

## UNIT 15

### Types of Tractors and Combine Harvesters

#### **Read and translate the text:**

Tractor is useful when it supplies power to machines. Power can be supplied by the tractor in various forms. The tractor can pull or push machines, it can supply power to machines from the power-take-off shaft and it can drive machines by means of a belt from a belt pulley.

The tractor power is produced by the engine and is measured by horse powers (hp) or kilowatts. There are tractors with engine power from 3 to 300 hp.

Tractors are classified according to the maximum power that their engine can produce. The crawlers or tracklaying tractors are large, they are used for heavy operations, such as road making and dam building.

Large tracks increase the grip of the tractor on the ground, and the crawlers are able to push or pull heavy loads and machines. Most of the tractors have tyres which can be placed closer or farther apart according to the distance between the rows that must be cultivated. Wheeled tractors may have mounted implements and machines on them. This is done by the three-point linkage.

There are tractors with diesel or gasoline engines. The diesel engine will use less fuel than the gasoline engine for the same work done. The regular servicing of tractors is necessary because it provides the tractor's useful work. The fuel should be clean and have no water, if the engine is water cooled one must be sure that there is water in the radiator. The radiator should be clean. The oil has to be changed regularly.

#### **Answer the following questions using the information from the text.**

1. In what forms can power be supplied by the tractor?
2. What operations can the tractor do?
3. By what means can the tractor drive machines?
4. What is produced by the engine?
5. How is the tractor power measured?
6. How are tractors classified?
7. What are the crawlers or tracklaying tractors used for?
8. What are the crawlers

able to push or pull? 9. How can the tyres be placed? 10. What tractors have implements and machines mounted on them? 11. What engines will use less fuel? 12. Why is the regular servicing of tractors necessary? 13. What should the fuel be?

**Use the questions from the previous exercise as a plan and retell the text about tractors.**

**Are the sentences true or false? Correct the false sentences.**

- 1 Tractors are useful when they supply power to machines.
- 2 Tractors supply power to machines from the camshaft.
3. The tractor power is produced by the PTO shaft and is measured by horsepower.
4. Tractors are classified according to the maximum power produced by their engines.
5. The tractors may be only with diesel engines.
6. The regular servicing of tractors is necessary.
7. The crawlers are used for heavy operations.

**Complete the sentences.**

1. The tractor can supply power to the machines from the ... (power-take-off shaft, belt pulley, three point linkage).
2. The tyres can be placed closer or farther apart ... (according to, by means of) distance between the rows.
3. The crawlers are usually ... (small, large, various).
4. The tractor can ... (increase, pull, do) machines.
5. The crawlers are able to ... (increase, pull, drive) heavy loads.
6. Implements are mounted on the tractor by means of... (a belt pulley, tyres, a three point linkage).
7. The fuel should be ... (heavy, clean, dry).

## **Read and translate the text.**

### **Tractor Types**

1. Tractors may be classified according to traction parts used and according to use and size of the tractor.

2. According to wheel or track systems the classification is the following:

- a) wheeled tractors;
- b) track type tractors.

3. The wheel type tractor is most commonly used in agriculture. In the past many wheel type tractors were made as three- wheel type. Now most tractors produced are of the four-wheel type with tyres which can be placed closer or farther apart according to the distance between the rows. The four-wheel-drive tractor is the most popular type.

4. Tracklaying tractors have two heavy metal tracks. They are usually used for heavy work (dam building or road making).

5. According to their use tractors may also be classified as follows:

- 1) general-purpose tractors;
- 2) large field tractors;
- 3) garden tractors;
- 4) industrial tractors.

The general-purpose tractors may be used for tillage, harvesting, loading etc. Their power is up to 80 hp. Some of them may be used for row-crop cultivation.

Note:

traction part – тягова частина

## **Retell the text according to the plan.**

- a) Classification of tractors according to wheel or track system.
- b) Classification of tractors according to their use.

### **Form questions using the question-words in brackets.**

1. The regular servicing of tractors is necessary because it provides the tractor's useful work. (Why...?)
2. Tractor is useful when it supplies power to machines. (When....?)
3. Tractors can pull or push machines. (What...?)
4. Wheeled tractors may have mounted implements. (What...?)
5. Large tracks increase the grip of the tractor on the ground. (Do....?)

### **Read and translate the text.**

#### **Ploughs**

The plough has been used in its different forms for many centuries. It has become the main implement used for the preparation of seedbeds.

A plough is an implement with one or more mouldboards which cut and turn the soil. Modern ploughs are commonly fully mounted on the tractor hydraulic system. Some are semi-mounted with the front supported by the tractor hydraulic linkage and the rear by one or more wheels. A semi-mounted plough is not lifted off the ground.

The number of mouldboards on a plough will depend on the type of soil and the tractor size. Ploughs with up to six mouldboards' are in common use. There are three main types of ploughs:

1) Conventional ploughs with right-handed mouldboards<sup>2</sup> They are usually fully mounted but some semi-mounted and trailed models are also in use.

