



TOW PLOW



September 24, 2010

Table of Contents

Goal.....	1
Introduction.....	1
Course Description.....	1
Eligible Employees	3
Prerequisites.....	3
Course Objectives	3
Section 1 – Safety	5
Lockout Procedures during Maintenance	7
Section 2 – Inspection and Installation	7
Installation.....	9
Section 3 - Operation	12
Deployment/Retraction	13
Mold Board	15
Steering	16
Section 4 - General Operations.....	16
Prior to Operation	17
Plowing Operations.....	17
Emergency Stopping.....	19
Lighting.....	20
Blade Maintenance.....	22
Driving Courses	23
Checklists.....	27
Definitions.....	32

Goal

The goal of the Tow Plow operator's course is to promote safe and proper operations and preventive maintenance practices with the Tow Plow.

Introduction

The Tow Plow is a trailer snow plow designed to tow behind a truck with a standard-mounted front plow. This configuration can provide a cleared path as wide as 25' with a 12' front plow. The outcome of this effort is to improve service by providing faster



results while reducing snow removal costs for equipment, fuel and labor. The Tow Plow is a large piece of equipment and requires a skilled operator. Proper training, knowledge and experience are essential for an operator to maximize the Tow Plow's benefits in snow removal operations.

Course Description

This training gives participants general guidelines and instructions for safe, proper, and efficient operation of Tow Plows. It provides new, as well as experienced, operators with the fundamental concepts and practices for operating MoDOT's Tow Plow with:

- Improved efficiency
- Greater safety
- Reduced maintenance and repair costs through preventive maintenance
- Fewer breakdowns
- Greater job satisfaction

The total contact hours (12) required for this course include:

- Tow Plow Operator - 8 contact hours - Instructor led-class, including hands-on and closed driving course. (LMS 24425)
- Tow Plow Operator - Assessment - 4 contact hours - Perform a ride along dry-run (pre-winter storm) during good weather in the area that the operator will perform snow removal operations with the Tow Plow. The dry-run will be performed with an experienced Tow Plow operator in order to familiarize new operators to the handling and operational aspects of the Tow Plow, prior to the winter season. The ride along will include proper deployment and operating procedures, along with a checklist of items to be covered during the check ride. Roadside hazard identification, plowing techniques, and turnaround points should be discussed and practiced during this process. (LMS 24425-A)
- During storm check ride (optional)
 - o Perform an “optional” ride along during active snow and ice removal operations where the new employee will ride along with an experienced Tow Plow operator who has completed the required training and is selected by the supervisor as competent to perform the ride along. There will be no time restrictions to this check ride. It may be completed when the experienced Tow Plow operator feels that the new operator is capable of operating the Tow Plow on various roads within the assigned area. The purpose of this check ride is to evaluate the new employee’s safety and performance abilities of Tow Plow operation and is required only at the discretion of the supervisor.
 - An experienced Tow Plow operator will drive with the new operator observing
 - New operator will drive with an experienced Tow Plow operator observing
 - All routes should be considered for this check ride and may be completed in various stages due to time, operator, and equipment availability

Eligible Employees

All field employees are eligible to operate a Tow Plow. It is recommended that supervisors and superintendents select only qualified candidates based on quality operational characteristics and the willingness of the employee to operate a Tow Plow.

Due to numerous configurations available to the Tow Plow within MoDOT's fleet, this course is designed to familiarize the operator with general knowledge of the Tow Plow and the general operating features. Therefore, it is recommended that training for the Tow Plow be performed with equipment that will be utilized within the employee's normally assigned work area.

Areas covered in this course include:

- Identification of equipment
- Safety hazards and proper safety procedures
- Daily inspections and lubrication
- Operation procedures
- Preventive maintenance
- Closed driving course
- Pre-season dry-run
- During storm check ride (optional)

Prerequisites

- Class A CDL
- Dump Truck Operators training
- Snow and Ice Removal (basic) training

Course Objectives

Upon completion of this course you should be able to:

- Identify Tow Plow key components
- Identify all safety hazards, terms, and labels
- Perform a pre and post-trip inspection of the Tow Plow
- Describe preventative maintenance practices

- Identify and become familiar with all in-cab operator controls
- Demonstrate on a closed course, the safe and proper Tow Plow operating procedures

Types of roads that the Tow Plow is used to clear:

- Urban multi-lane expressways and interstates
- Congested urban areas with left turn lanes, islands, and commercial entrances
- Rural divided highways
- Climbing lanes as the truck plows the first pass through the area
- Alternating passing lane routes, eliminating the need for a second truck
- Two-lane roadways with paved shoulders

The Tow Plow is a large piece of equipment that requires operator knowledge, skill, and attention. It is important to become familiar with all operating characteristics prior to operation during a winter event. The Tow Plow standard configuration allows the plow to steer to the right; this allows the plow to cover a large area in addition to the front plow. A few configurations are designed to steer to the left.

