

Session 7: Inspection of Completed Work and Liability Issues

Course Topics

- Session 6 – Guardrail/Terminal Installation and Common Errors
- **Session 7 – Inspection of Completed Work and Liability Issues**

Session 7 Objectives

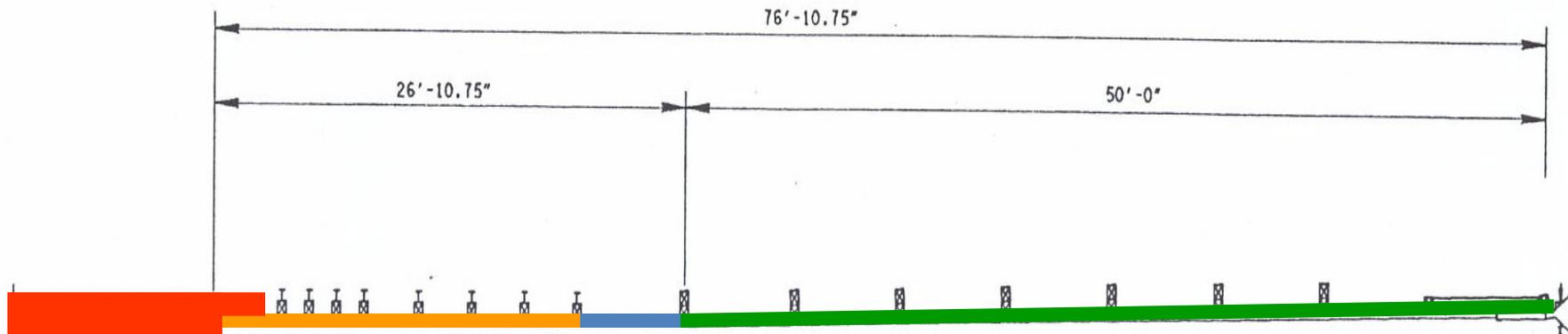
- Ensure completed installation conforms to plans, specifications, and manufacturers' guidelines
- Document inspection results
- Minimize agency/installer liability

Session 7 Outline

- Barrier Installation
- The Installation Inspection
- Site Grading
- Inspection, Reporting, and Documentation Procedures
- Protection of Unfinished Work
- Introduction to Liability Issue
- Duties of Transportation Agencies
- Definition of Terms in Tort Law
- Required Elements of a Tort
- Establishing Expected Level of Performance
- Responsibilities
- Risk Management in Highway Work Zones

The Installation Inspection

➤ Inspect the Guardrail



Minimum length installation for tangent energy absorbing terminal (NCHRP 350 TL-3)

The Installation Inspection



DATE: _____
LOCATION: _____
PROJECT #: _____
CONTRACTOR: _____
FOREMAN: _____
WEATHER: _____
TYPE OF OPERATION: _____

ESTIMATED INSTALLATION LENGTH: _____
GENERAL CONTRACTOR SUPERVISOR: _____
PHONE: (_____) _____
EMERGENCY CONTACT: _____
PHONE: (_____) _____

INSTALLATION OVERVIEW:

TRAFFIC CONTROL:

WAS TRAFFIC CONTROL USED ON THIS PROJECT: YES NO
WAS T.C. APPLIED USING PROPER SPECIFICATIONS: YES NO
SUMMARIZE DEVICES/EQUIPMENT USED: _____

NOTE ANY EXCEPTIONS/DEFICIENCIES: _____

APPROVED BY: _____

GUARDRAIL ITEMS:

WERE GUARDRAIL BARRIER ITEMS CONSTRUCTED ACCORDING TO PLANS, DRAWINGS,
AND OR SPECIAL PROVISIONS: YES NO
WERE GUARDRAIL TERMINAL SYSTEMS CONSTRUCTED ACCORDING TO
MANUFACTURERS GUIDELINES: YES NO
SUMMARIZE INSTALLATION MATERIALS: _____

