

Government Engineering College, Valsad

Chemical Engineering Department

Webinar Title: Basics of Petroleum Refining

Name of Expert: Mr. Pawan Mundhra

Date of Webinar: 31/5/2020

Time: 5:00 P.M onwards

Faculty Coordinator: Prof. H.M.Jariwala

Organising Committee: Prof. A.R.Magodara, Prof. A.H.Prajapati

No. of Registered Participants: 47

Guest Profile:

Mr. Pawan Mundhra a qualified B.E. Chemical offering extensive experience of 13 years as an Oil and Gas industry professional.

Webinar description:

The Department of Chemical Engineering organized a Webinar on “Basics of Petroleum Refining” on 31th May 2020. The webinar was organized for all students of the Chemical Engineering Department. Prof. H.M.Jariwala introduced Mr. Pawan Mundhra to all participants. Mr. Pawan Mundhra started with introduction of petroleum refining and discussion on processing steps, distillation, separation, purification, treatment. Mr. Pawan Mundhra shared his personal experience on treatment and causes of sulfur content in crude oil. The session ended with a vote of thanks by Prof. H.M.Jariwala in appreciation to Mr. Pawan Mundhra for sharing his valuable time for interacting with Students and Faculties.

Glimpses of Expert lecture

MAJOR REFINERY UNITS

Distillation tower (pipe still)	• Boils the crude oil to allow separation of different components based on boiling temperatures
Flasher (vacuum tower)	• Distills atmospheric residues in tower bottoms under a vacuum to generate vacuum gasoil and pitch while avoiding thermal cracking
Reformer	• Changes the molecular shape of naphtha to create a high-octane gasoline
Catalytic cracker	• Cracks heavy products (e.g., vacuum gasoil) using a catalyst to produce light products (gasoline and distillates)
Hydrocracker	• Similar to a catalytic cracker but uses high-pressure hydrogen in the process
Alkylation unit	• Taken small, very light, molecules and combines them to create larger ones used for making gasoline
Coker	• Thermally cracks heavy residues to make light products. The final residual product that is left is coke (similar to coal)
Visbreaker	• A similar unit to a coker, only not as effective and cheaper to build

WORLDWIDE PETROLEUM PRODUCT USAGE

LPG	• Commercial residential fuel • Petrochemical feedstock
Naphtha	• Petrochemical feedstock
Gasoline	• Motor vehicles
Jet fuel (light kerosene)	• Jet aircraft
Kerosene	• Home and commercial heating and lighting
Diesel (light gasoil)	• Transport and frame heating • Industrial furnaces • Off-road equipment
Residual fuel oil	• Power plants • Industrial furnaces • Buick fuel
Asphalt	• Highways and streets • Roofing material

* Buick fuel is used for shipping
Source: OECD

REFINERY OVERVIEW

Feedstocks:	Crude Oil	Intermediates	Refinery	Finished products:	% Sample*
				LPG	10%
				Naphtha	8%
				Gasoline	26%
				Jet fuel (kerosene)	8%
				Diesel (light gas oil or heating oil)	28%
				Residual fuel oil	18%
				Asphalt and others	1%

REFINERY PROCESSING STEPS

	Separation	Conversion	Finishing
Objective	• Breaking up a mixture into its components	• Fundamentally changing the chemical structure of a product by: – Breaking down molecules – Combining molecules – Rearranging structure	• Improving the qualities of products by: – Blending products of different qualities to get an optimal mix – Treating products (typically with hydrogen) to remove impurities
Examples	• Distillation/fractionation • Extraction	• Cracking • Alkylation (combining) • Isomerization (rearranging)	• Gasoline blending • Hydrotreating

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