SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF AGRICULTURE ENGINEERING

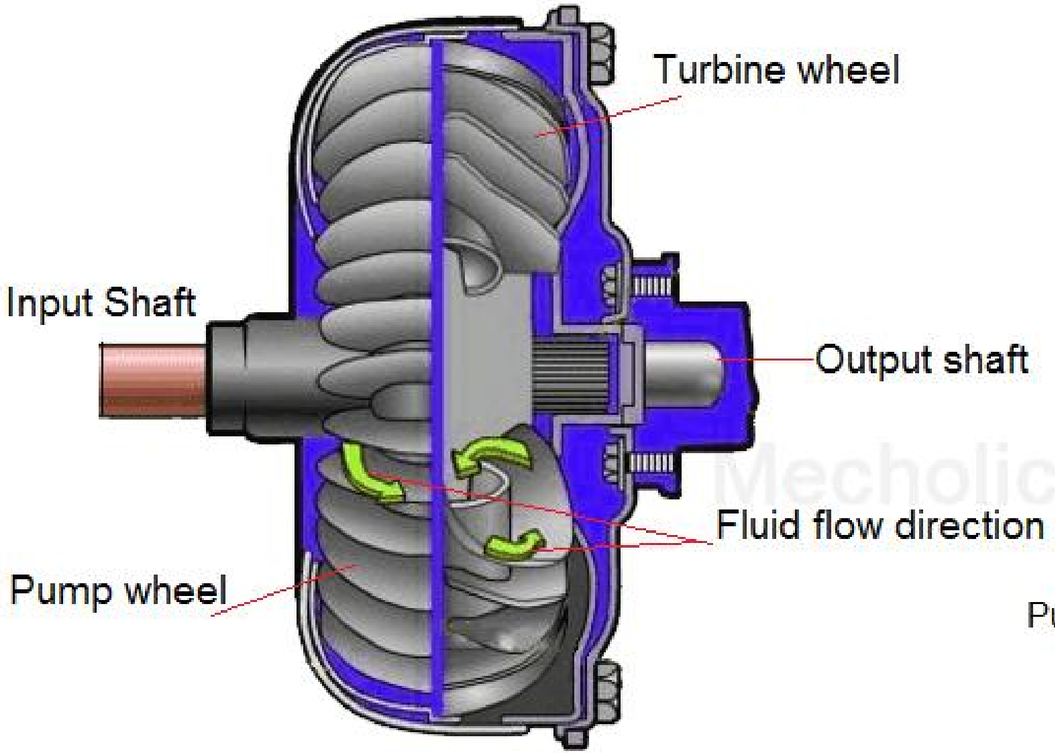
19AGB301-FARM TRACTORS

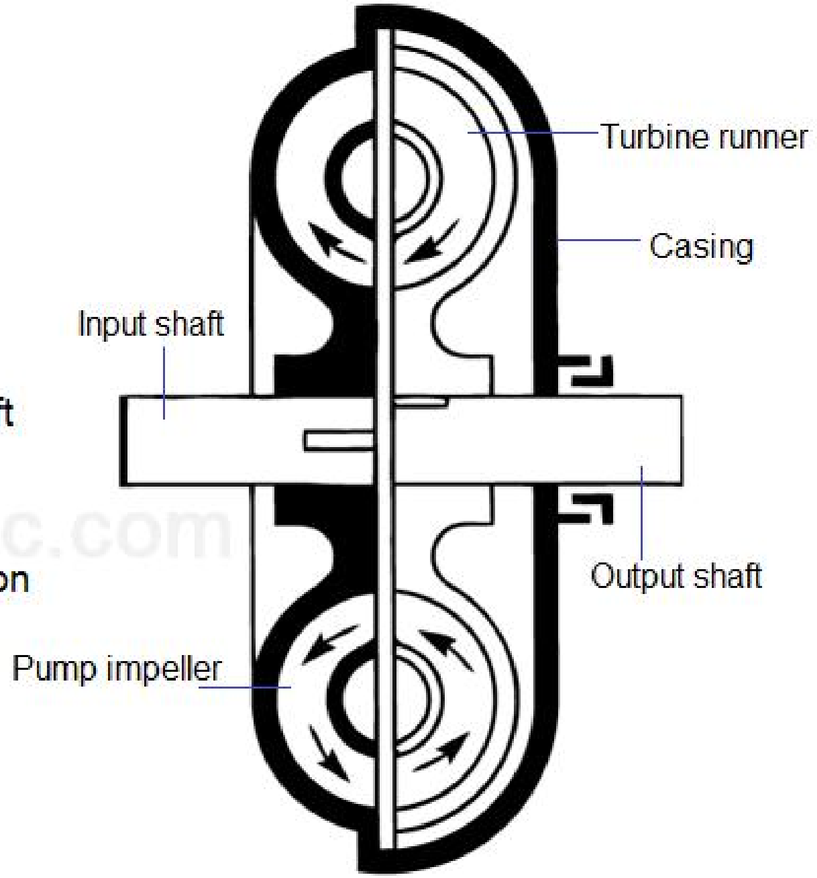
III YEAR - V SEM

TOPIC – HYDRAULIC COUPLING, TORQUE CONVERTORS

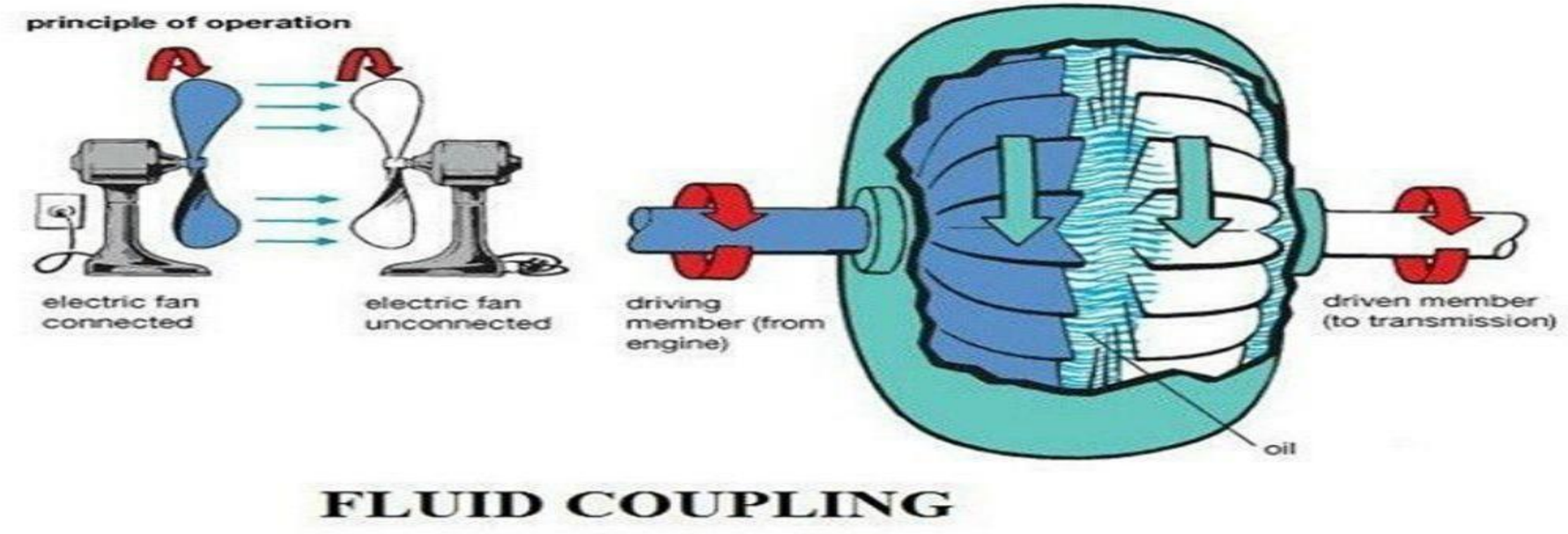
FLUID COUPLING (HYDRAULIC COUPLING)

- ✔ A fluid coupling or hydraulic coupling is a hydrodynamic device used to transmit rotating mechanical power.
- ✔ It is used for transmitting power or torque from one shaft to other shaft with help of an oil (fluid), without Mechanical connection between the two shafts.





