SNOW REMOVAL SAFETY
SNOW - White or translucent ice crystals, usually in clusters to form flakes. Can accumulate to as much as 1-inch per hour. One inch of rain equals 5 - 10 inches of snow.

SLEET - Precipitation that falls in the form of frozen ice pellets.

FREEZING RAIN - Liquid precipitation that freezes upon contact with the ground.

WINDROW - The pile of snow that a snow plow leaves at the end of a driveway.

KNOW YOUR ENEMY
The Snow Season

› In NJ snow can be expected anytime from November through March

› **Prior to the season**
  - Plans need to be reviewed & revised
  - Equipment inspected and prepared

› **After the season**
  - Equipment inspected and serviced
  - Salt Spreaders cleaned thoroughly
Storm Situations

› **Nor’easter** - Cyclonic storm on the northeast coast of US. Produces heavy precipitation and high winds. During winter months results in heavy accumulations of snow and wind blown snow drifts

› **Blizzard** - Severe weather with low temperatures, winds in excess of 35 mph, falling or blowing snow reduces visibility (1/4 mile or less), duration of at least 3 hrs.
Drivers / Operators

› **Veterans** - Drivers with extensive experience plowing snow in your community, using your equipment.

› **Experienced** - Experienced drivers who are new to your operations or equipment

› **New** - Drivers experienced in driving trucks, but not in plowing snow, or driving in severe weather conditions

› Drivers must have experience with equipment before driving in severe conditions

› Team newer drivers with experienced drivers

› In-house orientation or training is valuable
Are You Prepared?

Start work physically & **mentally** fit and properly clothed.

› **Check all equipment before each use.** Fill out a Pre-Trip Inspection Form.

› **Know your route.** Perform pre-storm route inspections observing landmarks & the locations of possible hazards.

› **Choose the speed** appropriate for conditions.

› **Keep your temper & patience** when vehicles pass or tailgate.

› **Observe all traffic laws** and signal your intentions clearly. Remember to **wear your seatbelt.** This is a State Law.

› **Watch for signs of fatigue.** Staring for hours at the driving snow can have a hypnotizing effect on drivers. Get out & walk around the truck & take some deep breaths.
CDL Drivers

› All driver’s must have valid driver’s licenses
› Vehicle with a GVW in excess of **26,000 lbs.** must have a Commercial Driver’s License with appropriate Class B endorsement
› Driving records for all drivers should be checked periodically
Plowing Safely

› Visibility - review visibility issues for your equipment, as well as those created by storm conditions

This is acceptable – why?

What is wrong here?
Plowing Safely

› Dealing with other drivers & pedestrians
Pedestrians
Rear lighting and signaling
Rear lighting systems on snowplows serve two distinct purposes:
• to alert other drivers that the plow is on the roadway
• to provide information about the plow's relative speed and distance
Maggie’s Law

› Passed in 2003 to help control driver fatigue
› Named for Maggie McDonnell killed in 1997 by driver who had smoked crack cocaine then stayed awake for 30 hours
› Driver received a $200 fine
› Law defines sleep deprived driver as one who has been awake for 24 hours
› Driving drowsy is the same as DUI
   › Jail time
   › Up to $150,000
Clues to Fatigue Accidents

- Lack of skid marks
- Lane weaving
- Age & sex of driver (most men under 26)
- Work schedule – shift workers
- Many drivers will tell police after accident that they “were just sleepy” so that they are not charged with DUI
Things to Consider

› Hours of Service rules will not protect a driver from becoming fatigued
› All people are different and have different circumstances
› Consider pulling drivers for mandatory rest times
Driver’s Checklist - Emergency Kit

› Extra clothes
› Hat
› Extra gloves
› Windshield scraper & brush
› Food/snack
› Waterproof boots
› Sunglasses - glare
› Flashlight
› First Aid kit

• Warm Beverages (non-alcoholic)
• Maps
• Small Hand Tools
  – Screwdriver
  – Pliers
  – Hammer
• Extra Cotter Pins?