NOTE ANY EXCEPTIONS/DEFICIENCIES: _____

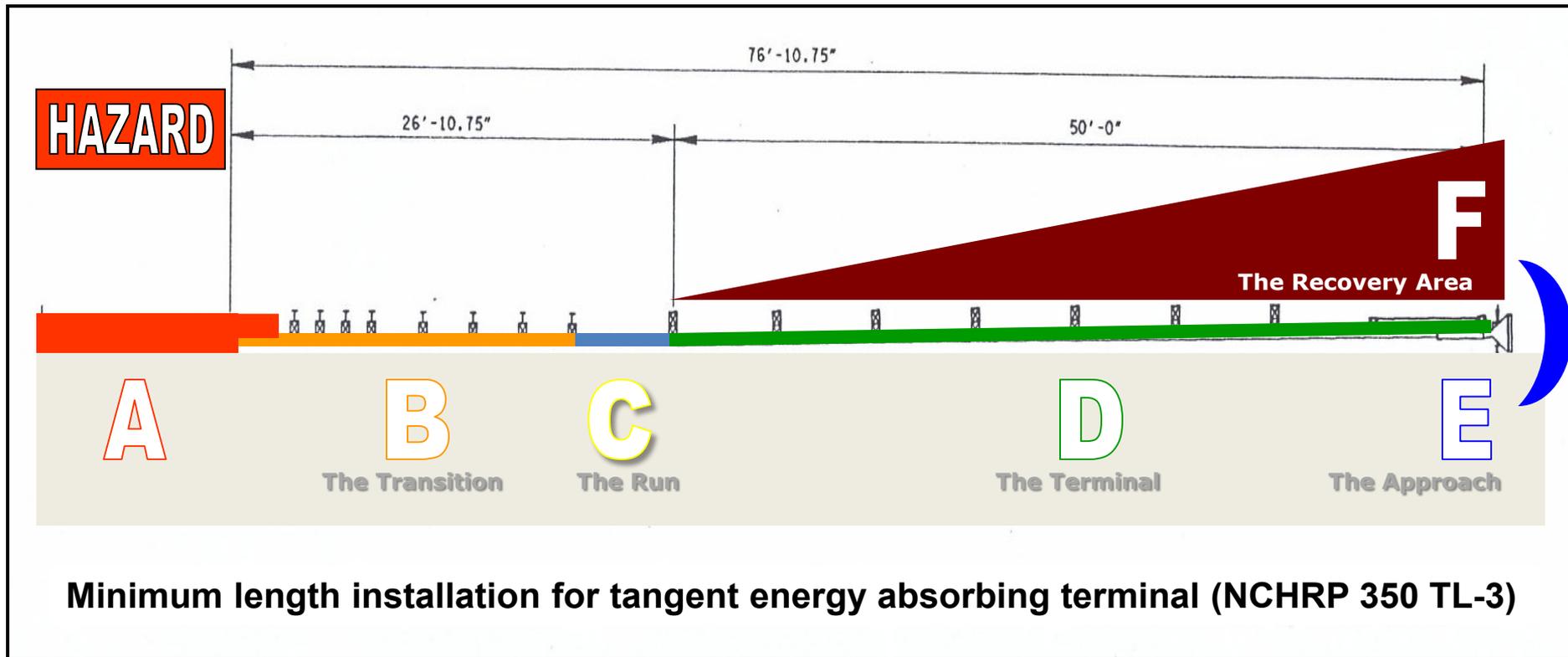
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EXAMPLE Form:
Delaware does not have
a Guardrail Inspection
Form



