

Utility Type Vehicles (UTVs): Lawncare Training Guide

UTV maintenance and safe use

Introduction

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 UTVs and how they can operate them safely.

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 belts. Most UTVs are also equipped with a roll-over protection structure (ROPS) to protect the occupants during a tip over. The 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. This document does not cover recreational or sports UTVs which require more aggressive safety strategies because of higher speeds, higher horsepower, and more challenging terrains.



UTV designed for hauling goods.



Liquid cooled engine - radiator under the seat.

Major Components and Operation

This section of the training guide includes a general description of major components of UTVs. For specific details and for actual specifications, the reader may depend on the owner's manual for the particular model the individual is dealing with.

Power Unit

Most UTVs are powered by engines that run on diesel or gasoline. Power capacities of these engines may range from 15-35 HP. Engines with single and multiple cylinders with different configurations are common and they

may be either air or liquid cooled. Most engines also come with provisions for quick start and excellent acceleration.

Power Transmission

Most UTVs are 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 ranging between the minimum and maximum values. These transmissions are capable of providing different output shaft speeds at a constant drive-shaft angular speed. This feature permits maximum fuel economy by allowing the engine to run at the most efficient speed for a range of vehicle speeds. Alternately, it also has the flexibility to maximize the vehicle performance by controlling the engine speed at which the vehicle can produce peak power. This speed typically is higher than the speed at which the efficiency peaks.

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 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 this type of transmission system, power is transmitted through fluid under confinement. Some advantages of hydrostatic CVTs are as follows:

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

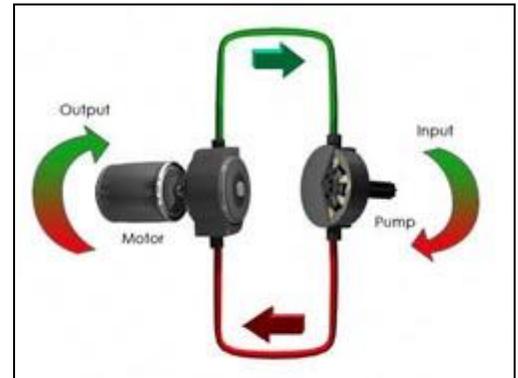
High cost and sensitivity to fluid contamination are the primary disadvantages of the hydrostatic CVTs.

Controls

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



Belt and conical pulley system for continuously varying the speed.



Hydrostatic Transmission



Operator's controls platform.

Tires

Tires with different tread designs and sizes are available for UTVs. Tires should be selected taking into consideration how and where the vehicles are to be used. Once the right type of tires is selected and mounted, proper care and maintenance are extremely important.

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. Over-inflated tires may result in inefficiency due to higher wheel slip, faster and uneven wear, and rough ride. On the other hand, under-inflation may cause rim slip and additional loss of air pressure. In the long run, this may result in heat buildup, and buckling and excessive wear on sidewalls. Right inflation pressure provides proper tire-ground contact which in turn results in improved traction and even tire wear.



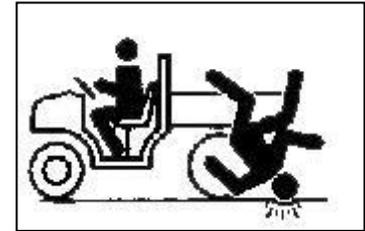
Different tread designs for UTV tires

Safe Operation

To start with, the operator of a 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 demonstration from experienced individuals who are familiar with the equipment. The following are some additional safe practices the operator should follow to make UTV use safer.

- When driving a UTV in unfamiliar territories, a general survey of the work area, before operating the vehicle, would be appropriate.
- Avoid distractions – operators should not use cell phones while operating UTVs.
- Legs and arms of the operator and the passenger must always be inside the vehicle at all times.
- Drive slowly and turn smoothly to avoid an overturn. Both high speed and sharp turns under off-road conditions may increase the opportunity for UTV turnover.
- Avoid driving on steep slopes. When it is absolutely necessary to work on slopes, 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 reduce the speed before reaching the slope to reduce the wear on the brakes.
- When operating on rough terrain, slow down to maintain control and protect occupants.
- Stay clear of ditches and embankments. If a ditch is six feet deep, the rule of thumb is that the vehicle should be at least six feet away from the edge of the embankment to avoid embankment failure.