› What else do you carry?
Safe Plowing Procedures

› Maintain safe speed for conditions
› Use warning devices - Lights etc.
› Be alert for buried cars or objects
› Watch the turning radius on **right** turns
› Do not plow snow over bridges onto traffic below
› Be alert for other drivers
› Keep the truck bed low to avoid overhead objects
Striking Overhead Objects

› If the bed is raised to direct salt or sand to the rear the cab protection is elevated and may strike low wires or underpasses. Keep the lift angle low.

› Severe vehicle damage will occur when hitting fixed objects such as bridge overpasses.

› Electrocution could result from hitting a low wire, stay in the truck!
Striking Overhead Objects
Striking Stationary Objects!
Snow Plans
Managements Responsibility

› Prioritize routes and key areas
› Work from an established written plan
  - Minimum accumulations for deployment
  - Personnel call-out list
  - Communicate the plan – Does the Police Department know when plows will be out?
  - Established routes and direction of travel
  - Are there snow emergency routes?
  - Alternate side parking rules - Are Snow parking rules posted, or communicated to residents?

› Document actions for each storm
  - Call-out time and conditions
  - Time plows hit the streets
  - Actions taken and when
    › plow / salt-sand
  - Time secured and conditions
Vehicle Inspections

› Inspect vehicles
  – Prior to start of season
  – Prior to commencing plowing
  – During any breaks or refueling
  – Before securing equipment for the end of shift

› Document the inspections
Inspection Checklist

› Coolant/Anti-freeze levels
› Heater / Defroster
› Wipers and washer fluid
› Tires - tread depth, (4/32 minimum) tire chains?
› Lights (flashers, beacons and reflectors)
› Steps, handrails, etc
› Exhaust system - CO can make you drowsy
› Hydraulic systems - **LEAKS** are Hazardous!
› Plow blade, pins, chains
› Salt spinners – **BEWARE** of auger hazards
High-pressure injection injury of the hand is a surgical emergency.

The velocity of fluid forced through such a system (or through a pinpoint break) can be in excess of 600 feet per second. This speed is sufficient to drive fluids through gloves and coveralls.

Little pain may be felt at the time of injury, the affected area soon becomes swollen and painful.

About 50% of high-pressure injection injuries of the hand result in amputation of a finger.
Road Salt

› The use of de-icing agents is an important component of strategies to keep roadways open and safe during the winter and minimize traffic crashes, injuries and mortality under icy and snowy conditions.

› Road salt is an essential, cost effective tool for maintaining safe winter road conditions.

› Use less chemical when temperatures are rising and more when they are falling.
Road Salt

› A study of accident rates in New York state documented a freeway accident rate of:
  - 4.6 accidents per million vehicle miles (MVM) on snow covered roads,
  - 2.3 accidents per MVM for wet roads, and
  - 0.6 accidents per MVM for dry roads.

› A separate study by Marquette University covering five states measured an 88% reduction in accident rates immediately after the application of de-icing chemicals.

› Experience shows that it is most effective to spread between 100 and 300 pounds per single lane mile.
How Salt Works

1. Salt is spread on surface
2. Salt melts through snow/ice, forming brine
3. Remaining snow/ice floats on brine, breaking bond with road surface
4. Vehicle traffic breaks through the surface, reducing snow/ice to plowable slush and moving it to sides of road

Source – Salt Institute
Salt Spreading Hazards

A driver died on Dec. 20, 2004, as he tried to remove ice or salt clumps from the auger area inside the truck's dump box when his sleeve caught on a metal tooth on the auger bar.

› The auger is located at the rear of the dump box, although there is metal shielding that prevents exposure to the auger from the rear of the vehicle, there is no such shielding blocking exposure from the inside of the dump box.

