**MAWA EVENTS**

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

**Phone:** +601116373203 | **Email:** info@mawaevents.net

# FACILITIES ENGINEERING & MANAGEMENT - BOLTED & FLANGED CONNECTIONS

*"Ensuring Safety, Reliability, and Compliance in Critical Bolted Joint Assemblies"*

## Schedule

| Venue (InHouse) | Fees |
|---|---|
| At Your Organization Premises | Ask For The Quotation |

► **Available delivery methods:** In-House Training

## Introduction

Bolted and flanged connections are critical components in process plants, refineries, power stations, and mechanical systems. Failures in these joints can lead to catastrophic leaks, safety hazards, and costly downtimes. Engineering, assembling, inspecting, and maintaining these joints require specialized knowledge and disciplined execution aligned with international standards such as ASME, API, and EN.

This 5-day technical course is designed to provide facilities engineers, maintenance professionals, and plant managers with the practical knowledge and engineering principles required to ensure the integrity, performance, and compliance of bolted and flanged connections. The training includes real-world case studies, torque calculation exercises, assembly demonstrations, and inspection techniques to reduce joint failure and improve asset reliability.

## Objectives

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

- Understand the engineering principles behind bolted flange joint integrity
- Analyze flange and gasket selection based on service conditions
- Apply proper bolt tightening and torqueing techniques
- Implement leak prevention strategies and joint assembly best practices
- Follow industry codes and standards for flange connections (ASME PCC-1, API 6A, EN 1591)
- Perform failure analysis and recommend corrective measures

**MAWA EVENTS**

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

**Phone:** +601116373203 | **Email:** info@mawaevents.net

## Why Attend

- Minimize plant shutdowns caused by joint failures or leakage
- Improve safety and performance of critical piping and pressure systems
- Master torque, stress, and preload calculations for bolted connections
- Comply with international standards and audit requirements
- Gain practical hands-on exposure to joint assembly and troubleshooting

## Target Audience

This program is designed for:

- Facilities and plant engineers
- Maintenance and reliability engineers
- Mechanical and piping engineers
- Project and turnaround managers
- QA/QC and inspection personnel
- Safety and compliance officers

## Individual Benefits

Key competencies that will be developed include:

- Joint integrity analysis and performance management
- Selection of gaskets, fasteners, and flanges
- Execution of leak-free assembly and tightening operations
- Proficiency in international codes and torqueing methodologies
- Root cause failure analysis of joint defects

## Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Reduced leakage and unscheduled maintenance incidents
- Enhanced safety and environmental compliance in operations
- Standardized procedures for bolted connection installation
- Better lifecycle management of critical process joints
- Increased asset integrity and cost-effective maintenance planning

## Instructional Methodology

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

- Strategy Briefings – Flange connection theory, design, standards, and torque principles
- Case Studies – Common joint failures, leak incidents, and prevention lessons
- Workshops – Gasket selection, torque calculation, preload evaluation
- Peer Exchange – Group reviews of plant problems and reliability improvements
- Tools – Flange assembly checklists, torque tables, gasket selection matrices

**MAWA EVENTS**

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

**Phone:** +601116373203 | **Email:** info@mawaevents.net

## Course Outline

**DETAILED 5-DAY COURSE OUTLINE (CUSTOMIZABLE)**

**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: Introduction to Bolted Flange Joints**

- Module 1: Overview of Bolted Joint Applications and Failure Risks (07:30 – 09:30)
- Roles in pressure systems, leak paths, case histories
- Module 2: Flange Types and Design Standards (ASME, API, EN) (09:45 – 11:15)
- Weld neck, blind, lap-joint, RTJ, and more
- Module 3: Material Considerations for Flanges, Bolts, and Gaskets (11:30 – 01:00)
- Thermal, mechanical, and chemical compatibility
- Module 4: Workshop – Joint Assembly Component Review (02:00 – 03:30)

**Day 2: Gaskets and Sealing Principles**

- Module 1: Gasket Types and Applications (07:30 – 09:30)
- Spiral wound, ring-type, soft cut, metal-jacketed
- Module 2: Sealing Principles and Gasket Selection Criteria (09:45 – 11:15)
- Compressibility, recovery, stress retention
- Module 3: Flange Surface Finish and Its Impact on Sealing (11:30 – 01:00)
- ASME surface finish recommendations
- Module 4: Workshop – Gasket Selection Exercises (02:00 – 03:30)

**Day 3: Bolt Load, Torque, and Preload Concepts**

- Module 1: Bolt Load Calculations and Stress Distribution (07:30 – 09:30)
- Force transmission, tension vs. torque
- Module 2: Torque Methods and Lubrication Effects (09:45 – 11:15)
- Torque wrenches, hydraulic tensioners, snug-tightening
- Module 3: Bolt Tightening Sequences and Patterns (11:30 – 01:00)
- Cross-pattern, star method, uniform load application
- Module 4: Workshop – Torque Calculation and Simulation (02:00 – 03:30)

**Day 4: Assembly, Maintenance, and Integrity Assurance**

- Module 1: Correct Joint Assembly and Field Practices (07:30 – 09:30)
- Flange alignment, lubrication, bolt elongation
- Module 2: Inspection and Testing of Flanged Connections (09:45 – 11:15)
- Visual inspection, pressure testing, ultrasonic
- Module 3: Leak Detection and Troubleshooting Techniques (11:30 – 01:00)
- Common faults and field diagnostics
- Module 4: Workshop – Assembly Procedures and Failure Case Review (02:00 – 03:30)

**Day 5: Codes, Standards, and Risk Management**

- Module 1: Review of Key Standards (ASME PCC-1, EN 1591, API 6A) (07:30 – 09:30)
- Guidelines for integrity, maintenance, and inspection
- Module 2: Managing Joint Integrity During Shutdowns & Turnarounds (09:45 – 11:15)
- Planning, documentation, tracking systems
- Module 3: Documentation, Audit Trails, and Quality Assurance (11:30 – 01:00)
-

Joint tagging, bolt load verification, digital monitoring

- Module 4: Final Workshop – Joint Integrity Plan Development (02:00 – 03:30)

## Certification

Participants will receive a Certificate of Completion in Bolted and Flanged Connections for Facilities Engineering, demonstrating their practical skills in joint integrity, torqueing methods, gasket selection, and code-compliant assembly practices.

## Why Choose MAWA Events

- **Global Expertise:** More than 17 years of experience in professional training and consulting.
- **Industry-Leading Faculty:** Courses delivered by seasoned professionals with hands-on experience.
- **Practical Insights:** Learn to turn theory into actionable strategies for real-world business impact.
- **Client-Focused Solutions:** Customized programs designed to achieve your organisation's unique goals.

| **In-House / Customized Training**<br>Interested in running this course for your team?<br>Please contact us: | TEL:<br>**+601116373203** | EMAIL:<br>**info@mawaevents.net** |
|---|---|---|