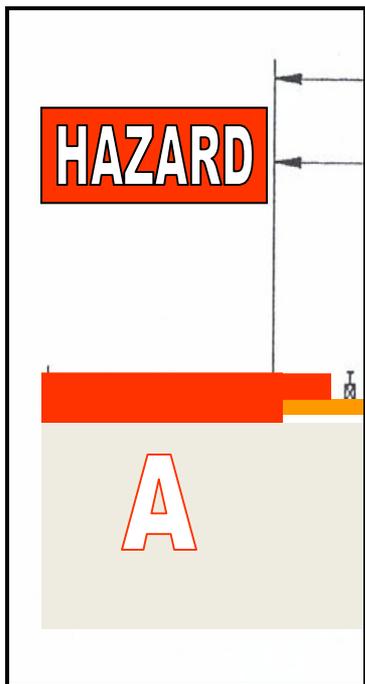
The Installation Inspection

➤ Where To Begin: Breaking Down The Task



The Installation Inspection

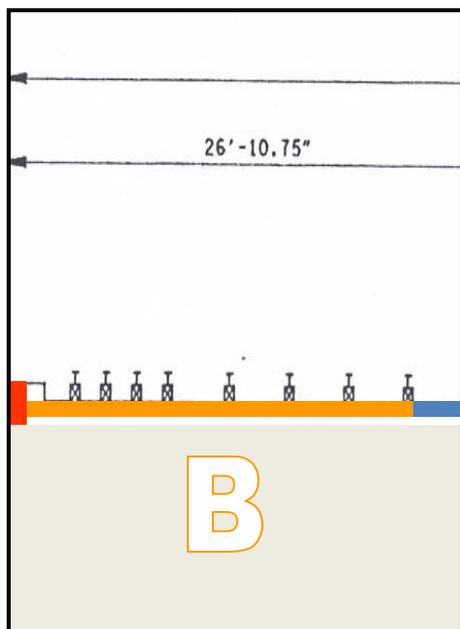
➤ The Fixed Object / Hazard



- If Rigid Bridge Railing Exists
 - Make sure semi-rigid barrier is properly connected to the end of the rigid barrier.
- If No Bridge Railing
 - Ensure that guardrail adequately shields the downstream end of the hazard and is adequately anchored.

The Installation Inspection

➤ The Transition

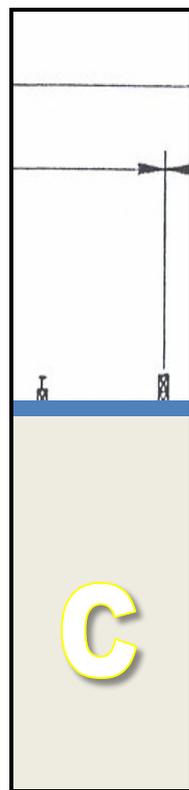


- Every State is different – consult local standards for layout.
 - Keep eye out for post/concrete interference.
 - Double/Triple/Quadruple blocking may be required.
- Watch out for special oversize posts and variable post spacing.

The Installation Inspection

➤ The Run

- Can be 1 section of rail or 100+.
- Each post set at proper height.
- Each block set correctly on the post.
- Each bolt is tightened snugly.



➤ Each rail/cable section

- Check protective coating
 - Thickness & continuity
 - White rust
- Proper overlapping

➤ Delineation

- Local standards will guide placement and spacing.

The Installation Inspection

➤ **Note Special Conditions**

- Base plated posts over structure
- Driven posts in rock
- Missing posts in guardrail over culvert
- Longer posts at steep slopes
- Extra blockouts
- Curbs

