Machinery Guide: cultivation

Ploughs

Furrow non reversible

Furrow reversible
The Reversible Plough is a unique implement, which is directly mounted to the tractor. This is a hydraulically operated basic implement for preparation of land. It is very useful in hard and dry trashy stumpy land condition and in soil where scouring is a problem. Heavy-duty clearance allows the plough to operate under heavy crop residual. This plough works on both the left and right side and automatically reverses the position while ploughing hence less time & diesel consumption.

The reversible plough has two mouldboard ploughs mounted back-to-back, one turning to the right, the other to the left. While one is working the land, the other is carried upside-down in the air. At the end of each row, the paired ploughs are turned over, so the other can be used. This returns along the next furrow, again working the field in a consistent direction.
Close up of older furrow press

Tines
Spring Tines

Einbock Tines

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Heavy tined cultivator

Chisel ploughs
The chisel plough is a common tool to get deep tillage with limited soil disruption. The main function of this plough is to loosen and aerate the soils while leaving crop residue at the top of the soil. This plough can be used to reduce the effects of compaction and to help break up ploughpan and hardpan. Unlike many other ploughs the chisel will not invert or turn the soil. This characteristic has made it a useful addition to no-till and limited-tillage farming practices which attempt to maximise the erosion-prevention benefits of keeping organic matter and farming residues present on the soil surface through the year. Because of these attributes, the use of a chisel plough is considered by some to be more sustainable than other types of plough, such as the mouldboard plough.
Cultivators

A rotary tiller, also known as a rototiller, rotavator, rotary hoe, power tiller, or rotary plough (in US: plow), is a motorised cultivator that works the soil by means of rotating tines or blades. Rotary tillers are either self propelled or drawn as an attachment behind either a two-wheel tractor or four-wheel tractor. For two-wheel tractors they are rigidly fixed and powered via couplings to the tractors’ transmission. For four-wheel tractors they are attached by means of a three-point hitch and driven by a Power Take-Off (PTO).
Bedformer – usually a rotary cultivator with crumbler roller and sideforming discs

Discs
Harrows

A set of harrows is an implement for cultivating the surface of the soil. In this way it is distinct in its effect from the plough, which is used for deeper cultivation. They are commonly called harrows (plural) as they are used as a set. There are nominally three types of harrows; disc (disk), tine and chain.

Harrows were originally horse-drawn. In modern practice they are almost always tractor-mounted implements, drawn after the tractor, either trailed or mounted on the three-point linkage.

Harrowing is often carried out on fields to follow the rough finish left by ploughing operations. The purpose of this harrowing is generally to break up clods and lumps of soil and to provide a finer finish, a good tilth or soil structure that is suitable for seeding and planting operations. Such coarser harrowing may also be used to remove weeds and to cover seed after sowing.

Power Harrow
Power harrow, in which the cultivators are power-driven from the tractor rather than depending on its forward motion.

Rollers
The roller is an agricultural tool used for flattening land or breaking up large clumps of soil, especially after ploughing. Typically, rollers are pulled by tractors or, prior to mechanisation, a team of animals such as horses or oxen.

Flatter land makes subsequent weed control and harvesting easier, and rolling can help to reduce moisture loss from cultivated soil. On grassland, rolling levels the land for mowing and compacts the soil surface.

On tilled soil a one-piece roller has the disadvantage that when turning corners the outer end of the roller has to rotate much faster than the inner end, forcing one or both ends to skid. A one-piece
Soil turned on soft ground will skid up a heap of soil at the outer radius, leaving heaps, which is counter-productive. Rollers are often made in two or three sections to reduce this problem, and the Cambridge roller overcomes it altogether by mounting many small segments onto one axle so that they can each rotate at local ground-speed.

The surface of rollers may be smooth, or it may be textured to help break up soil or to groove the final surface to reduce scouring from rain. Each segment of a Cambridge roller has a rib around its edge for this purpose.

Rollers may be ganged, or combined with other equipment such as mowers.

**Subsoilers**

![Subsoiler Image]

A **subsoiler** or **mole plow** is a tractor mounted implement used to loosen and break up soil at depths below the level of a traditional disk harrow or **rototiller**. Most tractor mounted cultivation tools will break up and turn over surface soil to a depth of 6” to 8” while a subsoiler will break up and loosen soil to twice those depths. Typically subsoiler mounted to a Compact Utility Tractor will reach depths of about 12” and typically have only one thin blade with a sharpened tip.
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