Tractor and Equipment at the UVM Horticulture Research Center
Equipment

- Equipment: anything with a motor or power cord
- HRC Equipment Must Meet the Needs of All Users SAFELY
- Each user must be expressly trained on each piece by HRC manager
  - Clipboard in shop
- NO peer training
SHOP

• Use tools as needed but..
  – RETURN IMMEDIATELY and put away
  – Power tools (electric or air) require express permission to use
  – Tools never leave site
  – No shop use for personal cars
  – NO WELDING
  – CLEAN UP!
Vehicles

- All users must complete UVM Driver Training course
- Polaris Ranger is NOT farm vehicle, DO NOT USE
- Trucks w/o plates are on-farm off-road utility trucks
  - Not subject to use fees
  - Runs ‘as is’
  - Still subject to all safety policies
Fueling Equipment

• Always fuel OUTSIDE
• Check fuel tank: Diesel, Gas, or Mix?
  – If at all unsure ASK
• No fuel cans in shop/classroom
Tractor Safety
Tractors and Power Equipment

- MUST be trained on specific tractors before use
- Lawn mowers, weed wackers, rototillers
- Closed-toe shoes REQUIRED
- This does not count as training
- Second person must be on-site during operation
- Training on one tractor does not count for all
Age Of The Equipment

- Newer tractors have many safety controls that automatically protect the user
- Our tractor fleet contains many older tractors
- Knowledge gap exists for younger workforce and new hires of any age on how to operate tractors safely (esp. older models)
Equipment Operation

• Read Manual before operation
• Read and follow warning labels
• Stay alert and avoid potential hazards
• Preview your route for obstacles, holes, slopes, ditches, terrain, etc. Remove debris
Tractor Operation

• Maintain and use the tractor’s safety features (such as, ROPS, seat belt, & PTO shields)
• Conduct tractor pre-operation checks
• Operate the tractor and implements safely and according to manufacturer’s directions
• Use the right tractor and implement for the job
• Know equipment blind spots
• NO PASSENGERS!!!!
COMMON MACHINE HAZARDS
(Engineering)

- **Wrap points** (hay baler, PTO shaft, auger, weed wacker)
- **Pinch points** (gears, sprockets, moving parts of belt or pulley drives/chains)
- **Burns** (exhaust/mufflers, hot hydraulic fluids)
- **Shear & cutting points** (sickle bars, rotary blades grain augers)
- **Crush points** (between two machinery parts or machines)
- **Thrown objects** (ejected or propelled objects, stones, sticks, chaff, etc.)
- **Hydraulic systems** (high pressure 1000-3000psi. Hot! Hoses can whip around; equipment fails and can crush)
COMMON MACHINE HAZARDS (Operation)

- Rollovers: rear and side
- Front-end loader incidents
- Falls from tractor
- Tractor run-over's
- Caught-between crushing
- PTO shaft entanglement
- By-pass starting
TRACTOR ROLLOVERS

Tractor rollovers happen when the center of gravity moves past a baseline of stability, either to the side or rear of the machine.

Many rollovers happen at speeds <8 mph and on slopes less than 5°. Avoid sudden motions.

Contributing factors to rollovers are:
• Various sizes, shapes and weights of implements
• Speed!!!
• Terrain
• Human error

Know the safe working load of each tractor & never exceed it!
• ROPS work by **limiting a rollover to 90°** and preventing the operator from being crushed under the weight of the tractor.

• ROPS work only if the operator is **wearing a seatbelt** to keep them in the operator station as the tractor is rolling.
WHEN ARE ROPS REQUIRED BY LAW

WHEN:

• Engine greater than 20 horsepower
• Vehicle is 2-wheel, 4-wheel or track driven (crawler-type) and designed to pull, propel, or carry implements designed for agricultural use (disk, tiller, plow, etc.)
• Manufactured after October 25, 1976
• The manufacturer made a retrofit ROPS option available or it was available at the time tractor manufactured (no matter what year tractor manufactured)
ROLLOVER PROTECTION FOLDABLE ROPS

- Foldable ROPS are available for some tractors
- Fold down in low vertical clearance areas
- Return ROPS to upright position as soon as possible after close clearance work is done
- It is recommended to install foldable ROPS on low profile when available
ROLLOVER PREVENTION: IMPROPER HITCHING

• Hitch loads for pulling to the drawbar or the three-point hitch only
  Loads that are attached by looping a chain around the axle housing, seat base, or upper link of the 3-point hitch reduce the pulling capacity and increase the possibility of rear-ward rollover

• Do not hitch or pull without express training
FRONT-END LOADER INCIDENTS

• Front-end loaders are used for lifting & moving materials

• Mishaps are caused by exceeding lifting capacity, lack of safety equipment, or inappropriate use including:
  – Front-loader attachment not intended for lifting people
  – Speed: working too fast for existing conditions
  – Rear of tractor may not have proper counter balance for the load
  – Weight of load: Exceeding front loader lift capacity
  – Improper attachment of bucket to frame
FALLS FROM TRACTORS

• Most falls are due to improper mounting or dismounting of the tractor.
  Injuries to wrist, arm, hip, leg, ankle & runovers can result
• Don’t “jump” down from tractor

  o Use a **3-point mount** (either 2 hand and one foot or 2 feet and one hand in contact with steps at all times)
  o **Face the tractor** when going up and down the steps and use handholds. There is less chance of catching pant’s cuffs or boot loops on clutch pedal, etc. which can pitch a person off the tractor
FALLS FROM TRACTOR

- Most tractors are not designed to carry passengers
- **Maintain a no rider policy**
- Injury occurs to passengers by falling from tractor & being run over once they have fallen
CAUGHT-BETWEEN INCIDENTS

• “Caught between” means a ground worker is crushed between the tractor and an implement
• This often occurs when the tractor is backing up to an implement to hook up
• Common causes of caught-between accidents:
  – Break down of communication between operator and person on the ground
  – Loss of control of the tractor
  – Worker in wrong spot
  – Operator can’t see worker
  – Operator misjudges and tractor moves rearward too far
• Stand out of path of travel
• Operator: Double check **everything** before disengaging clutch
THE PTO (POWER TAKE-OFF)

PTO produces a rotating torque and directly transfers it to another machine or tool. For a mower implement the rotating torque is used to turn the mower blades.
PTO ENTANGLEMENT INCIDENTS

The most gruesome of injuries resulting in severe injury, dismemberment, or death by the human body becoming entangled in (literally wrapped around) equipment

- PTO powered implements operating at 540 rpm can entangle a shirt sleeve or pant leg around the drive shaft 9 times in 1 second dragging your arm or leg with it

Happens in a blink of an eye!
PTO ENTANGLEMENT

• Proven accident prevention is to keep PTO shaft shields in place, and never remove them except for maintenance work.

• While the tractor is off, always inspect shaft, driveline & universal joint to ensure guarding prior to use.

• Spin driveline guard to ensure it is not stuck on the shaft.
Equipment Overview

• Express training required by TB or 'approved' trainer, NO peer training
• Respect every piece of equipment
• Remember primary hazards
• Know the equipment and use the right piece for each job