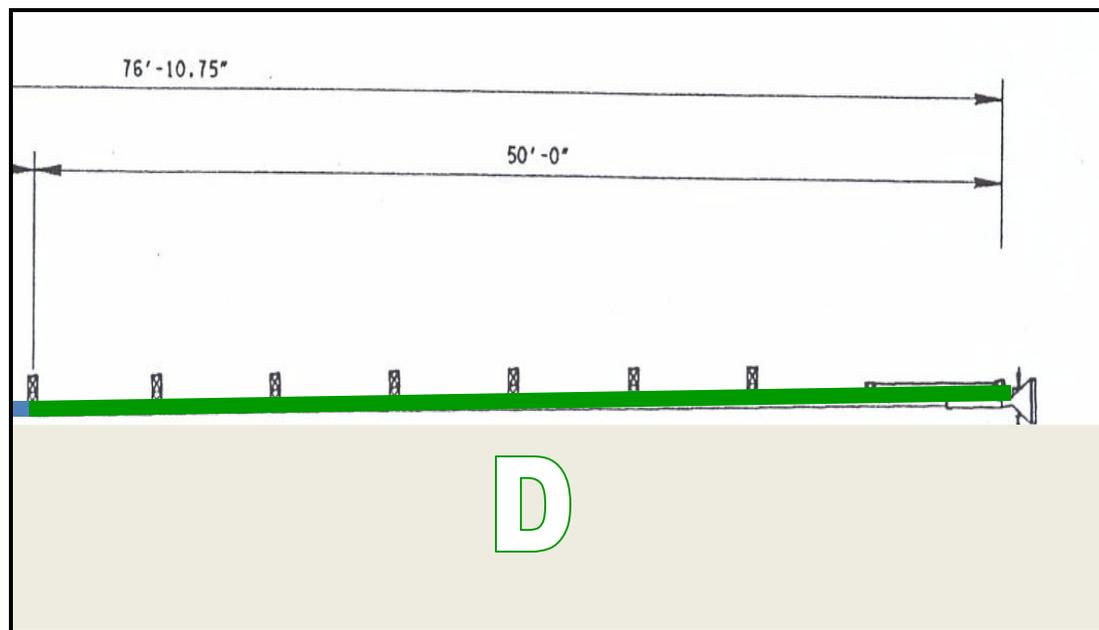
The Installation Inspection

➤ The Terminal

- RULE #1:
FOLLOW
MANUFACTURER
INSTRUCTIONS

➤ Watch out for:

- Impact Head Connections
- Cable Tautness
- 4" Ground Exposure Limit



Terminal Installation: Example

➤ Example Installation Check List:

SKT-SP & FLEAT-SP Inspection Checklist

State: _____ Date: _____
Project #: _____ Location: _____

- The rail height is in accordance with the contract plans. This is approximately 27 ¾" above the edge of the finished grade. A height of up to 30" is allowable.
- There is no curved rail within the terminal SKT-SP 50'-0" or FLEAT-SP 37'-6" (TL-3).
- The end rail section is not attached to the post at post location #1.
- The **FLEAT-SP** rail is not attached to the post at post location #3.
- The end rail panel has special slots and all rails are lapped in the proper direction.
- The ¾" x 8 ½" hinge bolt at post #2 is on the downstream side of the post.
- The ⅝" x 9" hinge bolt at post location #1 is on the upstream side of the post.
- The lower stub at posts #1 and #2 do not protrude more than 4" above the ground line (measured by the AASHTO 5' cord method). Site grading may be necessary to meet this requirement.
- At post #2, the open-ended slot at the post bolt is on the upstream side of the post.
- Standard steel W6x9# x 6'-0" guardrail posts are used at post locations #3 and beyond.

- All posts within the **SKT-SP** or **FLEAT-SP** are spaced at 6'-3" centers.
- The **SKT-SP** impact head does not encroach on the shoulder (a maximum 25:1 taper is permitted to eliminate the potential for encroachment).
- The **FLEAT-SP** is installed with a straight flare (offset between 2'-6" & 4'-0") over a 37'-6" terminal length.
- The two 5/16" x 1" hex bolts holding the impact head to post #1 are secured.
- The 8" x 8" bearing plate at post #1 is correctly positioned with the 5" dimension up and the 3" dimension down. The anchor cable is taut and correctly installed. A retainer/tie has been placed over the bearing plate to prevent rotation.
- The cable anchor bracket shoulder bolts are properly attached to the W-beam guardrail and the cable anchor bracket is fully seated on the shoulder portion of the bolts.
- If the posts were augered, the backfill material around the posts is properly compacted.
- No washers are used on the face of the rail except at the cable anchor bracket bolts.
- The finished installation is in accordance with all specific State DOT guidelines.

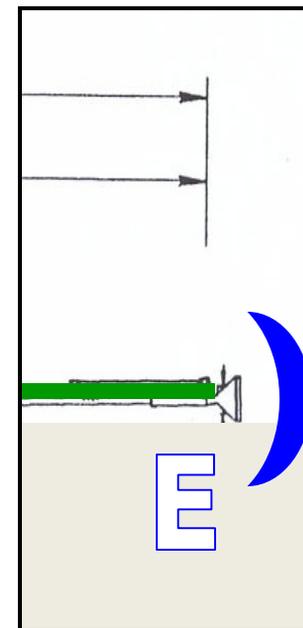
Additional notes:

Inspection performed by: _____

The Installation Inspection

➤ The Approach

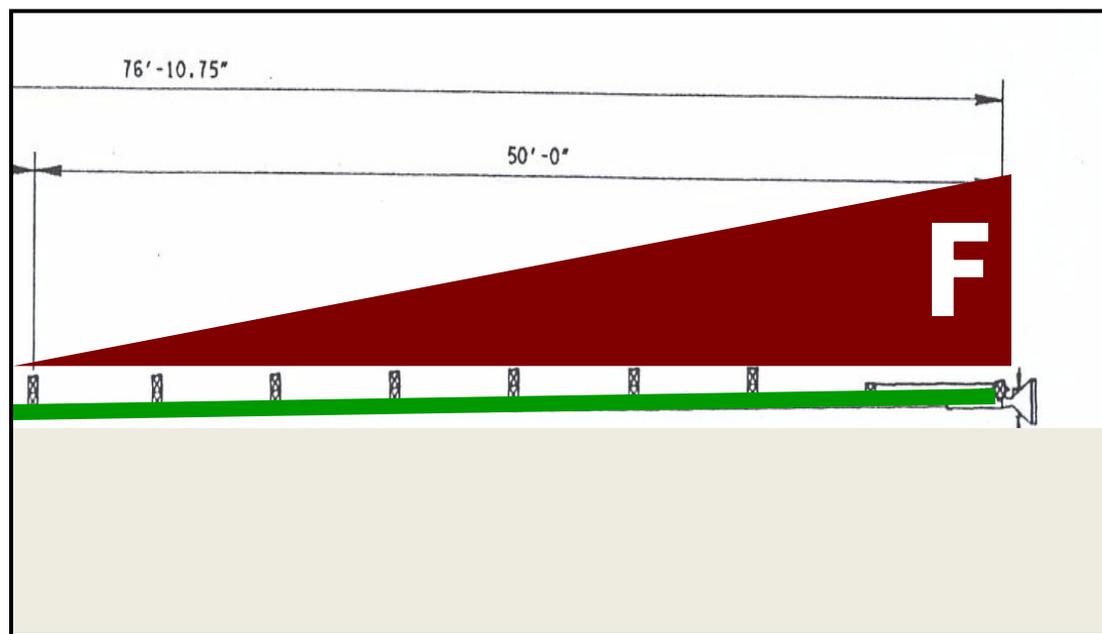
- Described in local standards under grading requirements.
- Typically a 10'-0" wide strip at the terminal.
- **LEVEL TERRAIN MUST BE KEPT CLEAR OF DEBRIS.**
- No Rocks, Trees, Breakaway Utility Poles, Uneven Terrain, Sidewalks/Curbs, or anything that may upset the vehicle prior to impact.



