

Workshop Outline

- CH. 1 COMPRESSED AIR SYSTEMS, REALITY CHECK**
 - THE AIR SYSTEM GOAL –VS– FUNCTION
- CH. 2 COMPRESSED AIR SYSTEMS, MANAGEMENT**
 - TRADITION & RULES OF THUMB
 - Traditional Priorities in Air System Operation*
 - The New Paradigm in Compressed Air Management.*
 - Concepts of Air System Management*
 - Techniques of System Evaluation*
 - Technical Services and Support*
 - Improving Air Applications Performance*
 - Products to Improve System Efficiency*
 - Compressed Air Systems as a Profit Center*
 - Compressed Air System Mission*
- CH. 3 COMPRESSED AIR SYSTEMS, INVESTMENT**
 - INVEST RESOURCES FOR CUBIC FEET OF AIR
 - Compression Efficiency*
 - Rotary Screw Compressors*
 - Part Load Performance*
 - Four Compressor Applications*
 - Reciprocating Compressor Control*
 - Rotary Screw Compressor Capacity Control*
 - Monitor the Compressed Air Investment*
 - Cost of Ownership and Operation*
 - Maintenance Expense*
 - Repair Expense*
 - Operating Expense*
 - Financial Expense*
 - Estimating Compressed Air Investment*
 - Prudent Compressed Air Investment*
- CH. 4 COMPRESSED AIR SYSTEMS, COST**
 - COST OF COMPRESSED AIR SYSTEM LOSSES
 - Compressed Air Demand Management*
 - Compressed Air System Losses*
 - FLOW THROUGH AN ORIFICE
- CH. 5 COMPRESSED AIR SYSTEMS, BUSINESS IMPACT**
 - COMPRESSED AIR – A PROCESS SYSTEM
 - Compressed Air, a Process System*
 - Compressed Air Performance Documentation*
 - Air System Controls*
 - Business Impact of Cost Savings*
 - Document Total Compressed Air System Cost*
 - Six Steps to Compressed Air Demand Management*
- CH. 6 COMPRESSED AIR SYSTEMS, PERFORMANCE**
 - AIR SYSTEM PERFORMANCE MODELING
 - Mass Flow / Mass Ratio Model*
 - CASIMM™ Compressed Air System Impedance Management Model*
 - The Evolution of a Typical Air System*
 - The TRADITIONAL Solution*

The Enlightened Approach

The Compressed Air Management Approach

CH. 7 COMPRESSED AIR SYSTEMS, BENCHMARKING

Step #1 to Effective Air Demand Management

Audit the Compressed Air System

DATA LOGGING & SYSTEM INFORMATION

Auditing the Compressed Air System

Data Acquisition

Example Audit Data / Information

Data: What to measure? Where to measure?

Information: What does it all mean?

Getting to the Bottom Line

Air System Audit Summary

CH. 8 COMPRESSED AIR SYSTEMS, OPTIMIZING

Stabilize System Operating Pressure

AIR SYSTEM MANAGEMENT STRATEGIES

Engineer Primary Storage Systems

Optimize Compressor Control Response

Establish a Leak Management Program

Eliminate Gradient & Dynamic Losses

Secondary Storage Systems

Correct Point of Use Issues

Reduce System Supply Pressure

Optimize Compressed Air Generation

CH. 9 COMPRESSED AIR SYSTEMS, EMPOWERMENT

AIR COMPRESSORS AND COMPRESSED AIR SYSTEMS

AIR COMPRESSORS

Basic theory and operation - nomenclature and common terminology

Reciprocating

Screw type

Rotary vane type

Centrifugal

Lubricated, semi-lubricated and dry compressors

Typical applications of the different types

COMPRESSOR PERFORMANCE

Input pressure

Output pressure

Output quality

Flow rate

Effects of temperature and humidity

Energy consumption

Compressor control systems

CENTRIFUGAL COMPRESSORS

Application range

Drivers

Description and performance characteristics

Application examples

Life cycle examples
Life cycle costs
Flow regulation and controls
Operation and maintenance

COMPRESSOR ACCESSORY EQUIPMENT

Pre-filters
After filters
Oil coalescing filters
Water coalescing filters
Charcoal filters
Micron filters
Aftercooler/separators
Cooling systems
Air receivers
Dryer systems
Manual, automatic drains

BASICS OF AIR/GAS DISTRIBUTION SYSTEMS

Design
Installation
Standards
Storage
Operation
Maintenance
Compressor control systems

COMPRESSED AIR SYSTEMS SPECIFICATIONS

Operating conditions
Industry standards
Compressor design
Compressor installation requirements
Motor characteristics
Acceptable vibration levels
Performance guarantee
Documentation
Bid technical data
Bid review

SAFETY

Electrical safety
Pressure vessels and piping
Fire safety
Guards and warning notices

PREVENTIVE MAINTENANCE

Efficiency
Down-time
Scheduling
Budgeting

Preventive maintenance software
Manufacturer support
Spare parts inventory
Vibration analysis and predictive maintenance
Remote monitoring of equipment
Rebuild/replace decisions
Cost

REDUCING COST OF COMPRESSED AIR SYSTEMS

Understanding the true cost of compressed air
Energy efficient compressor selection and system design
Determining air flow and pressure requirements
Checklist to slash compressed air operating costs
Developing compressed air profile
Integrating compressed air monitoring with maintenance program

CASE STUDY - SELECTING THE APPROPRIATE COMPRESSOR SYSTEM

An existing compressor system was not providing the required pressure. This session looks at the procedures taken to review the different types of compressors available and how the correct system was selected.

SELECTING NEW COMPRESSORS AND IMPROVING YOUR EXISTING SYSTEM

Criteria for the selection of the most suitable compressor for your application.
Considerations of capital and operating costs, efficiency, reliability, and methods to improve your existing system.

INTRODUCTION TO WORKSHOP

ASME EA-4 – 2010 Energy Assessment for Compressed Air Systems
A case study will be presented for the participants to work on during the workshop.

WORKSHOP

Participants will work in small groups to select appropriate compressor for the case study problem. Participants will also generate ideas for improving the existing system described in the case study.

PRESENTATION FROM WORKSHOP

Representatives from each group will present the selection made and suggestions for improving the existing system along with the rationale for each decision. A discussion will follow.

TROUBLESHOOTING WORKSHOP

Solutions to achieving an efficient and reliable compression system. This is an interactive workshop in which the moderator, besides contributing his own experience, involves participants to express their problems and actively take part in evolving solutions.