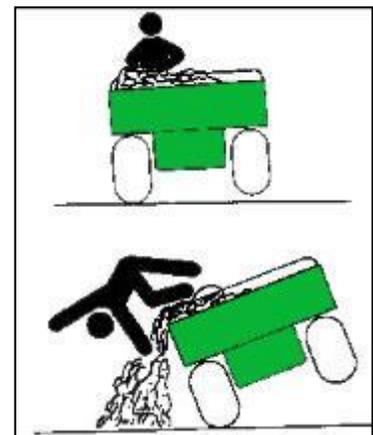
- Only adults who can reach the handhold while sitting with their backs against the seat and feet flat on floorboards should be taken as a passenger.
- UTVs are designed only for two occupants (operator and a passenger). Under no circumstances, should additional riders be allowed to ride in the cargo box or elsewhere.
- Seat belts must always be worn when riding on a UTV.
- When backing up the vehicle, do so carefully. Watch especially for young children when backing up.
- Do not operate UTVs inside, under, or through buildings.
- Never operate an UTV under the influence of drugs or alcohol.
- UTVs are used extensively for transporting cargo. When transporting cargo, make sure that it is secured properly in the cargo box. Shifting cargo may cause tipping.
- Operators are encouraged to use personal protective devices such as over-the-ankle shoes with sturdy heels and soles, gloves and long sleeves that are appropriate for their responsibilities.
- Operators are responsible for the ignition key the entire time they use the vehicle. Keys are not to be left in UTVs while unattended.
- UTVs are designed primarily for off-the-road uses. Avoid paved and unpaved public roads.
- Use lights, reflectors and flags to get the attention of others around the UTVs.
- When UTVs are used for hauling, load the cargo box in a way that will contribute to better traction for driving and stopping. During towing, maintain a speed that will assure full control. One should also note that the stopping distance increases with speed and weight of a towed load.



No passenger are allowed in the cargo box



Secure the cargo.



Balance and secure loads

Note the following about pedestrians and disabled persons:

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

Parking

Park UTVs on hard, covered surfaces such as asphalt and concrete. Never park in heavily traveled pedestrian areas. Do not block fire lanes, entrances to buildings, stairways, disability ramps, main thoroughfares, or fire suppression equipment. If you park in a designated parking space, you must have a

permit from the parking authorities. Also remember to secure the parking brake before exiting the vehicle.

Other Applications

In the green industry, UTVs are often used for applications such as spraying and spreading fertilizer, chemicals, or sand.

When UTV's are used for these types of operations, care must be taken to precisely control both the vehicle speed and engine rpm of the UTV and the rate of application on the sprayer or spreader as the case may be. The operator must also be cautious about sudden shifting of weight in the cargo when used as a sprayer or spreader.



Ensure that parking brake is engaged and key is removed when operator on the seat.

References

CVT – Continuously Variable Transmission. <http://cars.about.com/od/thingsyouneedtoknow/a/CVT.htm> (Assessed on Oct 24, 2011).

Jespen, S.D. and K. Henwood. 2010. Safe Operation of Utility Type Vehicles (UTVs). Ohio State University Extension, Publication No. AEX-597.1-10, Ohio State University, Columbus, OH, http://ohioline.osu.edu/aex-fact/pdf/0597_1.pdf (Assessed on Oct 24, 2011).

Harshman, W.C., A.M. Yoder, J.W. Hilton and D.J. Murphy. 2004. ATVs and Utility Vehicles, HOSTA task Sheet 6.2, National Safe Tractor and Machinery Operation Program. The Pennsylvania State University, University Park, PA, <http://www.nstmop.psu.edu/PrintTaskSheets/6.2%20ATV%27s%20and%20Utility%20Vehicles.pdf> (Assessed on Oct 24, 2011).

Recreational Off-Highway Vehicle Association, 2008 www.rohva.org (Assessed on Oct 24, 2011).

The UTV Buyer's Guide (on ROPS issue). 2009. <http://www.outdoorlife.com/articles/gear/2007/09/utv-buyers-guide> (Assessed on Oct 24, 2011).

Credits

This module was developed with the support of National Youth Farm Safety Education and Certification (Grant No. USDA/NIFA-2010-41521-20830), the National Institute of Food and Agriculture, and the U.S. Department of Agriculture. Team members contributed to the development of this module include: Robert Grisso, John Perumpral, Don Ohanehi, Mike Goatley, Kathleen Jamison, Cathy Sutphin, Dan Swafford, and Carl Estes. Authors would also like to acknowledge the contribution of students (Matt Kandel, Andy Karpin, Jeremy Smith, JD McCoy, Jonathan Dooks, Meghan Laporta, Kristianne Macaraeg, Theresa Garwood, Chris Hollie and Adam Goatley) who participated in the project.

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Department of Agriculture or the U.S. Department of Labor.