

Utility Type Vehicles: UTV Maintenance and Safe Use Lawn Care Training Guide

Utility type vehicles (UTVs) are popular equipment used in a variety of settings, including the lawn care industry. Their hauling capacity and versatility have increased their popularity, and they are widely used in rural, suburban, and urban settings for a variety of lawn care, agricultural, construction, and industrial applications. Considering that UTVs are widely used in the green industry, it is extremely important that young workers in the industry become familiar with the safe operation of UTVs. The purpose of this training guide is to familiarize young workers with the safe use of UTVs.

General Description

Utility type vehicles are similar to golf carts except they are fitted with cargo beds to carry loads. Most UTVs weigh 1,000 or more pounds, and they are designed to carry or pull loads equivalent to their weight. They generally come with either side-by-side or bench seats with seat belts. Most UTVs are also equipped with a rollover protection structure to protect the occupants during a tip over. This structure consists of a tubular frame system that surrounds the operator and passenger space. Generally, UTVs are classified as self-propelled vehicles specifically designed for hauling goods.



UTV designed for hauling goods.

Major Components and Operation

This section of the training guide includes a general description of major components of UTVs. For specific details and specifications, consult the owner's manual for the particular machine.

Power Unit

Most UTVs are powered by either diesel or gasoline engines in the range of 15-35 horsepower. Engines with single and multiple cylinders with different configurations are common, and they may be either air- or liquid-cooled. Most engines come with provisions for a quick start and excellent acceleration.

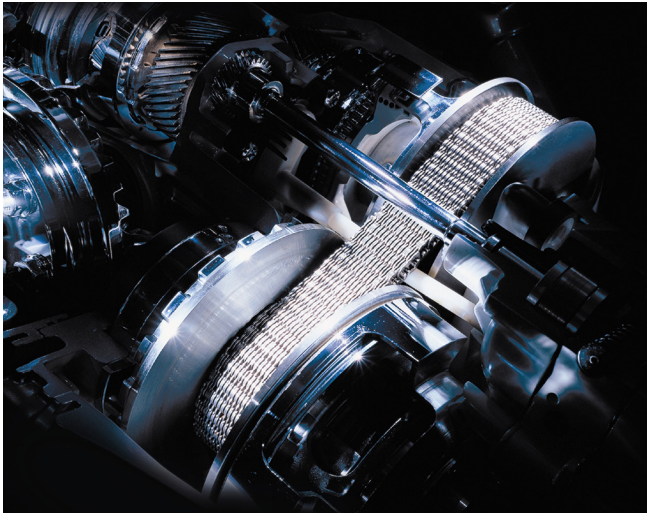


Liquid-cooled engine with radiator under the seat.

Power Transmission

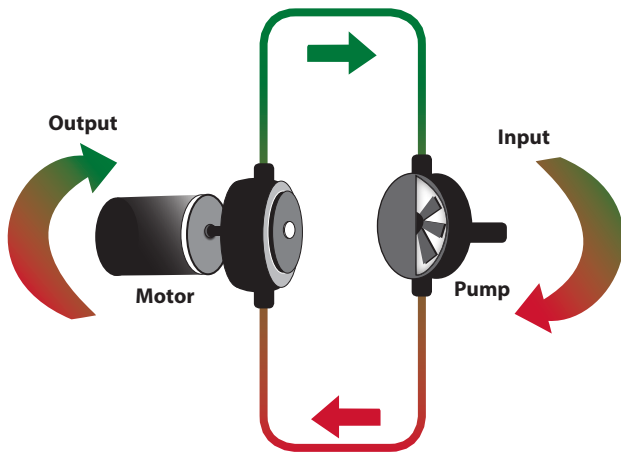
UTVs are usually equipped with continuously variable transmission systems (CVTs). Unlike mechanical transmissions that offer a fixed number of gear ratios, CVTs provide an infinite number of gear ratios. These transmissions provide different output shaft speeds at a constant drive-shaft speed. This feature permits maximum fuel economy by allowing the engine to run at the most efficient engine speed for a range of vehicle speeds.

Alternately, they also have the flexibility to maximize performance by controlling the engine speed at which the vehicle can produce peak power. This speed is typically higher than the speed at which the efficiency peaks.



Belt and conical pulley system for continuously varying the speed.

Most UTVs utilize a belt and conical pulley system to continuously vary their speeds. This type of power transmission system can transmit considerable power at forward speeds in the range of 10-15 mph without a clutch or shifting gears.



