SNS COLLEGE OF TECHNOLOGY

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Coimbatore – 35

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DEPARTMENT OF AGRICULTURAL ENGINEERING

19AGB301 – FARM TRACTORS

III – YEAR V SEMESTER

UNIT 3 – POWER OUTLETS AND TRACTOR CONTROL

TOPIC 2 – Tractor PTO, Belt-pulley,

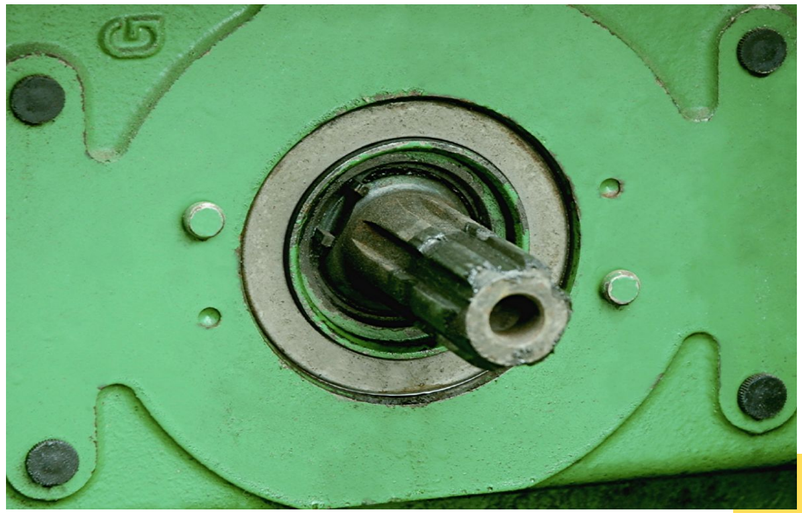
PTO?

PTO- Power Take off

A power take off is a mechanical device that transmits rotary power from a tractors engine to external equipment

The PTO converts the tractor's engine rotation into mechanical rotation or hydraulic power.

This allows large implements to be moved with less power.



USES !!!!

Uses of Power Take-Off (PTO) in Tractors

The Power Take-Off (PTO) system in tractors allows for the efficient transfer of power from the tractor's engine to various implements and attachments.

Tillage

Ploughs: PTO powers ploughs for breaking up soil and preparing it for planting.

Harrowing: Used for leveling and breaking up soil clumps.

Seeding and Planting

Seeders and Planters: PTO-driven seeders help in precise planting and efficient seed distribution.

Mowing

Mowers: Rotary mowers and sickle bar mowers are powered by PTO, making grass cutting more efficient.

CONTD!!!

Hay and Forage Management

Hay Balers: PTO drives the mechanisms that compress and wrap hay into bales.

Rakes and Tedders: Used for turning and aerating hay to facilitate drying.

Spraying

Pesticide and Fertilizer Sprayers: PTO-powered sprayers ensure even application of chemicals over crops.

Harvesting

Combine Harvesters: PTO can drive various components for cutting and processing crops.

Corn Pickers and Forage Harvesters: PTO provides the necessary power for harvesting operations.

Transport

Dump Trailers: PTO can operate hydraulic systems to lift and dump loads.

Post-Harvest Operations

Grain Augers: Used to move grain from one location to another efficiently.

Choppers and Shredders: PTO-driven machines can chop or shred crop residue for better decomposition

ADVANTAGES

Versatility

Multiple Applications: PTO allows tractors to power a wide range of implements, from tillers and mowers to balers and sprayers, making them adaptable for various agricultural tasks.

Increased Efficiency

Power Transfer: PTO systems enable the efficient transfer of engine power directly to implements, reducing the need for separate power sources and enhancing productivity.