MoDOT's current (**standard**) configuration for the Tow Plow consists of the following features:

- Two in-cab controls with one to operate the blade up and down and one to operate steering of the rear axle and swivel tongue
- One single and one double acting hydraulic circuit
- Operates at any angle up to 30 degrees on two 16,000 lb. steering axles



- 25 foot clearing path with 12 foot front plow
- Requires a 90,000 lb. pintle hook
- 7 wire trailer plug
- 6 wire trailer plug for plow lighting and warning lights
- 4 wheel ABS air brakes
- 8 cubic yard spreader (optional)
- 1,000 gallon liquid tank (optional)



Due to custom configurations, ensure new operators are familiar with configurations appropriate to the tow vehicle and Tow Plow that they are expected to operate.

Section 1 – Safety

It is required, in addition to this training, that all Tow Plow operators become familiar with the manufacturer's owner's manual, which provides additional information regarding safety, operations, and maintenance of the Tow Plow.

Any plowing operation can be hazardous since you will be operating in adverse weather conditions that include but not limited to snow and ice, with limited visibility.



It is important to use safe operating practices and good judgment while operating this equipment.

It is important to be aware of your surroundings at all times. Clean windows and mirrors provide visibility of traffic, the Tow Plow and hazards outside of the cab. In addition, mirrors must be adjustable from within the cab. This allows the operator to see the Tow Plow in any position. The truck should be equipped with lighting for night operations.

Safety is up to YOU!
**Only you can protect yourself
and others around you!**

Become familiar with safety terms and symbols. If you find a manufacturer's safety label is damaged or not legible, have it replaced.

The safety symbol alert means: Attention, Become Alert, Your Safety is involved.



Obey all safety instructions listed in this training manual and the Tow Plow owner's manual. Failure to comply with all safety instructions and policies could result in serious injury or death.

Key safety summary:

- Complete the required training
- Read and understand the owner's manual
- Read and understand all safety labels on the Tow Plow and tow vehicle
- Understand all operator controls for the Tow Plow
- Understand how to stop safely in the event of an emergency
- Follow safe work practices and all safety policies while operating, storing, or working on the Tow Plow
- Never allow anyone near the Tow Plow while in operation or while the tow vehicle is running where activation of the Tow Plow in any manner is possible
- Do not start unless the work area is clear
- Replace damaged safety symbols

Lockout Procedures during Maintenance

All employees must follow MoDOT's lockout/tagout procedures prior to performing any work on the Tow Plow. Control of hazardous energy shall be complied with under Section: 2.7 The Control of Hazardous Energy (Lockout/Tagout) within the Risk Management manual. In addition, follow the manufacturer's recommendations for lockout procedures and control of hazardous energy.

Section 2 – Inspection and Installation

Prior to operating the Tow Plow, perform an inspection to insure there are no safety defects and that the plow is operational. Daily inspections along with proper preventative maintenance will reduce the chance of a breakdown and down time of equipment. All defects found throughout the inspection process shall be noted and repaired prior to use. Lockout/tagout procedures shall be in place once it is determined that repairs are needed to ensure that the plow is not put into service and to control any hazardous energy.

The following (**standard**) items are to be inspected, but are not limited to additional features or configurations:

- Hydraulic fluid level on tow vehicle
- Inspect tires for damage, proper inflation and that all lug nuts are in place and have not become loose
- “STAY BACK 100 FEET” sign installed on rear of Tow Plow
- All safety and warning labels are in place and legible
- Grease all required components
 - All plow harness sheave nipples
 - All hydraulic pump drive shaft nipples
 - Front and rear tower sheaves and swivel blocks
 - Wing extension arm nipples
 - Front and rear tower guide tracks
 - All front harness pivot points
- Check for loose or missing fasteners (nuts, bolts, cotter pins, lock rings, etc.)

In preparation for the snow plowing season, a visual equipment inspection must be performed. Look for any damaged components, bends, cracked welds, hydraulic leaks, etc. Inspect all fasteners; tighten any that have loosened and replace any that are damaged. Check all hydraulic hoses for cuts, cracks, and/or leaks. Visually check plow lift chains and cable(s) for loose clamps and frays.



Immediately replace any damaged chains and/or frayed cables.

