MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

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FACILITIES ENGINEERING AND MANAGEMENT - BOLTED AND FLANGED CONNECTIONS

"Ensuring Integrity, Safety, and Reliability of Pressure-Containing Connections in Critical Facilities"

Schedule

Date	Venue	Fees (Face-to-Face)
21 – 25 Dec 2026	London, UK	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

Bolted and flanged connections are critical components in facilities across the oil & gas, power generation, petrochemical, and manufacturing industries. Failures in these joints can lead to catastrophic leaks, safety incidents, and costly downtime. Understanding proper design, installation, inspection, and maintenance practices is essential for maintaining integrity and performance.

This 5-day intensive training course provides engineers, technicians, and maintenance personnel with in-depth knowledge on bolted joint design, flange standards, gasket selection, torqueing techniques, and failure prevention. The course blends theoretical principles with practical applications to help ensure the safe and efficient operation of pressurized systems.

Objectives

By the end of this course, participants will be able to:

- Understand the engineering principles behind flanged joint design and performance
- Apply correct assembly, tightening, and inspection practices for bolted joints
- Identify causes of joint failure and implement corrective measures
- Select appropriate flange types, gasket materials, and fasteners for specific applications
- Implement maintenance and integrity assurance strategies aligned with industry standards

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Why Attend

- To reduce the risk of leaks and pressure failures in critical facilities
- To ensure compliance with international standards such as ASME, API, and EN
- To improve reliability and longevity of pressure-retaining equipment
- To learn best practices for installation, inspection, and torque verification
- To align engineering, maintenance, and HSE goals through joint integrity

Target Audience

This program is designed for:

- Facilities and maintenance engineers
- Mechanical and piping engineers
- Integrity and inspection specialists
- Plant supervisors and technicians
- Project, HSE, and reliability engineers

Individual Benefits

Key competencies that will be developed include:

- Bolted joint assembly procedures and torque control techniques
- Flange classification, material selection, and stress evaluation
- Gasket behavior and troubleshooting sealing issues
- Application of standards such as ASME B16.5, ASME PCC-1, and API 6A
- Inspection, testing, and root cause analysis of joint failures

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Enhanced plant safety through leak prevention and controlled tightening
- Improved equipment reliability and reduced unplanned maintenance
- Compliance with industry codes and mechanical integrity regulations
- Increased efficiency in shutdowns and turnarounds
- Standardized procedures across engineering and maintenance teams

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings: Engineering standards, joint integrity frameworks, and safety implications
- Case Studies: Real incidents of flange leaks and bolting failures
- Workshops: Torque calculation, flange alignment, and gasket selection
- Peer Exchange: Field experiences and lessons learned in joint integrity
- Tools: Bolt load calculators, inspection checklists, and tightening diagrams

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Course Outline

Detailed 5-Day Course Outline

Training Hours: 7:30 AM – 3:30 PM **Daily Format:** 3–4 Learning Modules | Coffee breaks: 09:30 & 11:15 | Lunch Buffet: 01:00 – 02:00

Day 1: Fundamentals of Bolted and Flanged Connections

- Module 1: Introduction to Joint Integrity and Flanged Systems (07:30 – 09:30) • Importance of bolted joints in pressure-containing systems
- Module 2: Flange Types, Ratings, and Standards (09:45 – 11:15) • ASME B16.5, B16.47, API, and DIN standards
- Module 3: Workshop – Identifying Flange Types and Components (11:30 – 01:00) • Raised face, RTJ, lap joint, and blind flanges
- Module 4: Load Paths and Forces in Bolted Joints (02:00 – 03:30) • Tensile load, preload, relaxation, and embedment

Day 2: Gaskets, Fasteners, and Material Selection

- Module 5: Gasket Types and Sealing Principles (07:30 – 09:30) • Spiral wound, kammprofile, sheet, and O-rings
- Module 6: Bolt and Stud Selection, Grades, and Coatings (09:45 – 11:15) • ASTM specifications and corrosion considerations
- Module 7: Workshop – Gasket Material Selection for Process Conditions (11:30 – 01:00) • Pressure, temperature, media compatibility
- Module 8: Torque-Tension Relationships and Load Control (02:00 – 03:30) • Lubrication factors and bolt stretch measurement

Day 3: Assembly, Tightening, and Inspection

- Module 9: Proper Joint Assembly and Alignment (07:30 – 09:30) • Surface preparation, bolt lubrication, and pattern tightening
- Module 10: Torqueing and Tensioning Methods (09:45 – 11:15) • Manual, hydraulic, pneumatic, and ultrasonic tools
- Module 11: Workshop – Simulating a Controlled Bolt-Up Procedure (11:30 – 01:00) • Achieving uniform gasket compression
- Module 12: Joint Inspection, Leak Testing, and Quality Control (02:00 – 03:30) • Pressure testing, flange face evaluation, and bolt load verification

Day 4: Failure Analysis and Maintenance Planning

- Module 13: Common Causes of Joint Failure (07:30 – 09:30) • Gasket blowout, fatigue, corrosion, and improper tightening
- Module 14: Root Cause Analysis and Corrective Actions (09:45 – 11:15) • Real-life case reviews and failure diagnostics
- Module 15: Workshop – Conducting a Flange Failure Investigation (11:30 – 01:00) • Evidence gathering and fault identification
- Module 16: Maintenance Scheduling and Turnaround Planning (02:00 – 03:30) • Critical joints, inspection intervals, and documentation

Day 5: Integrity Assurance and Best Practices

- Module 17: Risk-Based Inspection (RBI) for Bolted Joints (07:30 – 09:30) • Prioritizing joints based on criticality and exposure
- Module 18: Flange Management Systems and Joint Tagging (09:45 – 11:15) • Tracking, logging, and procedural standardization
- Module 19: Workshop – Developing a Flange Integrity Procedure (11:30 – 01:00) • Creating SOPs for site-wide implementation
- Module 20: Final Wrap-Up and Certification (02:00 – 03:30) • Lessons learned, action planning, and participant presentations

Certification

Participants will receive a Certificate of Completion in Facilities Engineering and Management – Bolted and Flanged Connections, validating their expertise in ensuring joint integrity, reliability, and safety across critical facility systems.

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Why Choose MAWA Events

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