Ease of Operation

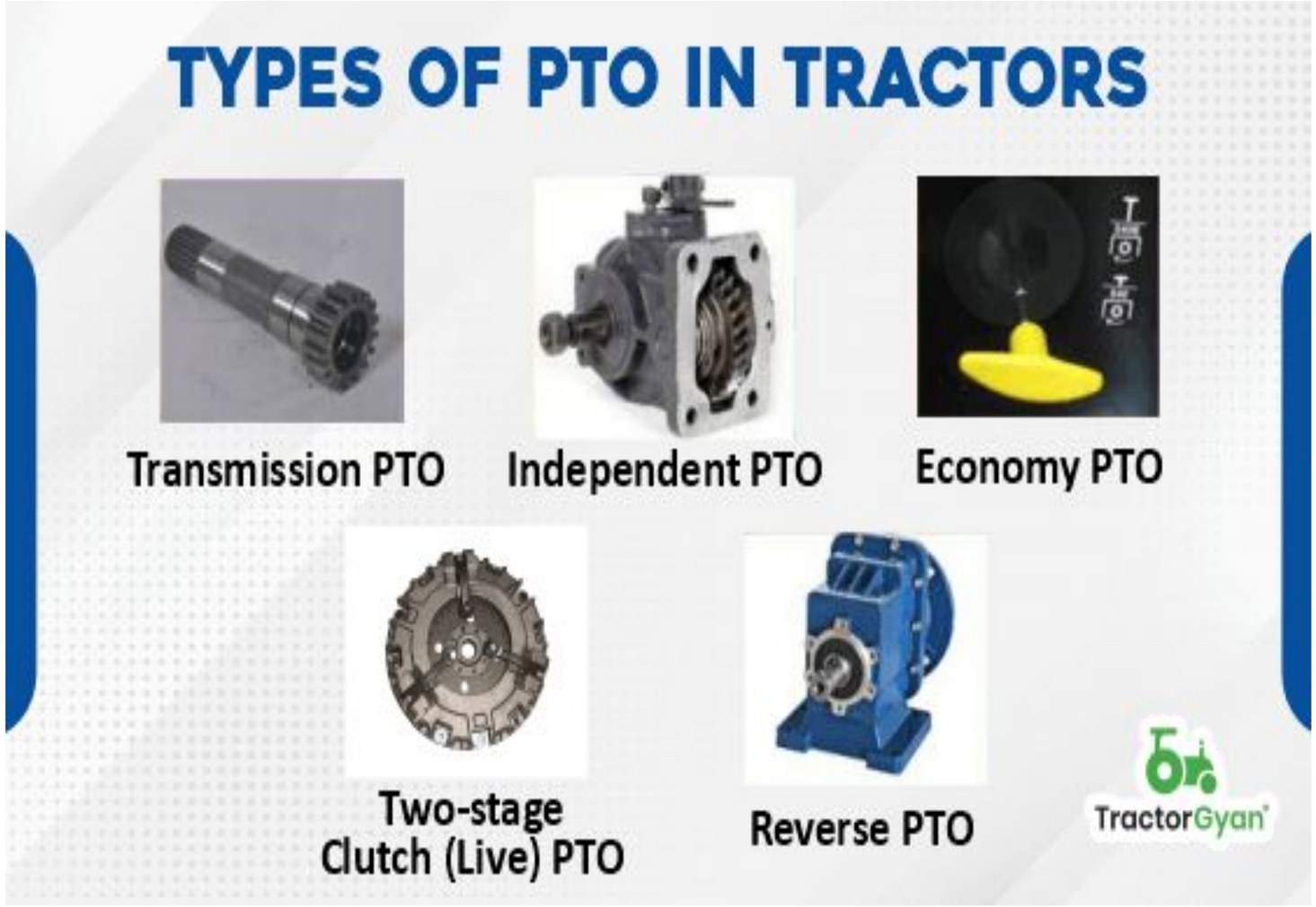
User-Friendly: Engaging and disengaging the PTO is straightforward, allowing operators to switch between tasks quickly and efficiently.

Cost-Effective

Reduced Equipment Needs: By utilizing PTO to power multiple implements, farmers can reduce the number of machines they need, leading to lower maintenance and operational costs.

DISADVANTAGES

- Safety Risks
- Maintenance Requirements
- Noise and Vibration
- Limited Power Output
- **Power Constraints:** The power available through the PTO is limited to the engine's capacity, which can restrict the size and type of implements that can be used effectively.


TYPES OF PTO IN TRACTORS
Transmission PTO
Independent PTO
Economy PTO
Two-stage
Clutch (Live) PTO
Reverse PTO
TractorGyan


ECONOMY
PTO

TYPES OF PTO

The Power Take-Off (PTO) system can be categorized into several types based on its design, operation, and application.

Standard PTO

The most common type, typically operating at fixed speeds such as 540 RPM or 1000 RPM.

Used for a wide range of implements like mowers, tillers, and balers.

Independent PTO

This system allows the PTO to be engaged or disengaged without affecting the tractor’s movement.

It operates independently of the tractor's transmission.

Provides more control over the implement, allowing it to run while the tractor is stationary or moving at different speeds.

Common in applications requiring precise control, such as sprayers and seeders.

Live PTO

- Similar to independent PTO, a live PTO operates independently of the tractor's speed and allows for continuous power transfer while changing speed or direction
- Enables the implement to continue operating even when the tractor is idling, improving efficiency and control
- Often used with balers and mowers

Transmission PTO

- Engaged and disengaged through the tractor's transmission system, meaning it operates based on the tractor's speed
- This type may require the tractor to be in a specific gear or speed to engage or disengage effectively.
- Generally found in older tractors and specific applications where constant power is not critical.

Two-Speed PTO

- Allows the operator to choose between two different speed settings (usually 540 and 1000 RPM) for different implements.
- Offers flexibility in using various attachments, optimizing performance for specific tasks.
- Useful in farming where implements with different power requirements are used.