- Visually inspect all hydraulic hoses and connectors for wear, damage, and leaks
- Check all cables, chains, and sheaves for excessive wear and damage
- Visually inspect all plow and wing units
 - Inspect cutting edge and shoes for excessive wear
 - Do not allow cutting edge to wear down into the mounting angle on the mold board
- Inspect mounting arms for excessive rust, damage, cracks in welds or bent and broken sections
- Inspect mounting holes on the arms and lugs for excessive wear
 - Holes greater than 3/16" clearance are to be repaired
- Inspect brake lines and glad hands
- Dump air from the brake storage tanks on tow vehicle and the Tow Plow to remove excessive moisture and insure that the system air pressure returns and does not leak
- Add air brake drier to brake system to prevent air brake freezing during extremely cold weather

Installation



Always store the Tow Plow on a firm level surface.

Always have help when installing the Tow Plow to the tow vehicle.

Installation may vary between units due to multiple custom configurations that are available within MoDOT, depending on hydraulic circuit set-up and type of chemical application equipment installed on the Tow Plow.

On new Tow Plows, prior to the winter season, it is important to set-up the Tow Plow for proper operation and to inspect for any operational issues. Always set-up the tow vehicle hydraulics for proper operation. Operating pressure must be 2300 psi to ensure proper lift of the mold board due to limited ability to lift the mold board. (Hydraulic pressures must be checked and set, if needed, prior to each winter season)

Depending on the vehicle's hydraulic system, some adjustments may be needed. Ensure the steering circuit is plumbed with a minimum of ½" hydraulic hoses and that the flow setting is correct. Restricted or low hydraulic oil flow could cause the Tow Plow steering to become slow or unresponsive in extremely cold weather.

Steering circuits on Tow Plows with serial numbers lower than #55 can become unresponsive in extremely cold weather. **Therefore, extreme caution should be used when deployed in extremely cold weather.** Retraction for obstacles may become difficult or may not respond to steering input. In this case, it may be necessary to fully deploy the Tow Plow and hold allowing the oil to circulate through the system and then retract to tow position. This will allow the hydraulic oil to warm up enough for response to the steering circuit. On Tow Plows #56 and higher utilize a shuttle valve allowing the operator to work the steering circuit to full deploy and back to tow position. This will allow oil to circulate back to the tank and will help to warm the oil and allow for better steering in extremely cold weather.

- Adjust the steering and mold board circuits of the Tow Plow so that deployment and retraction is smooth and steady
- Steering adjustment that is too fast can cause the Tow Plow to become unstable or jerky, thus causing handling issues, and/or may damage the plow
- Steering adjustment that is too slow may not allow the operator to avoid obstacles during retraction

Always include the operator when making these adjustments so that the operator can determine a safe and comfortable speed for deployment and retraction.

Ensure that every operator is familiar with your specific configuration. Below is a general installation procedure.

- Attach Tow Plow to tow vehicle pintle hitch
- Pintle receiver locked
- Raise landing gear into full up position and handle stored in tow position
- Air brake lines/glad hands connected (no leaks)
- Connect Tow Plow safety chains
- Connect plow lift hydraulic circuit
- Connect steering hydraulic circuit
- 7 wire trailer plug installed and all Tow Plow lights operational
- 6 wire plug installed and all operator lights are operational
- Inspect all lighting for damage and proper operation



(Brakes may be locked due to frozen moisture in the air brake system in extremely cold weather or from long term storage.) Release brakes and when ready to move pull gently against the Tow Plow and ensure that the brakes have released. Failure to do so could result in damage to the Tow Plow tires.

For safety purposes, the Tow Plow lifting arms shall be pinned into the up position for transport during long durations or if you do not intend to redeploy for an extended period of time. When installing or removing lock pins, always stand behind the plow to avoid injury or death due to falling plow. Always start with the two center pins of the lifting arm and work your way out so that you are positioned away from the plow when you remove the last pin. Reinstall pins in reverse order starting with the outer pins and finishing with the center pins.

Remove lock pins from mold board arms.



ALWAYS remove the two center pins first!



ALWAYS stand behind the mold board when removing the two outside pins!

With tow vehicle running, test all functions to ensure proper operation:

- Determine that the mold board moves freely from full up to full down
- Steering wheels move freely through full stroke of activating cylinder while moving forward

Section 3 - Operation

Deployment/Retraction



Operator shall visually check that the Tow Plow is clear of traffic while deploying!

Prior to activation of the Tow Plow, the operator must have the lock pins removed and insure that the plow area is clear of all people and obstacles when lowering the mold board. Always adjust mirrors and keep them clean so that the Tow Plow is in the operator's view at all times.