Hydrostatic transmission.

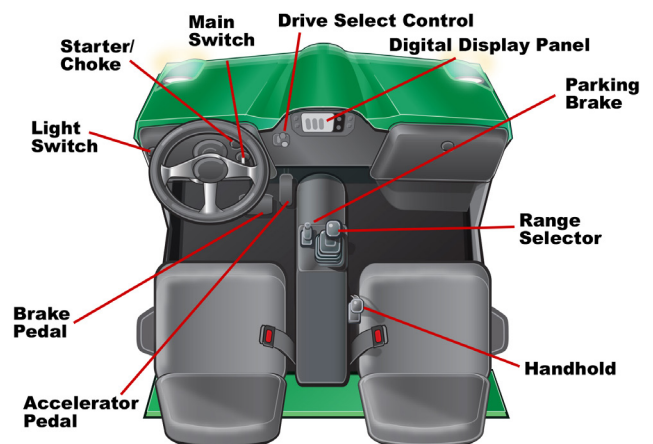
Hydrostatic transmissions, another version of CVT, are also widely used on UTVs for power transmission. A hydrostatic CVT generally consists of a variable displacement hydraulic pump and a hydraulic motor in addition to control valves and conductors. In this type of transmission system, power is transmitted through fluid under confinement. Selected advantages of hydrostatic CVTs are as follows:

- Capability to transmit more torque.
- Flexibility to mount the hydraulic motor directly on the wheel hub, allowing a more flexible suspension system.
- High transmission efficiency because of the elimination of friction losses.
- Easy single-lever control for forward and reverse speeds.

High cost and sensitivity to fluid contamination are the primary disadvantages of the hydrostatic CVTs.

Controls

Most UTVs have simple controls, and they are generally equipped with a key, parking brake, steering wheel, brake (hand or foot pedal), and throttle foot pedal. Remember that some vehicles need to be started before shifting from park to neutral.



Operator's controls platform.

Tires

Tires with different tread designs and sizes are available for UTVs. Tire selection should take into consideration how and where the vehicles are to be used. Once the right tires are selected and mounted, proper care and maintenance are imperative. Tire pressure should be checked and tires rotated periodically. Maintaining inflation pressure recommended by the manufacturer is extremely important for getting the full life out of the tires. Overinflated tires may result in inefficiency due to higher wheel slip, faster and uneven wear, and rough ride. On the other hand, underinflation may cause rim slip and loss of air pressure. In the long run, this may also result in heat buildup and buckling and excessive wear on sidewalls. Correct inflation pressure provides proper tire-ground contact, which, in turn, results in improved traction and even tire wear.

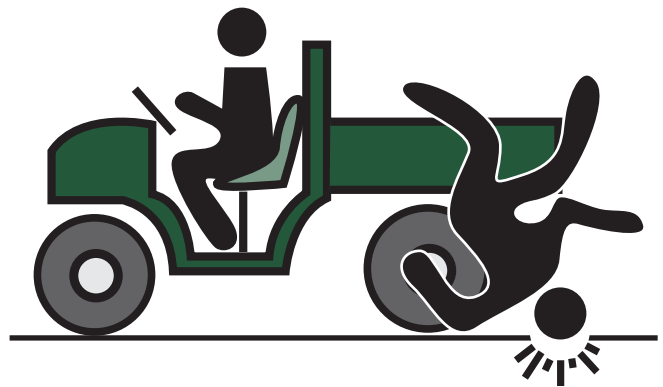


Different tread designs for UTV tires.

Safe Operation

The operator of the UTV must become familiar with the equipment before using it. This can be done by reading the owner's manual or by getting training and a demonstration from an experienced individual who is familiar with the equipment. In addition, the adoption of the following safe practices also can make UTV operation safer.

- Drive slowly and turn smoothly to avoid an overturn. Both high speed and sharp turns under off-road conditions may increase the chances for UTV turnover.
 - Avoid driving on steep slopes. When it is absolutely necessary, it is safer to drive uphill or downhill rather than across the slope. Drive to the top or bottom of the hill to make a turn. When approaching a downhill slope, gear down before reaching the slope to reduce wear on the brakes.
 - Slow down to maintain control and protect occupants when operating on rough terrain.
 - Stay clear of ditches and embankments. If a ditch is 6 feet deep, the rule of thumb is that the vehicle should be at least 6 feet away from the edge of the embankment to avoid embankment failure.
 - Allow as passengers only those adults who can reach the handhold while sitting with their backs against the seat and their feet flat on the floorboards.
 - Never allow additional passengers to ride in the cargo box or elsewhere under any circumstances. UTVs are designed for only two occupants (the operator and one passenger).
- Conduct a general survey of the work area before operation when operating a UTV in an unfamiliar area.
 - Avoid distractions; operators should not use cell phones or listen to music through headphones while operating UTVs.
 - Keep the legs and arms of the operator and passenger inside the vehicle at all times.



