

**PD577**

**Bolted Joint Assembly Principles per ASME PCC-1 – 2022**

**CEUs: 1.5**

**PDHs: 15**

**Number of Days: 2**

Although the mechanical principles that make a screw or bolt work are elementary – the inclined plane and the lever – the proper application of those simple machine principles to seal a vertical joint or sustain a tower crane under stress, is extremely complex. For many years, there has been recognition of the need to train, test, and certify craftsmen prior to allowing them to work on significant industrial applications which may have safety and structural integrity issues. This course will train and test bolting personnel at the supervisory level on the technological and practical problems of assembling bolted joints in large scale industrial applications.

**By participating in this course, you will learn how to successfully:**

- Describe the principles of joint design and reliability
- Explain the “nuts and bolts” of nuts and bolts
- Explain the concept of “load” as a bolting goal
- Describe ways to accomplish “load” (torquing and tensioning)
- Identify factors affecting proper “load” and how to compensate for problems
- Identify the proper selection and installation of gaskets
- Identify bolting tools of all types
- Describe the advantages and disadvantages of various bolting methods and where to use them
- Identify assembly procedures (bolting patterns, incremental tightening, etc.)
- Become familiar with work planning and preparation (tools, hardware, bolting plan, safety checklists)

**Who Should Attend**

Practicing design and manufacturing professionals involved in assembly of electro-mechanical hardware components and engineers and technicians in design and assembly operations. Engineers involved in the design, construction or maintenance of pressurized equipment utilizing flanged joints for the petroleum, refining, chemical, power, and process industries.

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**Course Materials (included in purchase of course):**

- **Digital course notes** via ASME's Learning Platform
- Access to ASME PCC-1 – 2022 Guidelines for Pressure Boundary Bolted Flange Joint Assembly for the duration of the course.

**Instructor**

**John D. Lay** is the Director of Training for Hytorc, the largest manufacturer of hydraulic bolting tools, responsible for North and South America. He has been involved in the teaching of both the theoretical and practical aspects of heavy industrial bolting since 2003 and has been involved in corporate training for over 20 years. John has assisted in the development of several multimedia courses that have been adopted as teaching standards for union apprentice programs in the millwright and pipefitter trades across North America. He is an Affiliate Member of ASME and brings a practical view of complex problems that can be understood by workers and non-engineers yet withstands the rigors of quantitative review. He is a member of the ASME Bolting Specialist Qualification Program Advisory Committee. John is also an adjunct faculty member at Texas A&M University Engineering Extension Service, for which he teaches the OSHA #7110 - Safe Bolting: Principles & Practices course.

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**Day One**

- The role of standards and the value of certification
- Principles of bolting
- Principles of Joint Reliability – Flanges, Fasteners and Gaskets
- Principles of Torque Tightening
- Principles of Tensioning (methods and tools)

**Day Two**

- Dealing with corrosion
- Planning your work and working your plan
- Safety – first, last and always!
- Bolting sequence, patterns and interaction
- Multiple point torqueing/tensioning
- Set up and familiarity with tools – safety in the shop
- Practical application of the principles learned
  - Alignment and sequencing
  - Gasket installation
  - Hydraulic torquing and disassembly
  - Hydraulic tensioning and disassembly
  - Mechanical tensioning and disassembly
- Review and summary