DO NOT deploy or retract the Tow Plow while stopped or with the brakes set to prevent damage to the tires.

Activation of the mold board and steering may be performed at the same time through deployment or retraction.

Using the left/right steering circuit the Tow Plow can be deployed to any distance/angle desired. **Full deployment is not required for operation.**

The Tow Plow should be deployed in the following sequence:

- Remove lock pins from the mold board arms, starting with the center pins
- While moving the vehicle forward, activate the steer wheels to the extended position. Lower the mold boards to ground level (this may be performed simultaneously)
- Move unit ahead until the plow is set at the operator's desired position to the correct side of the tow vehicle



WARNING: Adequate power adjustable mirrors must be installed on the tow vehicle to allow the driver to fully see the unit in the deployed position.

Always adjust the Tow Plow deployment based on the desired clear lane width; **full deployment is not required for operation**. Always be aware of the operating position and do not over deploy the Tow Plow. (Always deploy just enough to cover the area required). At a 30 degree angle of deployment, the Tow Plow is covering a path half of its length.

Always be aware of obstacles ahead of you and always be prepared to make adjustments for obstacles such as guardrails, stalled vehicles, sign posts, etc. When unsure about clearance of the Tow Plow to obstacles, simply retract (pull in) the Tow Plow. This is extremely important in low visibility conditions.



Always retract the Tow Plow to the tow position in low visibility conditions.

Retract the Tow Plow when you encounter low visibility conditions to avoid striking stalled vehicles or other obstacles that may be in the path of the Tow Plow. Low visibility conditions may not allow the operator enough time to retract in order to avoid an impact. Re-deploy the Tow Plow and resume normal clearing procedures once conditions improve. In the event you see an obstacle, retract (pull in) the Tow Plow far enough ahead of the obstacle to clear it without having to make any sudden moves or lane changes. Visually confirm that you have cleared the obstacle and re-deploy. If you are the lead plow of a gang or working with another operator, always communicate obstacles to all other operators. This is especially important when a plow is running behind the Tow Plow and clearing the shoulders. Visibility for the remaining plows may be diminished due to blowing snow from the plows in front.



When in doubt, PULL THE PLOW IN!

To return the Tow Plow to the transport position:

- Raise the mold board and steer wheels to 0° (this may be performed simultaneously)
- Continue moving forward until the Tow Plow is directly behind the tow vehicle
- Ensure the mold board is in full up position

If in transport for a long duration or you do not intend to re-deploy for an extended period of time, find a safe place to stop and install the lock pins.

Mold Board

It is recommended that the mold board not be down in the tow position due to possible scarring of the pavement or damage to raised obstacles such as manhole covers, bridge joints, raised pavement makers, etc.

To reduce the chance of pavement damage or damage to the Tow Plow, use of a leading edge shoe on the Tow Plow is recommended. If a shoe is not available or if it is worn or damaged and needs to be removed, it is recommended that the leading edge of the carbide blade be mitered approximately 1” to eliminate the vertical forward edge of the blade to make contact with the pavement in the event that the mold board is down in the tow position.

The mold board shall be in the full up position (stowed) while the plow is in the tow position for transport. To return to the transport position, raise the mold board from ground level and steer the wheels to a 0 degree position (can be done simultaneously). Continue moving forward until the Tow Plow is directly behind the tow vehicle. If in the transport position and you do not intend to re-deploy for an extended period of time, find a safe place to stop and install the lock pins.

Steering

To negotiate turns, the mold board should always be raised to the transport position however, it may not be necessary in all cases.



Operators have found that in large multilane intersections retracting the Tow Plow enough to clear traffic and obstacles allows for a large area of the intersection to be cleared in one pass. Good judgment and communication with operators of single front plow trucks may be necessary to provide efficient clearing of large multilane intersections.

Tighter turns and intersections should be avoided if the Tow Plow cannot physically make the turn without stopping and backing. However, the Tow Plow turning radius can be adjusted using the steering circuit; thus, allowing operators to negotiate tighter turns at smaller single lane intersections. Retract the Tow Plow and mold board into the tow position for right-hand turns. If backing is required, retract the Tow Plow into the tow position prior to backing. If left deployed the Tow Plow will swing behind the truck and to the left while backing.

Become familiar with turnaround areas that are to be used during operation. It is recommended operators practice turns utilizing the Tow Plow steering on a closed lot at their maintenance facility and also become familiar with intersections and turning areas that may require the Tow Plow steering to be utilized. It is equally important to identify areas where turnaround procedures are not allowed.

