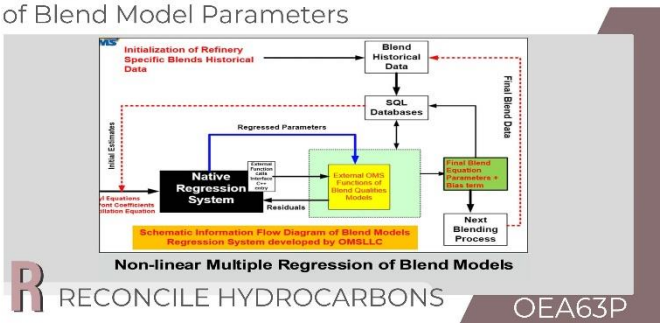
Regression and Feedback
of Blend Model Parameters



Topic ID	**OEA63T**
Title	**Regression and Feedback of Blend Model Parameters**
Category	**R-Reconcile Hydrocarbon**
eLearning Level	**Basic**

Introduction

A refinery faces tough market competition. Hence, it must be automated. For competitive functioning, blending models must be updated for specific time intervals. In this context, important blend model parameters are ethyl equation constants, NIR model parameters, DuPont coefficients, and indexed constants. Blend model customization is required for every 90 blends or after 90 days. Blend control applications use model bias. Therefore, they are dynamic as well as time-dependent. They also depend on blend grade.

This topic will discuss the need for blend model updates, a review of blend model parameters, updates for DuPont coefficients, ethyl equations and diesel qualities models, system architecture to regression model parameters, ethyl equation for octane, ethyl equation for distillation points, the flashpoint for diesel, etc.

Regression/Feedbacks of Blending Parameters

RON (Research Octane Number) indicates fuel quality. It can be obtained by variation in compression ratio under control conditions. At first, Blend RON is measured by the 50-50% mixture method. However, in the case during measurement of RON, blend components may interact nonlinearly. This may improve or violate the octane number. Accordingly, fuel quality will get affected.

50-50% mixture method is used for updating DuPont coefficient. This should last five years.

Ethyl equation predicts blend distillation. The regression point of the ethyl equation may be useful to predict the temperature of the distillation point X for different boiling points. This will help to update the ethyl equation. Here, the octane number can be improved. It is a mixture of iso-octane and n-heptane. A NIR vendor, external consultant, or in-house refinery expert may update NIR model parameters. There are indexed constants for various qualities, including freeze points, RVP, pour points and flashpoints.

The flashpoint is the lowest temperature at which a solvent can form an ignitable mixture in air. This happens near a given fuel's surface. It is easier to ignite liquid solvent with a low flashpoint.

Pour point (the temperature at which liquid fuel stops flowing) is an important property at low temperatures and is useful in fuel transportation. There are many blending models for predicting the freezing point. The most acceptable ones are the conversion factor method and blending coefficient method. Regression of the blending parameters uses the same form of the equation for flash, pour, and freezing points.

Typical blended historical data and feedback systems can improve future model parameters. For example, they can update models for better octane numbers.

Summary

If the blend is not updated, the refinery will not sustain itself in the market. Blending parameters are updated using historical data. Regression and feedback techniques are useful in this regard. Using model bias only cannot help to accurately predict fuel quality. A typical system architecture requires regressing blend model parameters and updating the model.

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