NARGAN
ACADEMY

Compressor Training Course

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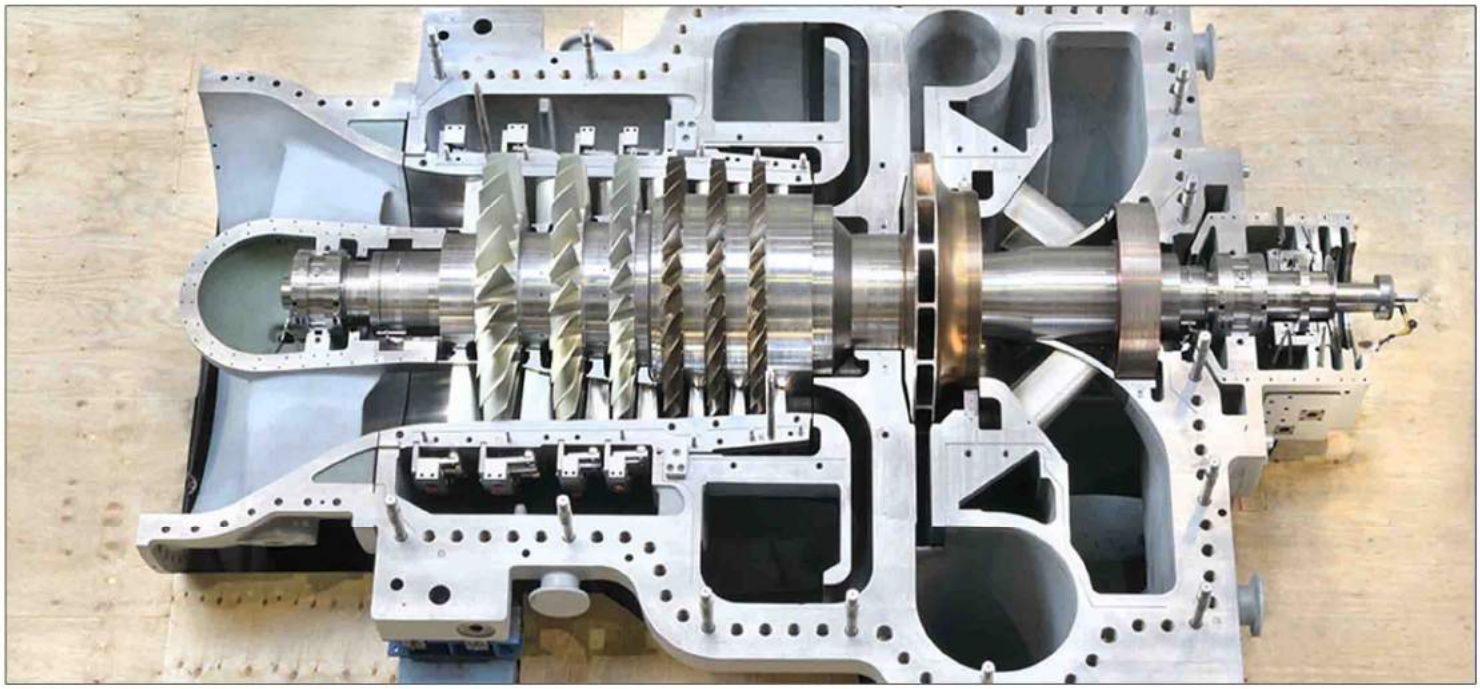

WHY CHOOSE THIS TRAINING COURSE?

Since the compressors are the most important, the most complicated and the most usable rotary equipment, improving the proficiency level in this field can have a remarkable attractiveness for participants. Additionally, the most of the plants in oil and gas industry require a compressed air and gas in order to their main functions get done and this issue has added to the importance of this course.

WHO IS THIS TRAINING COURSE FOR?

This course has been designed for supplying the engineers and experts of various disciplines' requirements working in vendor and EPC companies in oil and gas industry.

During this course, beside the professional topics, basic ones will be presented too, hence, it doesn't need to have a high knowledge of this field.

The only thing is needed to participate in this course is being familiar with Thermodynamics and fluids principles.