Section 4 - General Operations

Prior to Operation

Before each use:

- Make sure that all nuts and bolts are in place and properly tightened
- Make sure that all other fasteners are in place and are performing their specified function
- Make sure all safety signs are in place, clean, and legible
- Replace any damaged parts or excessively worn parts
- Inspect for damage to any part of the plow mold board or push frame, such as broken or worn bolts or pins, cracked welds, bent sections, and/or excessive rusting
- Inspect for damage to trip mechanisms, such as broken springs, cracked welds, worn or broken bolts
- Check all hoses for cuts, cracks, and leaks

Plowing Operations

While plowing multiple lanes, be familiar with the crown of the road in relation to the Tow Plow's position. Experience has shown that the Tow Plow should be positioned, if possible, with the crown between the tow vehicle and the Tow Plow in order to prevent damage to the road surface. If this is not possible try to keep the center of the Tow Plow mold boards at the crown of the road.

Gang plowing is probably the safest and most effective method for clearing first priority (high volume) routes. Operational speeds should be within the following:

- Safe for conditions present
- Safe for traffic volume and conditions
- Reduce spacing appropriately for limited visibility
- Paced so that multiple gang trucks do not become separated
- Spaced so that traffic may not pass between the gang plows

Distance between each Tow Plow/gang truck should be close enough to prevent other vehicles from “squeezing” in between them. A gang plow operation can consist of almost any number of trucks needed to get shoulder to shoulder single pass clearing and may be positioned in any manner that operators feel safe and comfortable with and is most effective. Positions may also need to be set based on truck configuration and style of plows to be used, whether it is left or right wings, under body plows and if the Tow Plow is incorporating a front plow. By overlapping plow widths, the road can be cleared shoulder to shoulder with little or no windrowing.



In the event snow is windrowed when gang plowing, either a clean-up plow or the last truck in the gang should drop off to open ramps and provide access to traffic on and off of the main highway. In some cases, a protective or “blocker” vehicle may be used to help control traffic for gang plow operations.

Use caution when plowing heavy snow loads. Correction of plow position, either by the tow vehicle or the Tow Plow, may be needed to maintain width of area to be cleared. As the snow load increases, skewing or side shifting of the Tow Plow may occur. If correction is needed and the operator decides to close in on obstacles, such as guardrails or curbs, be aware that the snow load could suddenly reduce and the Tow Plow will skew back to its original position and may strike roadside obstacles. This situation is even more prevalent when plowing under overpasses and bridges as the snow load decreases under these structures.



Though the Tow Plow is designed to plow hard surface shoulders such as concrete or asphalt, extreme caution should be used when plowing aggregate shoulders in order to prevent damage to the shoulders. If plowing snow off aggregate shoulders is essential, hold the mold board approximately 2” to 4” off of level ground. Be aware of obstacles while deployed and use the steering circuit to plow around obstacles on the shoulder.

Periodically during plowing, stop to inspect plow cutting edges and mold board shoes for wear. At the first sign of excessive wear, discard and replace with new parts. When the Tow Plow is disconnected from the prime mover, be sure to couple the hydraulic hoses together or cap the hydraulic couplers, to prevent damage to the quick disconnect hose ends and to help prevent the introduction of foreign material into the hydraulic system.

Emergency Stopping

Always maintain a safe distance from traffic in front of you. Incidents that may cause traffic to suddenly stop will require time and distance for you to react and stop. Unlike stopping a typical snow plow truck, the Tow Plow is a trailer with air brakes and braking while highway surfaces are potentially slick from snow and ice can cause the trailer to skid around and jackknife. Therefore, it is important to give yourself plenty of room to stop.

The Tow Plow is equipped with an anti-lock braking system (ABS). With the ABS system the trailer is less likely to swing out, but if you lose steering control or start to jackknife, let up on the brakes (if you can safely do so) until you gain control. When driving a combination truck trailer with ABS, brake as you normally would using the following guidelines:

- Use only the force necessary to stop safely and stay in control
- Brake the same way, regardless of whether you have ABS on the trailer, truck, or both
- As you slow down, monitor your truck and trailer and back off of the brakes (if safe to do so) to stay in control

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally for the conditions, but get them serviced soon.



ABS won't allow you to drive faster, follow closely or drive less carefully.

