



THE CHEMICAL ENGINEERING MAJOR

Fuel Quality Monitoring System Fundamentals

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Introduction

As refiners and chemical producers worldwide see higher crude oil and feed prices and continued demand for clean transportation fuels and lower production costs, a sound knowledge of fuel product specifications, their analysis, and quality monitoring is essential to understand its effect on engine performances. In addition, the efficient use of laboratory staff and equipment to ensure the optimum processing of crude oil to meet customer fuel product specifications is of prime importance.

This BTS training course has been developed to provide an in-depth, yet a practical review of the art and science of "Fuel Quality Monitoring System Fundamentals" in modern refineries. The program's content is both comprehensive and wide-ranging. A Case Study approach covers some selected crude oil assays, product specifications, sampling methodology, analytical methods and quality monitoring found in refinery facilities will be presented.

This BTS training course will highlight:

- Fuel quality fundamentals
- Fuel production technologies
- Gasoline specifications
- Jet Fuel specifications
- Diesel specifications
- Fuel quality monitoring system

Training Objectives

What are the Goals?

At the end of this BTS training course, you will learn to:

- Describe fuels chemistry, manufacturing, blending, distribution, and handling.
- Compare testing parameters for gasoline, jet fuel, and road diesel.
- Apply combustion parameters to fuels.
- Explain how fuel properties influence engine performance.
- Manage jet fuel quality by applying principles of handling and microbial degradation.
- Explain diesel properties and their impact on fuel performance.
- Troubleshoot quality problems and contamination of fuels.
- Discuss fuel quality monitoring system.
- Address specific problems in distribution and fuel testing and propose solutions

Target Audience

Who is this Training Course for?

This BTS training course is suitable for a wide range of professionals but will greatly benefit:

- Operation Engineers
- Production Engineers
- Process Engineers
- Senior Operation Personnel
- Operation Staff
- Technical Supervisory Staff
- Plant Engineers
- Fuel quality specialists
- Measurement and quality control operators
- Foremen

Training Methods

How will this be Presented?

A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions and motivate everybody finding the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience. Participants in this course will receive thorough training on the subjects covered by the course outline with the Tutor utilizing a variety of proven adult learning teaching and facilitation techniques.

Organisational Impact

- This BTS training course will emphasize fuels chemistry, manufacturing, blending, distribution, handling and troubleshooting techniques that would lead ultimately to improved fuel utilization, optimization, and enhanced organizational economics.
- Many aspects of fuel production operations and management can be improved including, product qualities, monitoring, and safety.
- This course will guide the participates to develop key concepts and techniques for the refining of petroleum processes and fuel manufacturing economics. These key concepts can be utilized to make operating decisions that can improve the overall refinery performance and economics.

Personal Impact

By attending this BTS training course, you will be able to:

- Increase fuel efficiency keeping safety as a prime consideration
- Improve On-Time performance while reducing operational expenses
- Conduct a "Fuel Efficiency" audit of your organization
- Develop Fuel Efficiency Program Evaluation tools

Daily Agenda

Day One: Introduction of Fuel Quality Fundamentals

- Crude oil chemistry and properties

- Classification of crude oils
- Crude assays and valuation
- Petroleum product specifications
- Petroleum products standardization and quality control
- Introduction to oil refineries
- Refinery configurations
- Case study: Impact of refinery configurations on fuel specifications

Day Two: Gasoline

- Gasoline chemistry
- Manufacturing technologies
- Gasoline specifications and quality monitoring system
- Testing parameters for gasoline
- Composition, Combustion Characteristics, Octane Number, Corrosiveness, Density, Flash Point and Fire Point, Oxygenates, Stability, and Instability, Volatility
- Effect of fuel properties on engine performance
- Troubleshoot quality problems and contamination of gasoline
- Case-Study: Naphtha Hydrotreater, Catalytic Reformer, and Isomerization Units

Day Three: Jet Fuel

- Jet fuel chemistry
- Manufacturing technologies
- Jet fuel specifications and quality monitoring system
- Testing parameters for Jet fuel
- Acidity, Calorific Value, Density, Flash Point, Freezing Point, Storage Stability, Thermal Stability, Viscosity, Volatility, Water
- Effect of fuel properties on engine performance
- Troubleshoot quality problems and contamination of jet fuel
- Case-Study: Hydrocracking Unit

Day Four: Diesel

- Diesel fuel chemistry
- Manufacturing technologies (Hydroprocessing)
- Diesel fuel specifications and quality monitoring system
- Testing parameters for Diesel fuel
- Acidity, Sulfur content, Appearance and Odor, Ash, Calorific Value, Carbon Residue, Cetane Number and Cetane Index, Cloud Point, Composition, Diesel Index, Flash Point, Freezing Point, Neutralization Number, Pour Point, Stability, Viscosity, Volatility, Water and Sediment
- Effect of diesel fuel properties on engine performance

- Troubleshoot quality problems and contamination of diesel fuel
- Case Study: Production of ultra-low sulfur diesel

Day Five: Fuel Quality Monitoring System

- Quality control of products in petroleum refining
- Gasoline Octane Blending
- Viscosity Blending
- Pour Point Blending
- Flash Point Blending
- Reid Vapor Pressure Blending for Gasoline and Naphthas
- Aniline Point Blending
- Sampling procedures
- Case-Study: Gasoline Blending
- Case-Study: Diesel and Jet Fuel Blending