

# **TRACTOR 101**

## **(Field Exercise)**

*The purpose of this exercise is to gain an understanding of skills for basic tractor operation. Rudimentary safety will be covered as well. Simple day-to-day maintenance will be covered in the field exercise.*

(This lesson plan is geared toward the operation of a Kubota 3410; nearly all information is transferable to most small farm tractors. However it is very important that when operating any tractor one has a solid fundamental understanding of that particular tractor's nuances, lever and gear positions, and safe operating guidelines.)

### **Understanding the Various Controls on the Tractor**

- **Starting the Tractor**
  - The Kubota and most small farm tractors are started by turning the key to the right one click until the light for the glow plugs comes on and then goes off again. You may then depress the clutch and turn the key all the way to the right until the engine turns over.
  - On cold mornings the choke may be required. This is operated by pulling the choke (located near the key) all the way out. As you turn the engine over, slowly push the choke back in until the engine kicks on.
  - It is very important that the throttle be pushed all the way in the upward (turtle) position before starting the tractor. This gives the tractor an opportunity to warm up in the idle position, very important with any diesel engine.
- **Throttle Control**
  - The throttle can be located sticking out of the right side of the dash. It is an orange handled lever equipped with a turtle and rabbit symbol.
  - Pulling down on the lever towards the rabbit increases the amount of fuel fed into the engine and therefore increases RPMs and available power to the tractor.
- **Clutch Pedal**
  - This pedal is found on the left side of your foot controls. It is a single pedal.
- **Forward and Reverse Pedal**
  - This “rocker” pedal makes the tractor go forwards and backwards and can be found on the right side of your foot controls. It sits on the floor of the tractor.
- **Brake Pedals**
  - These pedals sit above the rocker pedal and can be operated as one pedal or split to brake the individual rear tires.

### **Understanding the various parts of a small farm tractor and their functions**

- **PTO (power take off)**
  - A PTO is used for powering a tiller, auger, or any other implement that is actively driven by the tractors engine.
  - The PTO can be located in the back of the tractor.
  - The PTO is used by hooking up the PTO drive shaft to the PTO and running the engine so the tachometer reads 540 RPMs.
  - To engage the PTO the clutch must be depressed. Once the clutch is depressed you may shift the PTO lever forward and then slowly release the clutch pedal to begin spinning the PTO. The lever can be found next to your right hip on the tractor.
  - It is important when engaging the PTO not to “shock load .” A shock load happens when the clutch is popped and the engine is revved to a running RPM level. Shock loading the PTO stresses the metal on the tractor and the implement being driven. To avoid this, run the tractor's engine with the lowest RPM's possible when taking your foot off the clutch and engaging the implement.

- **Three-Point Hitch Hydraulic**
  - The hydraulic unit and three-point hitch system is designed to raise and lower the implement positioned on the rear of the tractor.
  - The hydraulic is used to determine the operating depth of both active (PTO driven) and passive implements. This will determine the depth of tillage, subsoil ripping, plowing etc. of any given implement in usage.
  - The lever that controls the three-point hitch can be found on the right side of the tractor driver's body around the height of the knee.
  - If the lever is pushed towards the ground at maximum depth the implement will be forced down as far as it may go by the hydraulics of the tractor.
  
- **Front Bucket Loader**
  - The front bucket loader is used for scooping up large loads and moving heavy objects or masses of earth around the farm.
  - The front bucket loader is hydraulically operated using the ball lever located on the right hand side of the tractor directly across from the tractor driver's shoulder.
  - There are two different ranges of motions available to you when using the front loader.
  - The arm of the bucket may be raised or lowered, and the bucket itself may be tilted forward and backward.
  - The controls are "reversed" in the sense that to make the arm of the bucket come up you pull straight down on the ball lever. To lower the arm you would push straight up.
  - To dump the bucket you would move the ball lever to your right, to tilt the bucket back you would move it to your left. Those are the four main movements of this lever, each movement accomplished by moving in the primary directions (north, south, east, and west).
  - There also are four other movements that incorporate both ranges of motion simultaneously. That is they move the arm and bucket at the same time. These positions can be found at the secondary directions (southwest etc.) They are useful once you've got the hang of the lever and will make your movements and fluidity much more efficient. They will be taught on site.

### **Basic Tractor Safety Principals**

- *Always wear your seatbelt.* Most tractors are equipped with a roll over protection device that is built to withstand the tractor rolling. A seatbelt will save you from getting crushed by the tractor.
- *Never stand near a spinning PTO.* The PTO and connected drive shaft spins with incredible force. Getting clothing or a body part caught in the spinning shaft behind the tractor will result in dismemberment and death.
- *Do not rest arms or hands in the joints of any hydraulic part.* The hydraulic operates with such force that it would be happy to take digits and hands away for you.
- *Never stick your hands inside or around active implement when the tractor is running. Please turn off tractor if jam or weed buildup occur when using implements driven by the PTO.* PTO can engage unexpectedly and kill your budding music career quite quickly.
- *Do not operate tractor on dangerous slope.* This can result in a rollover, not fun at all.
- *Always move very slowly when transporting heavy loads in bucket.* Driving tractor with heavy load in front loader greatly changes balance point and stability of tractor. Heavy loads encourage tipping and rolling. Be extra cautious of items in front loader that could roll out of the bucket towards the cab of the tractor and make you one with your tractor.