The procedure for stopping a trailer skid is:

- Recognize the trailer skid by seeing it in your mirrors
- Check mirrors anytime you brake hard to make sure the trailer is staying where it should be
- Once the trailer swings out of your lane it is hard to prevent a jackknife
- Stop using the brakes to get traction back
- Do not use the hand brake (This will cause the trailer to continue to skid)
- Once the wheels start to grip the road again, the trailer will start to straighten out and follow the tow vehicle
- If the Tow Plow is deployed during a skid, leave in the deployed position

Lighting

There are two groups of lighting on the Tow Plow:

- Work/Warning
- Operational (DOT)

Tow Plow lighting is connected to the truck via two separate trailer plugs:

- 7 wire large plug for DOT vehicle lights
- 6 wire plug for work and warning lights



All DOT lighting shall be in good working order and operational. Inspect all lighting for proper operation. This includes:

- Tail lights
- Brake lights
- Turn signals
- Side marker lights



Warning lights on the Tow Plow shall be activated during plowing operations.

It can be difficult to determine how far the Tow Plow is deployed. Therefore, it is important to enhance driver visibility and deployment width using proper mirrors, lights, and some specialized tools like lasers.

It can be difficult to determine how far the Tow Plow is deployed. One optional tool that can be used is a truck-mounted laser. Once set-up and aimed the laser will produce a “target” ahead of the truck on the ground so the operator can determine where full deployment of the Tow Plow is. The laser also has some limitations. Since the laser is mounted to the truck, to reduce the chance of damaging the laser, it has been found that the laser will only show full Tow Plow deployment, not actual. If the operator has not fully deployed the Tow Plow, the laser will not represent the Tow Plow’s true position.

Due to limited visibility from the cab of the tow vehicle, it is important to be able to see the Tow Plow when deployed. As stated previously, use of adjustable power mirrors, spot mirrors, and lighting for night operations is imperative. When incorporating work lights to the Tow Plow, do not aim work lighting toward traffic. If possible, aim work lighting downward to reduce glare for the operator and motorists.

It can be difficult to determine how far the Tow Plow is deployed. One optional tool that can be used is a truck-mounted laser. Once set-up and aimed the laser will produce a “target” ahead of the truck on the ground so that the operator can determine where full deployment of the Tow Plow is. The laser also has some limitations. Since the laser is mounted to the truck to reduce the chance of damaging the laser, it has been found that the laser will only show full Tow Plow deployment, not actual. If the operator has not fully deployed the Tow Plow, the laser will not represent the Tow Plow’s true position.

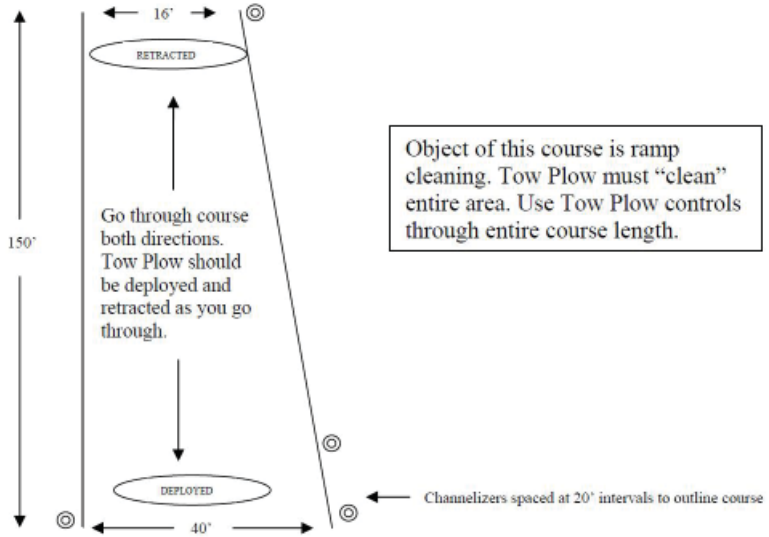
Blade Maintenance

Replacement of cutting edge:

