

Department of Mechanical Engineering

Alumni Knowledge Sharing Session

An Alumni Guest lecture was delivered through **online(WebEx)** on 11/07/2020 to B. Tech. Mechanical Engineering students and Faculty of ME DEPARTMENT, Time : 10 am TO 11 am topic on **"Aero Engines: Design ,Performance and Life"** by 2011 batch of Alumni of Mechanical Engineering Department by **Mr. Vaibhav Rao**, Specialisation: **Aero Engines: Design, Life and Performance**, Name of Company / Organisation working: **Rolls-Royce** , Email ID: rao.vaibhav@gmail.com, Contact Number: **8008345675**, City / Country/ Region and Location: **Bengaluru Karnataka**. He talked about types of aero engines, aero engine design and working procedure, nomenclature, compressors, turbines performance, material selection, design phases.

WEBEX Link:

<https://meetingsapac20.webex.com/meetingsapac20/j.php?MTID=meaec7435483fd84d984b98c09bbec617>

Some Glimses of Guest Lecture

The screenshot displays a Cisco WebEx meeting interface. The main content is a slide titled "Aero-engine design". On the left, a vertical list of aircraft models is shown, categorized into "Narrow body, Single aisle" (A300, A310, A320, A320neo) and "Wide body, Multi aisle" (A330, A340, A330neo, A350, A380). The slide features a diagram of an engine with mass flow W and inlet velocity V_0 entering from the left, and mass flow W and outlet velocity V_1 exiting to the right. A force F is shown acting on the engine. The text "Airframer decides" points to the equation $\text{Thrust} = W(V_1 \text{ fully expanded} - V_0)$. Below this, it states: "W is the mass flow through an engine (kg/s), V_1 and V_0 are jet exit and inlet velocities (m/s)". A note says: "An airliner typically supplies information like, 'I need my airframe to be able to carry <this much> payload for civil applications, should be able to fly at 39,000 ft. at 0.6 Mach, 6000N of thrust'". The text "Engine makers choose W, V_1 " is positioned above a graph of W vs V_1 showing a "Constant thrust line" with two points labeled 1 and 2. A table below the graph provides data for two engine configurations:

#	N	V_0 (m/s)	W (kg/s)	V_1 (m/s)
1	6000	200	60	300
2	6000	200	20	500

The WebEx interface includes a top navigation bar with "File", "Edit", "Share", "View", "Audio", "Participant", and "Meeting Help". A "Participants (32)" list is visible on the right, and a Windows taskbar is at the bottom.

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Viewing Vaibhav Rao's appli...

Thrust and Cruise speed is the key!

Basic jet propulsion

Equilibrium

$F = \text{Mass rate or air } (W) \times \text{change in jet velocity } (V_{jet} - 0)$
= Net pressure force on structure

$(W) \times \text{change in jet velocity } (V_{jet} - V_0)$
= Net pressure force on structure

Participants (31)

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