COURSE SYLLABUS (28 HOURS)

- Compressor Applications
- Compressor Classification and Selection
- Theory of Compressor
- Reciprocating Compressor (Types, Main Characteristics, Components, Limitations, Capacity Control Methods)
- Screw Compressor (Types, Main Characteristics, Components, Capacity Control Methods)
- Centrifugal Compressor (Components, Limitations, Capacity Control Methods, Performance Curve)

WHAT ARE THE GOALS?

The main goal of this course is to improve the technical knowledge of the participants regarding optimal compressor type selection principles, operation and application of different types of compressors such as screw compressors, centrifugal compressors, etc., as well as their classification. Also, in this course, topics related to flooding, lubrication, vibrations of rotary equipment are also discussed.

Hadi Zare

- M.Sc. in Mechanical/ Mechatronics Engineering from K. N. Toosi University of Technology
- Mechanical Department Lead Engineer at Nargan Company With More Than 10 Years' Experience In Rotary Equipment Engineering
- Experienced in Analysis, Design, Performance and Vibration Assessment of Mechanical Rotary and Packaged Equipment

THE COURSE **CONTENT**

Chapter 1

- Compressor Applications: Pneumatic, Compressed Air, Gas Pipeline, Gas Injection
- Fan, Blower, and compressors characteristics
- Roots Blower
- Compressor Function
- Compressor Types:Positive displacement, Dynamic.
- Introduction to Reciprocating Compressor: Double Acting Compressor, Single-Acting Compressor
- Introduction to Screw Compressors
- Introduction to Sliding-Vane Compressors
- Introduction to Dynamic Compressors (Axial- Centrifugal, Integrally-geared compressor)
- General Performance Curves
- Compressor Classification and Selection Procedure

Chapter 2

Theory of compressor:

- Gas Laws for Ideal Gases
- Gas Laws for Real Gases
- Generalized Compressibility Chart
- Standard Flowrate Definition
- Thermodynamic Systems
- Polytropic process
- Isentropic process
- Using InterCooler for compression
- Shaft Power vs Gas Power
- Compressor power calculation
- Reciprocating Compressor Details:
  - Reciprocating Compressors Application
  - Reciprocating Compressors Classification
  - Single Stage and Multistage Compressors
  - Compressor Cylinder Arrangement
  - Reciprocating Compressor Parts

Hadi Zare

- Having experiences in:
  - Design of 2-Stage Reciprocating Compressor, Centrifugal Compressor, and Gas Turbine
  - Vibration Analysis-Based and Machine-Learning Based Condition Monitoring
  - Development of Digital Twin Soft ware for 2-Stage Centrifugal Com pressor and GT10B Gas Turbine.
  - Development of Digital Twin Soft ware for 7-Stage Centrifugal Compressor
  - Performance Evaluation Test of Gas Turbines, Steam Turbines and Centrifugal Compressors
  - Optimizing Process Control Algorithm for Centrifugal Pumps, Compressors and Gas Turbines
  - Dynamic Simulation, Surge Analysis, Valve Sizing of Phase 15&16 As saluyeh Gas Booster Station

THE COURSE **CONTENT**

Chapter 3

- Cross Head Type Reciprocating Compressor
- Pressure Packing
- Performance of Reciprocating Compressors
- Operation Limits of Reciprocating Compressor
- Capacity Control in Reciprocating Compressors

Chapter 4

- Screw Compressor
- Operating principles
- Components
- Oil free screw compressor
- Oil lubricated screw compressor
- Multistage screw compressors
- Main parts of Screw compressor-Rotor
- Main parts of Screw compressor-Casing
- Capacity Control Methods
- Bearing
- Vibration Limit

Chapter 5

- Centrifugal Compressor
- Integrally Geared Compressor
- Non-Integrally Geared Compressor:
  - Centrifugal Compressors Types
- Barrel type vs Horizontally Split type
- Basic Elements
- Working Principle
- Compression Cycle
- Choke Line, Surge Line
- Fan Laws
- Design Limit of centrifugal compressor
- Centrifugal compressors performance curves

Chapter 6

- Capacity Control Methods
- Inlet Guide Vanes (IGV)
- Adjustable Diffuser Vanes, ADV
- Surge control
- Anti-Surge System
- Forces on Impeller(s) & Bearings
- Thrust balancing
- Compressor Arrangement