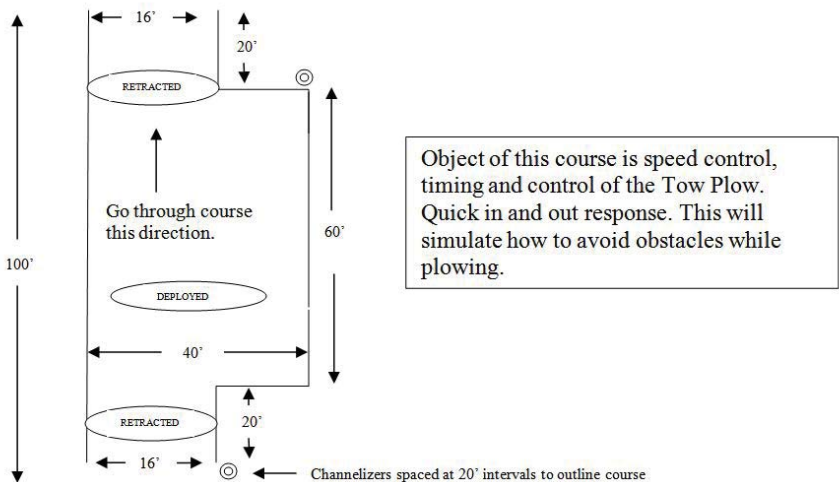
1. Park the tow vehicle on a level surface (such as a concrete garage floor or paved area) that is large enough to safely accommodate the unit with the Tow Plow attached. Place the vehicle’s transmission in “Park,” and set the parking brake
2. Lower the Tow Plow mold boards onto suitable blocking, positioned immediately behind the mold board. This blocking must be of sufficient height to hold the cutting edge approximately 6 to 8 inches above the level surface
3. Shut off the prime mover’s engine, remove the starter key, wait for all moving parts to come to a stop, and relieve all pressure in the hydraulic lines
4. Loosen the nuts on all the cutting edge bolts; remove all nuts and bolts except the bolts on each end of the cutting edge
5. While holding up the end of the cutting edge, remove the nut and bolt from that end and allow the cutting edge to pivot down to the level surface
6. Repeat step 5 for the other end of the cutting edge. If using a standard center punched reversible cutting edge, flip the edge from top-to-bottom and reinstall. Properly dispose of worn-out edges and all bolts and nuts
7. Reinstall a new wear edge by reversing the procedures in steps 7 thru 5; tightening all nuts to recommended torque values

Driving Courses

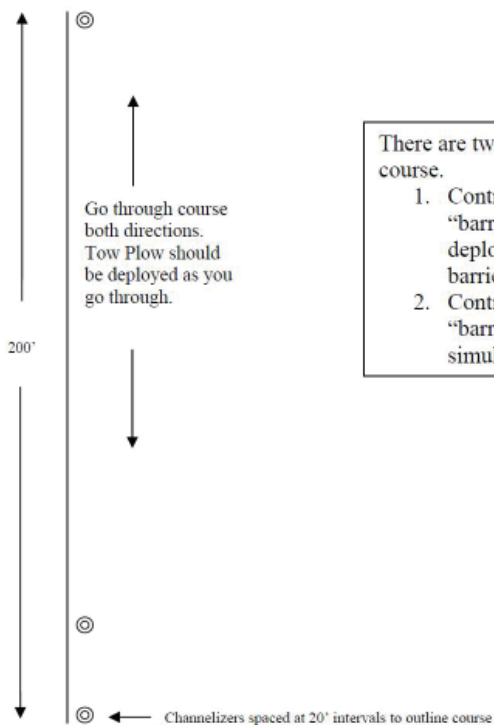
The "Ramp"



The "Quick Change"



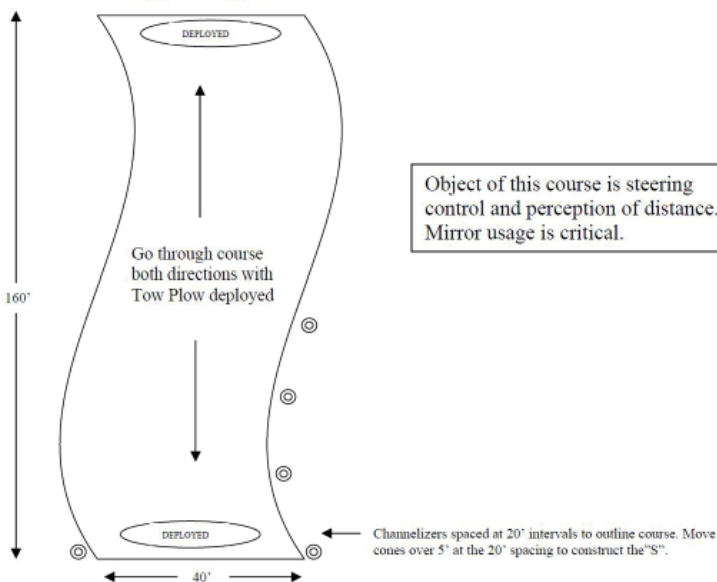
The "Barrier"



There are two objectives for this course.