HYDRAULIC COUPLING PRINCIPLE

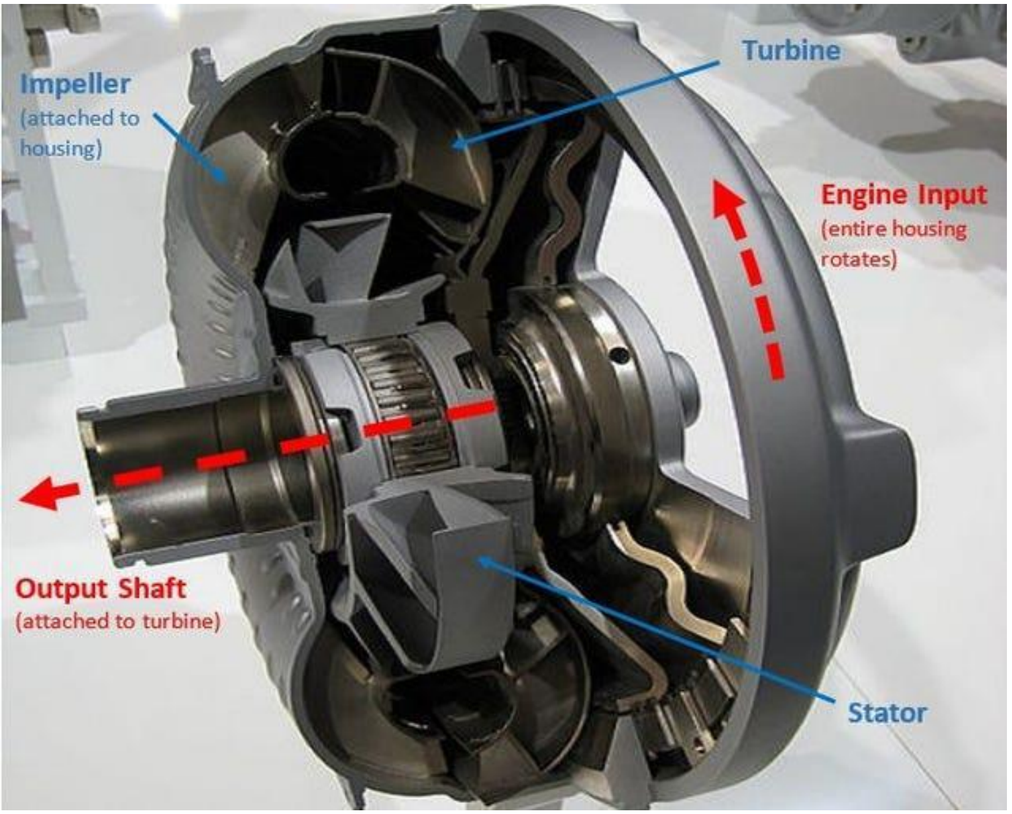


FLUID COUPLING

CONSTRUCTION

It consist of two rotating elements as radial pump impeller and radial flow reaction. The pump impeller is mounted on a driving shaft and turbine runner is mounted on a driven shaft.

Both the impeller and the runner are identical in shape and they are enclosed in a single housing filled with fluid (oil). The function of oil is to transmit torque from pump impeller to the turbine runner and also provide lubrication, and stability. There is no direct contact between the driving and driven parts.



Coupling and Its Parts:

Fluid drive coupling, also known as the hydraulic coupling is a hydrodynamic device that is used to transfer rotational power from one shaft to another by the use of transmission fluid comprised of three main elements:

(1)Driving impeller mounted on the input shaft.

