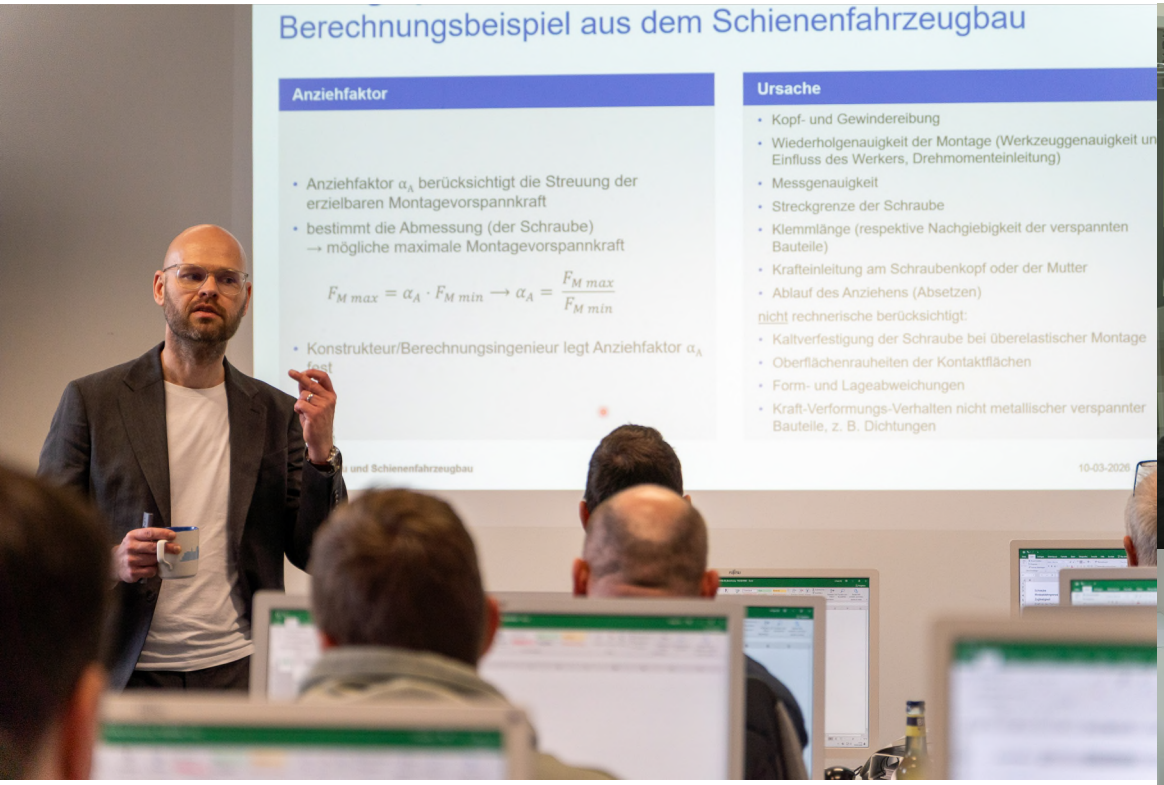
Assembly & Tools

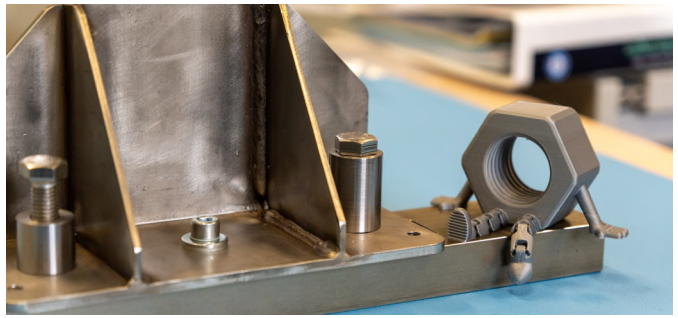
- Special tools and aids for flange mounting: small vs. large torques
- Mounting influence of sealing surfaces and seals in combination
- Tightening methods and sequences for flange connections
- Tolerances and conditions for professional installation
- Disassembly / Reassembly
  - Loosen, clean, rework
  - Storage & Handling on Construction Sites
- Trouble-Shooting & Test Methods

Inspection & Evaluation

- Ageing & damage Admissibility limits, e.g. for shape deviations or damage to the sealing surface
- ASME PCC-1
- Media influence: corrosion, diffusivity, embrittlement & leak tests
- Permit to work & work instructions
- Documentation and checklists
- Certificates and Qualifications,
- Periodic inspection, visual inspection and other NDT on flange connections

Impressions





Impressions