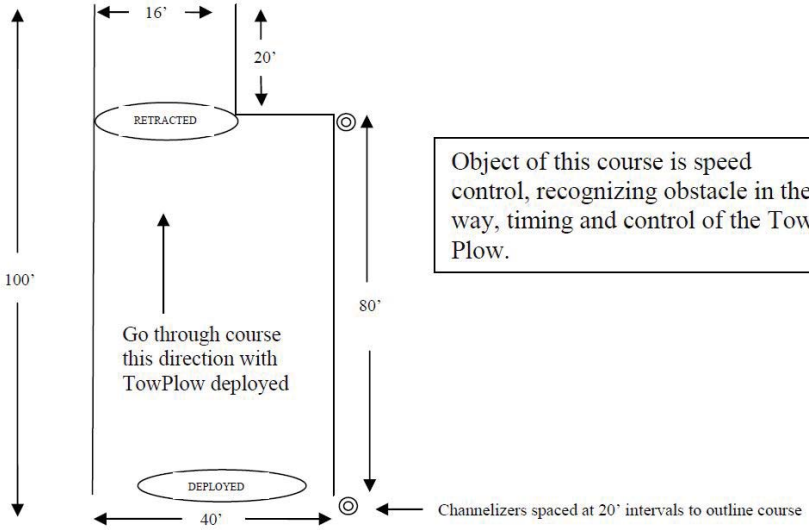
1. Control front plow close to "barrier" with Tow Plow deployed to simulate median barrier.
2. Control Tow Plow close to "barrier" deployed to simulate guardrail.

The "S" curve



Object of this course is steering control and perception of distance. Mirror usage is critical.

The "Parked Car"



Checklists

Tow Plow Inspection

NOTE: Employees are required to perform an inspection of the Tow Plow prior to each shift.

- Hydraulic fluid level (tow vehicle)
- Pintle receiver hitch closed and locked
- Trailer chains connected to the tow vehicle
- Brake lines and glad hands locked with no leaks
- Electrical connections for tow plow lights
- Electrical connections for tow plow warning lights
- Brake, turn and marker lighting operations
- Warning lights operations
- Lug nuts
- "STAY BACK 100 FEET" sign installed and visible
- Safety and warning labels in place
- Inspect for loose or missing fasteners
- Hydraulic hoses and connectors for wear, damage and leaks
- Cables, chains and sheaves for excessive wear and damage
- Plow frame and mold board
- Cutting edge of plow blade
- Lift arms, mounting holes and lugs for excessive wear
- Dump air from brake storage tanks
- *Add air brake drier to system (extremely cold weather conditions)

For pre-season and daily maintenance schedules, refer to the manufacturer's manual.



TOW PLOW



Training Checklist Part One

PLEASE PRINT

Employee name: _____ Organizational code: _____

Date: _____ District: _____ Trainer(s): _____

Supervisor: _____

NOTE: A completed copy of this checklist will be retained in the employee's file.

A. Tow Plow Operator Classroom Training (8 hours in length) (LMS 24425)

Employee demonstrates classroom understanding of the following:

- Classroom instructions
- Safety precautions and hazard identification
- Location of Tow Plow components
- Tow Plow inspection procedures
- Tow Plow installation procedures
- Tow Plow operational check procedures
- Spreader and/or liquid tank operational procedures
- Proper Tow Plow maintenance procedures
- In-cab control operational procedures
- Describe preventive maintenance practices
- Identify all safety hazards, terms, and labels

Employee signature: _____

Date: _____

Trainer signature: _____

Date: _____

B. Tow Plow Operator Hands-on Training (conducted immediately after classroom training)

Employee demonstrates driving competency on closed driving course by performing the following:

- Ramp cleaning maneuvers
- Quick change response maneuver
- Barrier maneuver
- "S" curve maneuver
- Parked car maneuver
- Perform pre and post inspections
- Identify all key components of the Tow Plow

Employee signature: _____

Date: _____

Trainer signature: _____

Date: _____



TOW PLOW



Training Checklist Part Two

PLEASE PRINT

Employee name: _____ Organizational code: _____

Date: _____ District: _____ Trainer(s): _____

Supervisor: _____

NOTE: A completed copy of this checklist will be retained in the employee's file.

A. Tow Plow Pre-Season Dry-Run Check Ride (4 hours in length) (LMS 24425-A)

Employee demonstrates competency on dry-run check ride by performing the following:

- Deploy into plowing position and retract
- Position of plow
- Identification of specific area hazards
- Negotiating intersections
- Negotiating curves and islands
- Negotiating turnarounds
- Negotiating bridges and overpasses
- Plowing shoulders
- Plowing inside retaining wall
- Position within a gang plow operation

Employee signature: _____ Date: _____

Trainer signature: _____ Date: _____

Definitions

Climbing lanes - An additional up-hill lane for slower traffic to allow faster traffic to pass while climbing steep grades.

Tow vehicle - Primary vehicle used to pull the Tow Plow.

Windrowing - An accumulation of snow left on the shoulder from the snow plow.