› Implement an effective lockout/tagout program that identifies and addresses the hazards associated with rotary machine parts.

The FACE report concludes: “Workers who operate or work near the rotary auger should receive specific training in the hazards associated with the rotary auger,”
Plow Inspection

› Inspect & ensure it is ready for deployment
› Inspect all surfaces for signs of cracks, wear or damage
› Inspect the hydraulic systems for safe operation
› Inspect lift frame for wear or damage
› Inspect cutting edge for damage
The Snow Plow

› Each town must determine the best blade to be used
  - Rubber Blade - flexible, able to withstand impact with ground level objects
  - Steel blade - scrapes closer to the road surface
  - Composite - In between

› How about wing plows?
New Technology

› 360° radar to detect moving objects.
› Global Positioning System technology and a geo-spatial database that enables a driver to determine where lane boundaries and the presence of fixed objects such as guardrails and mailboxes.
› Alert the driver via the vehicle's collision warning system.
› Magnetic guidance technology in which the vehicle is guided by an in-vehicle computer that tracks magnetic markers embedded along the center of a lane 1.2 meters apart to define the roadway.
Safe Plowing - Applying Intelligent Vehicle Technology

Caltrans' Advanced Rotary Plow uses radar sensing to avoid buried obstacles obscured by deep-packed snow and ice. When under full automation, this plow can be within two to six inches from the guardrail, and its front-discharge rotary blower is capable of clearing 4,000 tons of snow per hour.
Special Situations

› Plowing should be a two-man operation whenever possible to ensure better visibility, and to minimize fatigue.
› Plow with the storm as much as possible.
› As snow gets deeper, adjust plow angles and techniques.
› Wet snow can easily weigh up to **12 lbs/ft³**.
Other Snow Removal Devices

Snow Blowers

Shoveling
Snow Blower

› Two Basic Types
  – Two Stage Blower
    › Slower moving gathering Auger
  – Single Stage Blower
    › High Speed Gathering/Blowing Auger
Inspection Checklist

› Engine Oil
› Lights and flashers
› Clutch
› Blower System
› Chute Positioning
› Back up alarms?
› Tires, chains?
› Electric Cord
Snow Blower

Safety Consideration
- Review the owner’s manual
- Do not use your hand to clear snow from chute
- Do not leave the unit unattended
- Do not operate in an enclosed area
- Do not refuel while the engine is hot
Snow Blower

Safety Consideration
- Clear area of debris and rocks
- Leave a 1” gap above gravel
- Do not clear above a 35 degree slope
- Do not wear loose clothing
- Aim discharge chute away from people
PROPER TECHNIQUE FOR SHOVELLING SNOW

Keep feet wide apart. Put weight on front foot close to shovel and use leg to push shovel straight ahead.

Shift weight to rear foot and keep shovel-load close to body. Lift with arms and legs, not back.

Turn feet in the direction of throw and pivot entire body rather than twisting at the waist.
Snow Shoveling

Left:
- The back curved & twisted
- Hips not bent
- Knee is straight

Right:
- Keep the back straight
- Bend from the Hip
- Bend from the knee
Shoveling

- Dress warmly in Layers
- Shovel Early and Often
  - Warm up / Stretch
  - Newly fallen snow is lighter
  - Wet snow can weigh up to 12 pounds per cubic foot
- Push the Snow instead of Lifting
  - Avoid Overloading the shovel
  - Keep the shovel close to your body
  - Space your hands on the shovel
    - Increases Leverage
- Do not throw Snow over your shoulder
  - This causes twisting in your back
Shoveling
› Pace yourself
  – Shoveling is an aerobic activity comparable to weightlifting
  – Take frequent breaks and replenish fluids to prevent dehydration
› See What you are shoveling
  – Do not let clothing interfere with your vision
  – Watch for ice patches and uneven surfaces
› Use alternative measures
QUESTIONS?

"It's not worth it, Roy! Let's just give him our noses & let him go!"