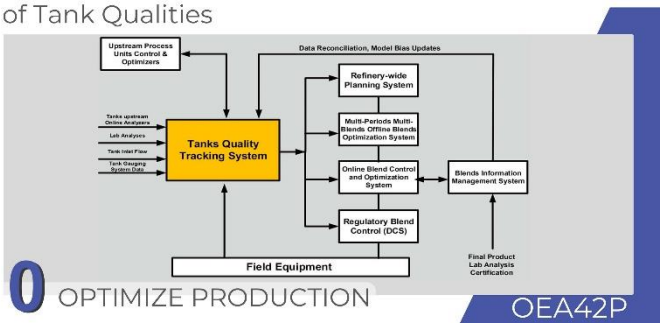
Model-Based Predictions
of Tank Qualities



Topic ID	**OEA42T**
Title	**Model-Based Predictions of Tank Qualities**
Category	**O-Optimize Production**
eLearning Level	**Basic**

Introduction

For refinery operation purposes, tank behavior is dynamic and complex. Therefore, it is not easy to know the precise tank level or inventory soon. This may increase a refinery's operation expenses.

This topic will discuss methods to estimate product qualities, load and cost of lab analysis, economics of online tank pseudo-analyzers, plant tank farms, current modes and methods of quality analysis, methods to analyze/estimate tank qualities, online process analyzers, online/lab analysis for rundown, online blending analyzers, conventional online analyzers for gasoline blending, tank samples and lab analysis, lab analysis load, etc.

Refinery Tank Farms

Refinery tank farms consist of tank units concerned with the feedstock's reception, storage, and processing. Refineries manage a huge stock of crude oil and product inventories.

That makes them a high-capital investment. Therefore, proper and accurate inventory must be maintained to improve operations' overall efficiency and ensure adequate reconciliation of hydrocarbons within a refinery.

Methods to Estimate Tank Qualities

Online analyzers are introduced to measure a wide range of physical properties to shorten the uncertainty gap between scheduled laboratory analyses. In addition, the use of these analyzers allows for correction concerning component ratio errors at early stages. Online analyzers are installed at the exit points of the process unit streams to control unit operations.

Tank sample analysis refers to testing petroleum products for various reasons, such as synthetic and physical properties. For example, these properties might be utilized for building standard volumes and establishing product quality. This procedure involves the manual collection of samples for laboratory analysis from the tank. Designated sample collection containers are used for this purpose.

There are two types of models used for predictive calculations: inferential and correlation-based models. The inferential model is used in the absence of analyzers for feed composition monitoring. It highlights disturbances and helps to estimate outlet compositions under normal operations. The correlation-based models come from the study of the models of actual processes in a steady state.

Over 70 tank qualities can be modeled using various modeling methods. These methods produce benefits within two to three months of commissioning. Changes in-tank qualities from batch blending, rundown, and inter-tank transfers can be estimated. However, an increase in the refinery laboratory workload leads to an increase in the laboratory analysis cost and, consequently, the production costs of the refinery.

Summary

With the attractive ROI and benefits of 2-3 million USD/year for a 300 KBD refinery using model-based predictions, it is imperative to adopt model-based prediction for use in the refinery. Predictive models (open-loop/closed-loop mode) show tremendous promise when used to measure tank qualities. In addition, model-based prediction is timesaving as compared to laboratory analysis.

Options for eLearning This Topic

Mode of eLearning	Available?
Free Course	No
Refresher Course	Yes
Pick N Choose (Custom Curriculum)	Yes
Advanced Level Course	Yes
Structured MCOR Curriculum	Yes