TKP3501
Agricultural Mechanization & Irrigation

Topic 4: Power Tiller

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History

- Common name: Pedestrial tractor or power tiller or compact tractor or two wheeled tractor
- It is a prime mover in which the direction of travel and its control for field operation is performed by the operator walking behind it.
- The concept of power tiller came in the world in the year 1920. Japan is the first country to use power tiller on large scale. In Japan, the first successful model of power tiller was designed in the year 1947.
- In India power tiller was introduced in the year 1963. Manufacturing of several makes of power tillers like Iseki, Sato, Krishi, Kubota, Yanmar and Mitsubishi were started in India after 1962.
- In agricultural power tillers are used for ploughing, sowing, spraying, harvesting and transporting works. It is the most wanted machine for puddling operation in rice cultivation.
Components of power tiller

- Engine
- Transmission gears
- Clutch i.e V-belts
- Brakes
- Rotary unit

All power tillers are fitted with an I.C. engine. At present makes like Kubota, Mitsubishi, Krishi, Yanmar and Satoh use diesel engine. Iseki make use kerosene engine.
Operation of a power tiller (power transmission in a power tiller)

- The power is obtained from the I>C engine, fitted on the power tiller. The engine power goes to the main clutch with the help of belt or chain. From main clutch power is divided in two routes, one goes to transmission gears, steering clutch and the to wheels. The other component goes to the tilling clutch and then to tilling attachment.
- V-belt pulley is usually used to transmit power from the engine to the main clutch.
- Main clutch: Power goes from engine to main clutch through V-belt – pulley arrangement
- Transmission gears: Transmission gears consists of gears, shafts, and bearings. Transmission gears reduce speed of the engine and increase the torque at the wheels.
Operation of a power tiller (power transmission in a power tiller)

- **Brakes:** All power tillers have braking arrangement for stopping the movement of power tiller.
- **Wheels:** Usually two to four ply pneumatic tyre are used in power tillers for the wheels.
- **The inflation pressure ranges from 1.1 to 1.4 kg/cm².**
- **Rotary unit:** Power tillers have a rotary unit for field operation. Rotary tines are used in rotary unit for soil cutting and pulverizing purposes. Rotary tines are of three types
  a) Straight tines
  b) Curved tines
  c) L shape blades
Purpose of Power Tiller

- **Multipurpose hand tractor** designed primarily for rotary tilling and other simple farm operation
- Normally being used as a soil preparation
- Simple operation such as; ploughing, puddling, levelling and smoothening, transportation, powering post harvest equipment's
- Operated at small scale farming
Features

A: Break
D, G and E: Gears
F: Throttle
C and H: Clutch break
L: Gear forward or reverse
Power trains for standard tractor

**ENGINE**

**CLUTCH**
- Disk type

**TRANSMISSION**
- Sliding gear
- Collar-shift synchromesh

**DIFFERENTIAL**
- Bevel pinion
- Mechanical differential lock

**FINAL DRIVE**
- Straight, semi-floating axle
- Pinion-inboard or outboard
- Planetary next to differential
- Chain drive (special applications)

**POWER TAKE OFF (PTO)**
- Transmission-driven
- Continuous-running
- Independent
- 540 or 1000 rpm

Power trains for power tiller

**ENGINE**

**CLUTCH**
- Belt tensioning

**TRANSMISSION**
- Dual belt
- Sliding gear

**DIFFERENTIAL**
- Yes

**FINAL DRIVE**
- Worm gear
- Chain gear
How to start the engine

- Using the dipstick provided, check the engine oil level. Top up with 10w/40 oil if necessary.
- Check fuel level. Only use diesel from a clean container. Never re-fuel when the engine is hot or running.
- Before starting the engine ensure the gear lever (D) is in neutral position and the power take-off (PTO) lever is disengaged (E).
- Apply ¾ throttle (F).
- Move the engine stop lever (B) to position 1 ‘ON’.
- Press and hold the decompression lever on top of the engine.
- Pull recoil start handle gently until it engages then, keeping the decompression lever depressed, slowly pull the engine over 2-3 times to prime the engine.
- Release the decompression lever and gently pull over the engine until compression is felt.
- Press, but do not hold, the decompression lever and give the starter handle a good strong pull to start the engine.
- Once the engine has started return the throttle lever (F) to idle position.
Attachments

TILLER
WIDTH SIZES RANGE FROM 18” TO 33”

ROTARY PLOW

BRUSH MOWER
21”, 26” AND 32”

CHIPPER / SHREDDER
Advantages use of power tiller

- Lest cost - cheaper than standard 4-WD tractor
- Less sophisticated - the design is much more simpler than a standard tractor
- Easy to maintain
- Simple to operate
- Versatile - can be attached to any small implement
- Suitable for small area
- Less compaction to the soil
Land leveling
SICKLE BAR MOWER

Ideal for mowing tall grass, weeds, woody brush and saplings, the Sickle Bar Mower neatly slices everything off near ground level with no flying debris or thrown stones. Simply walk behind it to create a path through areas you wouldn’t dare take a conventional mower. The height-adjustable bar is much wider than the wheelbase, so you can easily trim along ponds, under fences and more, saving you hours of trimming time! Your BCS tractor provides all the maneuverability, plus power reverse, to get you in and out of “impossible” areas with ease.

FEATURES:

- Bar widths range from 30” to 53”.
- Optional oil bath transmission for smooth operation and longer life.
- Optional “Duplex” sickle bar also available – a unique and fast sickle bar attachment that mows a 47” or 59” swath using two moving blades, each moving in equal and opposite directions.
- Ideal for commercial operations.
POWER SWEeper

Now you can walk your way to a fresh-swept look. The BCS Power Sweeper will cover your entire property in no time, and it’s so easy to operate, you won’t hesitate to use it after each storm. This is a true four season tool. In spring, it’s ideal for thoroughly removing damaging road salts left over from winter. During the winter months, it’s the best way to remove up to 6” of dry snow from any walkway. You can even use it as a de-thatcher on your lawn to give your grass a fresh, healthy look!

FEATURES:

• Change angles effortlessly from operator’s position.
• Adjustable gauge wheels allow for wide range of applications.
• Heavy-duty nylon bristles provide long life.
Attachment with trailer
Rotovator
Seedling-corn / soy bean
Water pump
Harvesting
Transplanting
QUESTIONS

- If you have 3 ha area to cultivate a chili production, what is the best tractor type to be used? State the type of implement suitable for the operation.
- What is the different between power tiller (2-WD) with standard 4-WD tractor?
- What is the benefit of power tiller as compared to the 4-WD tractor?
- What is the other attachments to the power tiller other than rotovator?
- Why is the power tiller is the most popular among small farmers?
Thank you.