



Refinery Troubleshooting

Potential PDH: 16

Description:

Since day-to-day operation problem solving and optimizing are critical to the profitability of plant operations, troubleshooting is a prime responsibility of refinery and plant engineers. The importance of troubleshooting has grown as plants push to operate at tighter economic margins. Lost profits due to unsolved unit problems can never be recovered. Consistently maintaining smooth operation, maximum capacity, and acceptable product quality are important goals that can be difficult to achieve. Thus, this program has been developed to provide an in-depth yet practical review of the art and science of plant troubleshooting.

The program's content is both comprehensive and wide-ranging. The sessions begin with a discussion of the fundamentals, including process objectives, equipment behavior, interaction of the process and equipment, and troubleshooting techniques. A case study approach covers major equipment found in refineries and petrochemical plants, specifically pumps, heat exchangers, fired heaters, vacuum systems, piping and hydraulics, compressors, distillation towers, and auxiliary equipment. All case studies are developed from actual field case histories. This approach demonstrates the complexity of actual plant operations and how to simplify and identify solvable problems. Once the fundamentals are established the session moves into the topics of troubleshooting techniques,

Outline:

INTRODUCTION

- Objectives and Approach
- Importance of Troubleshooting
- Case Studies

TROUBLESHOOTING CONCEPTS AND TECHNIQUES

- Typical Problems
- Integration of Process and Equipment
- Troubleshooting Techniques
- Troubleshooting Tools

DISTILLATION

- Flooding and Its Detection
- Pressure Surveys
- Saltation
- Entrapment
- Damaged Equipment



- Entrainment and Product Quality

HEAT EXCHANGERS

- Preheat and Crude Fouling
- Leaks
- Hot Vapor Bypass and Sealing
- Vapor Blanketing
- Heat Integration and Startup
- Heat Flux Limits
- Thermosyphon Reboilers

HYDRAULICS

- Gravity Flow and Open-Channel Flow
- Unstable Systems
- Compressible Flow: Transfer Lines
- Nozzles
- Pressure Balance Systems

PUMPS

- Suction Conditions-NPSH and Suction Specific Speed
- Multiple Pumps in Parallel
- Low Head Applications
- Fan Law Limits

FIRED HEATERS

- Pass Balancing
- Average Versus Peak Heat Flux and Coking
- Heat Integration and Air Preheat
- Environmental Control

VACUUM SYSTEMS

- Ejector Systems
- Suction Constraints
- Excessive Load
- Precondenser Performance
- Plugged Exchangers
- Damaged Equipment
- Liquid-Ring Low-Pressure Operation

CENTRIFUGAL COMPRESSORS

- Suction Conditions
- Surge Control

RECIPROCATING COMPRESSORS

- Interstage Pressures
- Capacity Restrictions

CONTROL

- Instability





- Impossible Constraints
- Unsound Control Schemes
- Instrument Installation Problems
- Advanced Control Problems

OTHER EQUIPMENT

- Coalescers
- Dryers
- Salt Dryers
- Drums
- Gas Turbines

ADVANCED TECHNIQUES

- Gamma Scans: Uses and Limitations
- Neutron Backscatter
- Thermal Scanning

Who Should Attend:

Program participants will have the opportunity to obtain a broad working knowledge of troubleshooting principles and practice, to gain insight into both traditional and advanced techniques, and to interact with others working in plants. The program is ideal for personnel involved in refinery troubleshooting, process engineering, plant operations, and technical services. Process engineers from operating, design and construction companies, as well as others providing services to the petroleum and petrochemical industries, should also find this program beneficial.

Subject Matter Expert (SME):

Andrew W. Sloley is a Principal Engineer for CH2M Hill, Bellingham, Washington. He has over 30 years of experience in the hydrocarbon processing industry. At CH2M Hill he is primarily responsible for technical design and review and acts as team leader for process design for refinery crude units, delayed cokers, alkylation, and refinery recovery units including gas plants and FCC product recovery. His other responsibilities include proposal preparation, technical support and system troubleshooting. Andrew has authored or co-authored over 250 publications on petrochemical and refinery operations in the areas of equipment design and troubleshooting. He is currently a contributing editor on equipment and plant design for Chemical Processing magazine. He has a B.S. degree in Chemical Engineering from the University of Tulsa and is a licensed professional engineer in Texas.