2) Reversible ploughs having left-and- right-handed mould- boards, we can plough up and down<sup>3</sup> in the same furrow. Most of them are mounted, but some of the larger models are semi- mounted. Reversible ploughs produce a very level finish<sup>4</sup>

3) Disc ploughs are rarely used in Great Britain. In place of the mouldboards they have large rotating discs which cut and turn the soil slice. Both right-handed and reversible types are being produced.

The soil engaging parts<sup>5</sup>, disc coulter and the body of the plough are attached to leg which are in turn<sup>6</sup> bolted to the plough frame.

The base of a plough body is called the frog, the soil engaging parts being bolted to it. The share cuts the bottom of the furrow slice. The mouldboard lifts and turns the furrow slice. There are many types of mouldboards, each producing its special surface. The disc coulter cuts the side of the furrow that is to be turned.

There are various types of plough body, each having its special use. The main types common in Great Britain are general-purpose type and digger type. The general purpose type is useful for the general ploughing work. The digger type is used for deep ploughing, generally in preparation for root crops.

Notes:

1 with up to six mouldboards – з числом полиць, що досягає шести

2 right-handed mouldboard – правостороння полиця

3 up and down – вперед і назад

4 produce a very level finish – дають дуже рівну поверхню

5 the soil engaging parts – ґрунтозахватні частини

6 in turn – у свою чергу

**Answer the following questions, using the information from the text «Ploughs».**

1. How long has the plough been used? 2. What has the plough become? 3. What kind of implement is the plough? 4. Where are ploughs usually mounted? 5. Are all ploughs fully mounted? 6. is a semi-mounted plough lifted off the ground? 7. What will the number of mouldboards depend on? 8. What ploughs are in common use? 9. How many main types of ploughs are there? 10. Are all conventional ploughs fully mounted? 11. Can we plough with a reversible plough up and down in the same furrow? 12. What do reversible ploughs produce? 13. Are disc ploughs often used in Great Britain? 14. What do disc ploughs have in place of mouldboards? 15. What kind of work does the mouldboard do? 16. Are there many types of mouldboards? 17. What are the main types of plough body? 18. What is the digger type used for?

**Use the questions of the previous exercise as a plan and retell the text “Ploughs”.**

**Complete the sentences using the words from brackets:**

1. A modern plough has up to (three, six, eight) mouldboards.
2. When the (camshaft, connecting rod, piston) has reached the bottom of its stroke, the inlet valve closes.
3. The driver has to attach the (plough, cooling system, piston) correctly.
4. Modern tractors usually have a (two-stroke, four-stroke, one-stroke) engine.
5. The plough is an implement used for (fuel ignition, soil cultivation, water cooling).

**Read and translate the text.**

### **Harrows**

1. Harrows are used for various purposes such as the preparation of seedbeds, the covering of seeds, the destruction of weeds<sup>1</sup> and the aeration of soil. Many types and sizes are in use today. The most common type is that with a zigzag frame and rigid tines.

2. Seed harrows are light implements with closely fitted tines, about 4 in (100 mm) long. They are used for the final preparation of seedbeds and for covering seeds after the drill<sup>2</sup>. They are mounted on small tractors.

3. Medium tractor harrows have various functions: the preparation of seedbeds, mixing of fertilizers<sup>3</sup> with soil and spring cultivation of autumn-sown corn<sup>4</sup>. The wider the implement, the more important it is to have good arrangements for transport. Mounted implements up to 8 m wide may be used with tractors of 40—50 kw. Heavier and wider harrows for use with tractors of about 75 kw may be semi-mounted. One type provides for lifting of the harrow sections to a wheeled frame, the wings of which can be manually rolled<sup>5</sup> behind the centre sections.

4. Disc harrows cut and consolidate the soil, two or more sets of discs are fitted on a frame which may be mounted or semi-mounted. Some heavy discs are trailed and have hydraulically operated transport wheels. Disc diameter varies from 30 to 75 cm. Discs are supported by bearings. Disc harrows working widths vary from 1 to 6 m.

5. Adjustments of disc angle. A hand-operated lever on the harrow is used to vary the cutting angle of the discs. Discs being fitted at the widest angle, the soil movement will be the greatest. When discs are set straight<sup>6</sup>, they will not move the soil very much and have a consolidating effect.

Notes:

1 the covering of seeds, the destruction of weeds – закопування насіння, знищення бур'янів

2 after the drill – після висіву

3 fertilizer – добриво

4 spring cultivation of autumn-sown corn – весняний обробіток, засіяних восени зернових

5 the wings of which can be manually rolled — крила, які можна котити вручну

6 are set straight – встановлені прямо

**Read and translate the text.**

### **Combine Harvesters**

Combine harvesters are used to harvest various crops. The combine cuts the crop, threshes it, separates the grain from the straw and chaff. The mechanism of a combine harvester can be divided into three sections. They are cutting, threshing and finally separating the grain from the straw and chaff.

