

K. J. Somaiya School of Engineering, Mumbai – 400 077
Department of Science and Humanities
F.Y. B. Tech. Semester –II (2024-25)
Engineering Mechanics
IA-1



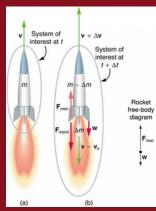
#### **Applications of Engineering Mechanics**

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DIV: C2 BATCH: 2

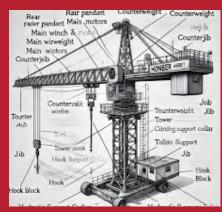
**FY COMPS** 

### <u>Aerospace Technology</u>



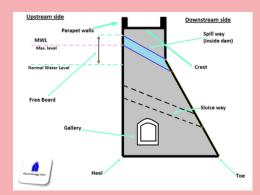
Rocket launches rely on Newton's laws of motion. The first law explains how rockets stay at rest until thrust propels them and continue moving in space. The second law determines how much force is needed for acceleration. The third law enables upward motion as expelled gases push downward. These principles guide launch dynamics, fuel efficiency, and space travel. The understanding of these dynamics under Engineering Mechanics helps engineers predict and utilize the natural laws of motion to their favor. Advanced propulsion systems, aerodynamics, structural integrity, material science innovations further optimize rocket performance, ensuring safer, costeffective, and sustainable space exploration.

## **Crane Operations**



Cranes use force equilibrium to lift and hold heavy loads. The applied force from motors and counterweights balances the weight of the lifted object. Engineers adept with engineering mechanics knowledge are able to make calculations to prevent tipping or structural failure, ensuring safe and efficient lifting in construction and other operations. When a tower crane lifts a steel beam, its counterweight, boom, and base must evenly distribute forces. If the forces are not properly balanced, the crane may become unstable. External factors like wind and movement also impact stability, requiring careful adjustments to maintain equilibrium.

# <u>Dam and Reservoir Design:</u> Fluid Mechanics



Engineering mechanics, combined with fluid mechanics, ensures dams and reservoirs can withstand water pressure. The design considers factors like fluid force distribution, spillway efficiency, pressure variations, ensuring safe water storage, flood control, and hydroelectric power generation. Structural stability, material strength, sediment management, and seismic resistance are also crucial for Advanced computational durability. modeling helps engineers predict stress points, optimize designs, and enhance sustainability, ensuring long-term safety and efficiency.

<u>References</u>