



UNIT-V PUMPS

Impact of Jets:-

The liquid comes out in the form of a jet from the outlet of a nozzle, which is fitted to a pipe through which the liquid is flowing under pressure.

If some plate, which may be fixed or moving, is placed in the path of the jet, a force is exerted by the jet on the plate.

This force is obtained from Newton's Second Law of motion or from impulse - momentum equation.

Thus impact of jet means the force exerted by the jet on a plate which may be stationary or moving.

Cases:-

- 1) Force exerted by the jet on a stationary plate
- (a) plate is vertical to the jet.
 - (b) plate is inclined to the jet
 - (c) plate is curved.

- 2) Force exerted by the jet on a moving plate.
- (a) plate is vertical to the jet
 - (b) plate is inclined to the jet
 - (c) plate is curved.



Euler's Equation for Turbo Machines:

It is expressed in terms of momentum equation for turbo machines.

Let ρ - density of fluid

a - area

V_1 - absolute velocity

V_{w1} - whirl velocity at inlet

V_{w2} - whirl velocity at outlet

u - Blade velocity.

So, the force exerted by the water in the direction of motion is given by

$$F = \rho a V_1 [V_{w1} + V_{w2}]$$

But the momentum of the water or impulse = $F \times$

$$F = \rho a V_1 [V_{w1} + V_{w2}] \times u$$

This momentum or impulse is known as work done by the fluid on the rotating element