- Always wear seat belts when riding in a UTV.
- Be careful when backing up the vehicle. Watch for young children when backing up.
- Do not operate UTVs inside, under, or through buildings.
- Never operate a UTV under the influence of drugs or alcohol.

- Make sure all cargo being transported — including toxic materials — is secured properly in the cargo box to avoid tipping and spilling. UTVs are used extensively for transporting cargo.



- Use all recommended personal protective devices, such as over-the-ankle shoes with sturdy heels and soles, gloves, and long-sleeved shirts.
- Do not leave keys in a UTV while it is unattended. Operators are responsible for the ignition key the entire time they use the vehicle.
- Avoid travel on public roads. UTVs are designed primarily for off-road uses.
- Use lights, reflectors, and flags to get the attention of others around the UTV.
- Load the cargo box in a way that will improve traction when UTVs are used for hauling. During towing, maintain a speed that will assure full control. Be aware that the distance to stop the vehicle increases with speed and weight.

Note the following about pedestrians and disabled persons:

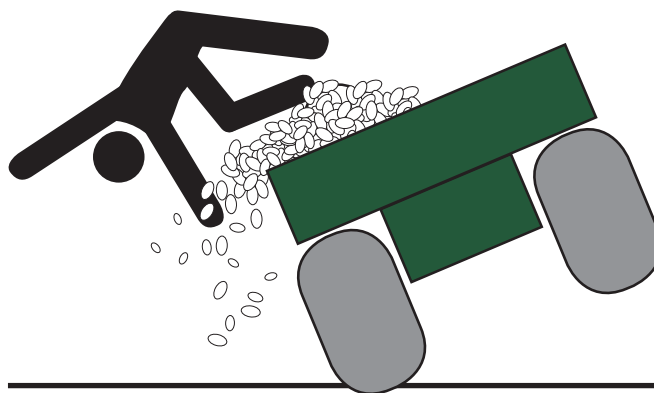
- Reduce speed to a minimum when driving along or near pedestrians and be prepared to stop quickly. Pedestrians have the right of way.
- Be especially attentive to the needs of disabled persons due to their limitations in vision, hearing, or mobility.

Parking

Park UTVs in less trafficked areas without blocking fire lanes, entrances to buildings, stairways, disability ramps, main thoroughfares, or fire suppression equipment. Do not park in a designated parking space without a permit from the parking authorities. Also remember to engage the parking brake before leaving the vehicle.

Other Applications

In the green industry, UTVs are often used for different applications, such as spraying and spreading fertilizer, chemicals, or sand. When UTVs are used for these applications, care must be taken to precisely control both the vehicle speed and engine rpm of the UTV and the rate of application of the sprayer or spreader, as the case may be. The operator must also be prepared to react to sudden weight shifts in the cargo area when the UTV is used as a sprayer or spreader.



Resources

Gold, A. 2014. "CVT – Continuously Variable Transmission: What It Is, How It Works." About.com Web Page. <http://cars.about.com/od/thingsyouneedtoknow/a/CVT.htm>.

Harshman, W. C., A. M. Yoder, J. W. Hilton and D. J. Murphy. 2004. *ATVs and Utility Vehicles*. Pennsylvania State University. National Safe Tractor and Machinery Operation Program. HOSTA Task Sheet 6.2. www.sdstate.edu/abe/extension/hosta/task-sheets/upload/6-2-ATVs-and-Utility-Vehicles.pdf.

Jespen, S. D., and K. Henwood. 2010. *Safe Operation of Utility Type Vehicles (UTVs)*. Ohio State University Extension. Agriculture and Natural Resources Fact Sheet No. AEX-597.1-10. http://ohioline.osu.edu/aex-fact/pdf/0597_1.pdf.

Plueddeman, C. J. 2007. "The UTV Buyer's Guide." *Outdoor Life*. Web page. www.outdoorlife.com/articles/gear/2007/09/utv-buyers-guide.

Recreational Off-Highway Vehicle Association. 2008. Website. www.rohva.org.

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