To cut the crop a reciprocating type cutter bar is used, i here is a divider at each side<sup>1</sup> of the cutter bar. It separates the crop to be cut from that which will be left for the next round<sup>2</sup>. The crop is cut while held against<sup>3</sup> the cutter bar by the reel. After the crop is cut, the reel directs it to the cutter bar platform. The reel is one of the

main parts of a combine. It has tines which can be angled<sup>4</sup> to provide better cutting of the crops. A large auger moves the crop to the centre of the platform. By means of tines the auger directs the crop to the main elevator which lifts the crop to the threshing mechanism.

The threshing mechanism consists of a front beater, a heavy rotating drum, a concave, and a rear beater. The main elevator is used to lift the crop to the front beater. It delivers the crop to the drum and concave. The front beater increases the speed of the crop as it moves to the drum.

Some combines do not have a front beater. In these combines the work of the front beater can be done by the main elevator. Threshing takes place between the drum and concave. There are spaces between the concave bars, so the threshed grain is allowed to fall through on to the grain pan. To reduce the speed of the crop as it leaves the cylinder is the task of the rear beater. The rear beater is the part of the threshing mechanism which both reduces the speed of the crop and directs it to the separating mechanism. To separate the grain from the straw is the main function of this mechanism. The separating mechanism consists of two parts: the straw walkers and the grain sieves. The grain is separated from the straw by the rising and falling action<sup>5</sup> of the straw walkers. They are driven by two crankshafts. The grain separated from the straw moves through the straw walkers and is directed to the grain pan under the concave.

The separating unit is used to sort the grain and chaff on the grain pan. This unit consists of two sieves and a fan. The vibrating action of the sieves separates the threshed grain. The fan provides a flow of air to keep sieves clean.

The harvested grain is directed to the grain tank. Big combines have an auger in the grain tank to provide the proper flow of the grain. Grain tank capacities vary from 1 to 50 tonnes. A high capacity auger is used to deliver the threshed grain from the grain into a trailer



Notes:

- 1 at each side - з кожного боку
- 2 for the next round - для наступного ходу
- 3 while held against -тоді як притиснутий до...
- 4 which can be angled - які можуть бути нахилені
- 5 by the rising and falling action - під дією піднімання та опускання

**Answer the following questions using the information from the text «Combine Harvesters»:**

I. What machines are used to harvest various crops? 2. What operations does the combine harvester do? 3. In what sections can the mechanism of a combine harvester be divided? 4. What are these sections doing? 5. What type of a cutter bar is used to cut the crop? 6. What is there at each side of the cutter bar? 7. What does a divider do? 8. Where does the reel direct the crop? 9. Where does a large auger move the crop? 10. What does the threshing mechanism consist of? 11. What is used to lift the crop to the front beater? 12. Where does threshing take place? 13. What is the task of the rear beater? 14. What does the separating mechanism consist of? 15. What is the main function of this mechanism? 16. What is used to sort the grain and chaff on the grain path? 17. What does the separating unit consist of? 18. What does the fan provide? 19. Where is the harvested grain directed? 20. What is used to deliver the threshed grain from the grain tank into a trailer?

**Use the questions of ex. III as a plan and retell the text «Combine Harvesters».**

**Are the sentences true or false? Correct the false sentences:**

1. Combine harvesters are used to harvest different crops.
2. To cut the crop the grain tank is used.
3. There is a divider at each side of the rear beater.
4. The reel is one of the main parts of a combine.

5. The main elevator is used to cut the crop.
6. Threshing takes place between the drum and concave.
7. The harvested grain is directed to the rear beater.

**Read and translate the text:**

**Windrow or Swath**

Combine harvesters are mostly used to cut and thresh in one operation, but they may be used to pick up and thresh crops which have been cut and left in the swath or windrow.

Windrowing or swathing<sup>1</sup> is mainly used before combining in Britain to avoid losses of grain before it is taken into the harvester. In some other countries notably<sup>2</sup> Canada, its main task is to spread the season in which combines may be efficiently used.

Modern windrowers are self-propelled machines. Some machines lay two swaths, usually one swath is formed. There are machines specially designed for lifting crops. Ail combines consist of cutting or pick up, threshing and separating mechanisms.

The crop is directed by the auger to the centre of the platform where it is picked up by the elevator and lifted to the drum (cylinder). Threshing takes place between drum and concave. Chaff and grain are collected by a grain pan. This mixture moves into the sieves. Unthreshed grain may be directed either to the drum or to a special re-thresher.

The great advantage of a self-propelled machine is that it is able to go straight into the crop and can cut it in the most convenient direction. It also has a large variation in forward and reverse speeds.

Many modern combines have a special system to warn the driver if the threshing is not up to standard.

Notes:

1 windrowing or swathing - укладання у валки

2 notably - особливо

**Complete the sentences.**

1. Combine harvesters are used
2. Modern windrowers are
3. All combines consist of
4. The crop is directed by the auger
5. Threshing takes place between