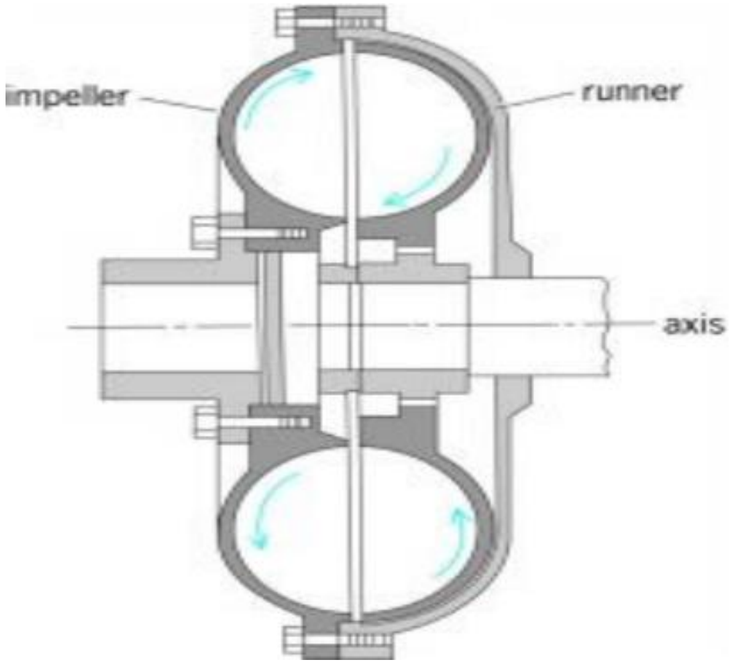
(2)Driven impeller mounted on the output shaft.

(3)Cover, flanged to the output impeller, with an oil-tight seal.

OPERATION

- When the driving shaft with pump impeller is rotated, the oil start moving from the inner radius to the outer radius of the pump impeller by centrifugal action.
- Due to centrifugal action and speed of the pump impeller, the pressure and kinetic energy of oil at the outer radius increases.
- This oil then enters the turbine runner at the outer radius of the runner & flows inwardly to the inner radius of runner.

- The magnitude of the torque increases with an increase in the speed of the driving shaft.
- The oil from the runner then flows back into the pump impeller, hence having a continuous circulation.
- In the actual practice, the speed of the driven shaft is always less than the driving shaft by 2% - 4% due to friction & turbulence loss in the impeller and runner passage, which is known as slip.
- Efficiency is 98%



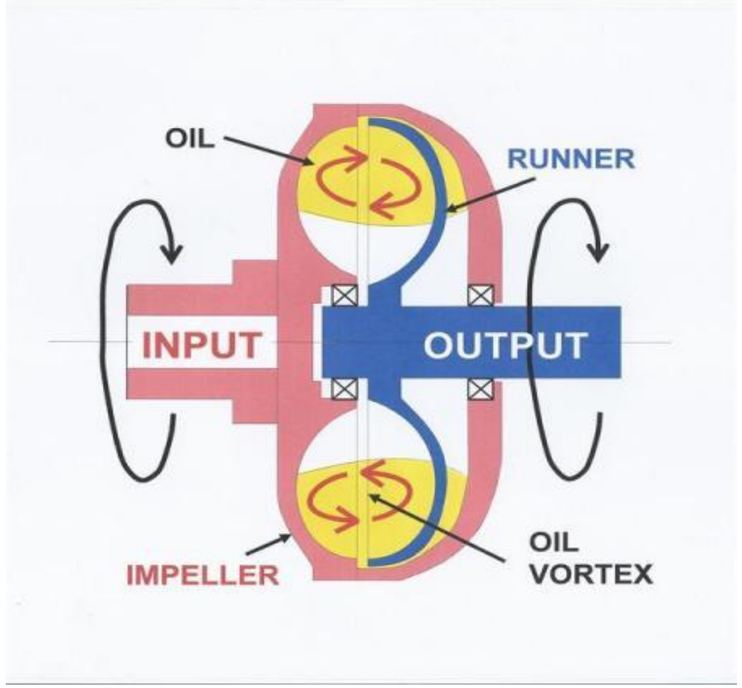
TORQUE CONVERTORS

A torque converter comprises:

1. Pump impeller coupled to the driving shaft,
2. Turbine runner coupled to the driven shaft, and

INPUT OUTPUT.

3. Reaction member or fixed guide vane arranged between the pump impeller and the turbine runner.



ADVANTAGES

- Makes it easy the gently accelerate the driven machines
- Limites torque, provide load sharing, dampen torque vibrations
- During start up will reduce current draw on your electric motor by 33%.

DISADVANTAGES

- Under stall conditions all of the engines power would be dissipated in the fluid coupling as heat leading to damage
- Fluid coupling cannot develop output torque when the input and output angular velocities are identical.

Reference video:

https://youtu.be/uvaV8nuHvE4?si=6w2ERKN0dtk5BuUX

Reference:

https://fluiddrivecoupling.com/

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Thank
you!