- **Reverse Power Take-Off (PTO)** is a system that allows the PTO to operate in both **forward** and **reverse** directions. This capability enables the attachment to function efficiently in either direction, which can be particularly useful for certain agricultural tasks.

Assessment

1. TYPES OF PTO
2. ADVANTAGES OF PTO

BELT PULLEY SYSTEM

Definition

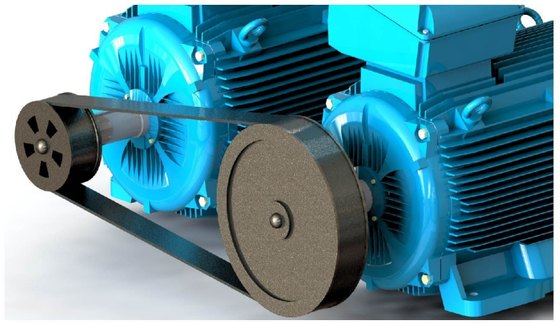
A belt pulley in a tractor is a mechanical device used to transfer power from the tractor's engine to various implements or attachments through a belt system.

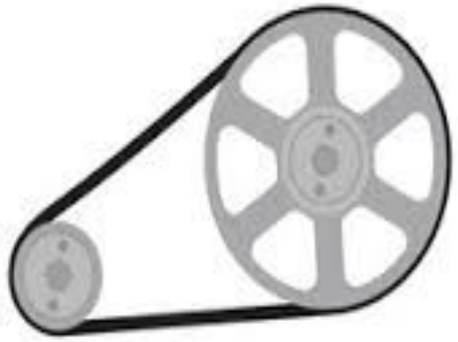
It allows for the operation of equipment that requires rotational power.

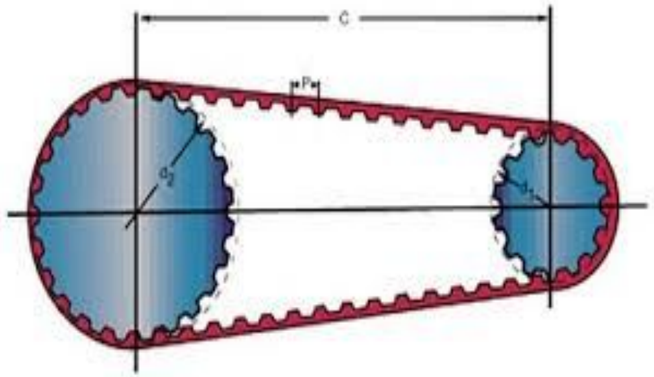
TYPES

- **Flat belt pulleys :** flat smooth surface and are used flat belts
- **v- belt pulleys:** V shaped groove , which provide better grip
- **cogged belt pulleys** : have multiple small logs or teeth and are used with cogged belts which offer even better grip and power transmission

Flat Belt





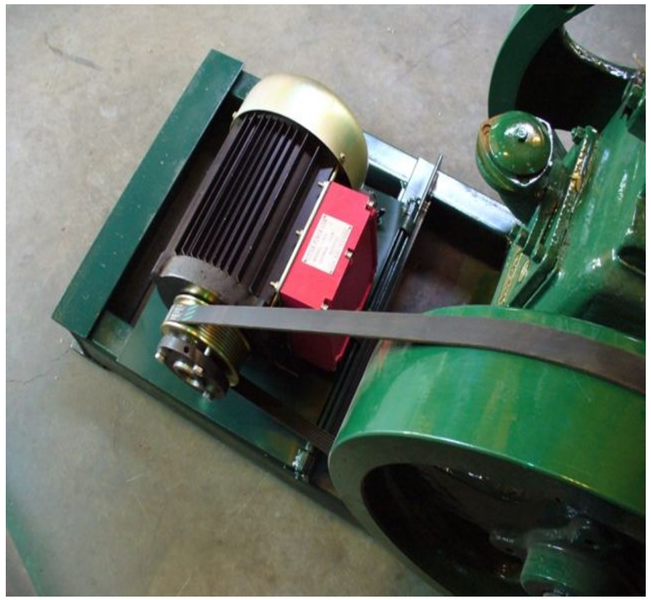


USES

Powering implements : Tractors often use belt pulleys to drive various agricultural implements such as baler, threshers and feed grinders.

Operating axillary equipment: Belt pulleys can also be used to power axillary implements such as generators, pumps

Driving the fan: The fan that cools the tractors engine is often driven by belt pulley



ADVANAGES AND DISADVANTAGES

1. VERSATILITY
2. EFFICIENCY
3. SIMPLE DESIGN
4. EASY TO MAINTAIN

DISADVANTAGES

1. SLIPPAGE- Belt may slip if they become loose , leading to reduced power transmission
2. Belt cracking
3. Belt drives require more space: Belt drives can take up more space

See You at Next Class!!!!