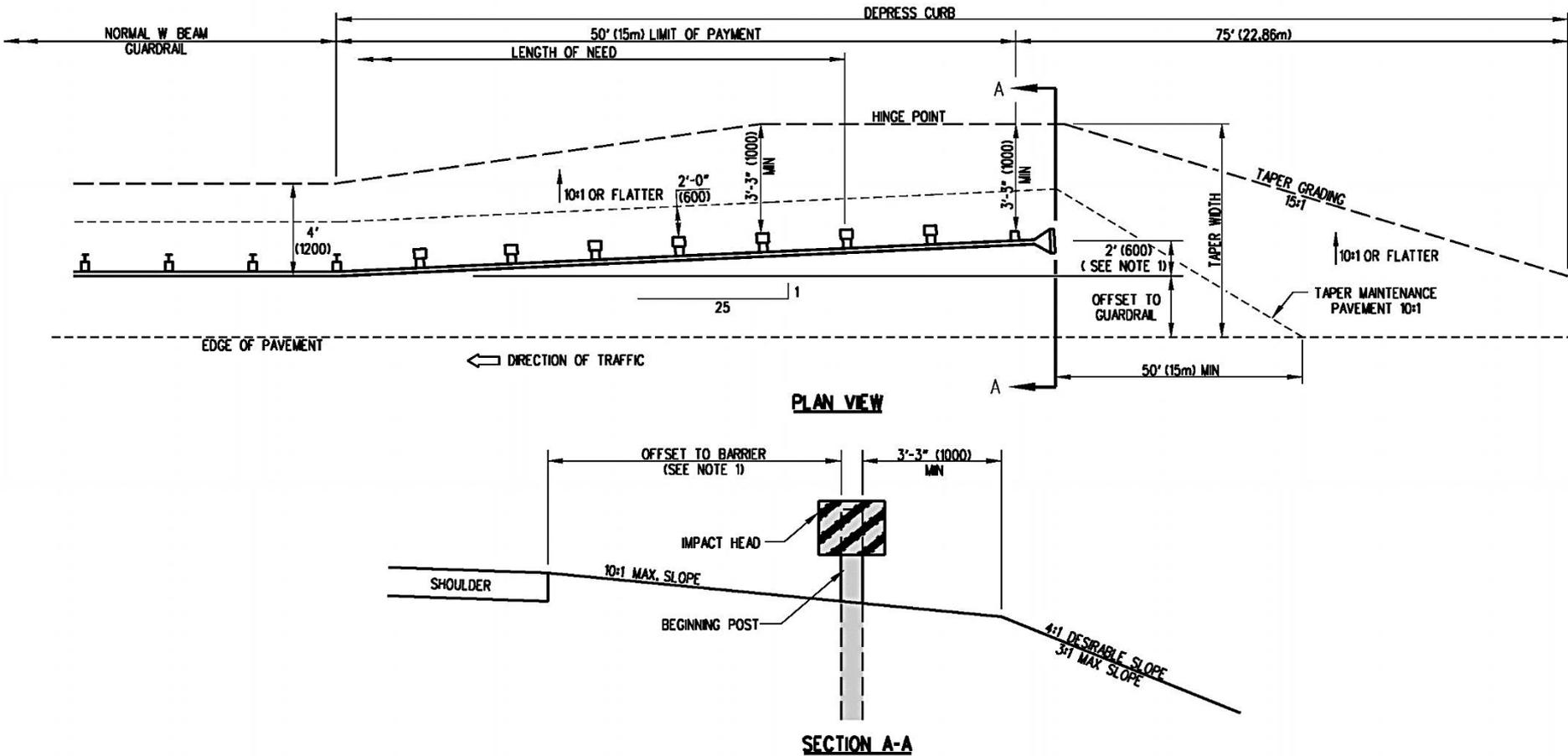
The Installation Inspection

➤ The Impact Zone / Recovery Area

- In impact, vehicle needs flat surface for safe deceleration
- Drivers that miss terminal have area in front of hazard to regain control.
- Typical slopes:
 - UNDER TERMINAL - 10:1
 - BEHIND TERMINAL 3:1 (4:1) or flatter



Site Grading DeIDOT Standard



Ref: DeIDOT Standard Construction Details, B-2 (2010)

Site Grading

- Measure *length* of recovery area to comply with state standards and specifications.
- Measure *width* of recovery area to comply with state standards and specifications.
- Check grade to make sure grade is the same as existing shoulders.
- Check grading material for proper density. (Material must be compacted.)
- If any deficiencies are found, report first to prime contractor, then to state. Insist corrections be made to insure a proper recovery area.

Poor Site Grading



High Foundation Tubes

Inspection, Reporting, and Documentation Procedures

- Always inspect your work first to correct any mistakes.
- After initial inspection, re-inspect with agency (inspector or project engineer).
- Measure guardrail with agency to agree on all item quantities and have agency record in project diary.



Inspection, Reporting, and Documentation Procedures

- Record quantities on company's work sheet.
- On project plans, draw a sketch of each individual run of guardrail on the back of the opposite page. Include all different items installed.
- Use video or camera to document each run and record location, quantities installed, time, and date.



Protection of Unfinished Work

- Unless the road you are working on is closed, **NEVER** leave any guardrail unfinished.
- Always complete the bridge attachments first, approach end terminals second, and trailing end terminals last.
- A good rule to follow is: you should **NOT** start more than you can finish in a shift.
- If for some reason end must be left unfinished protect that end with: a temporary attenuator and delineate.

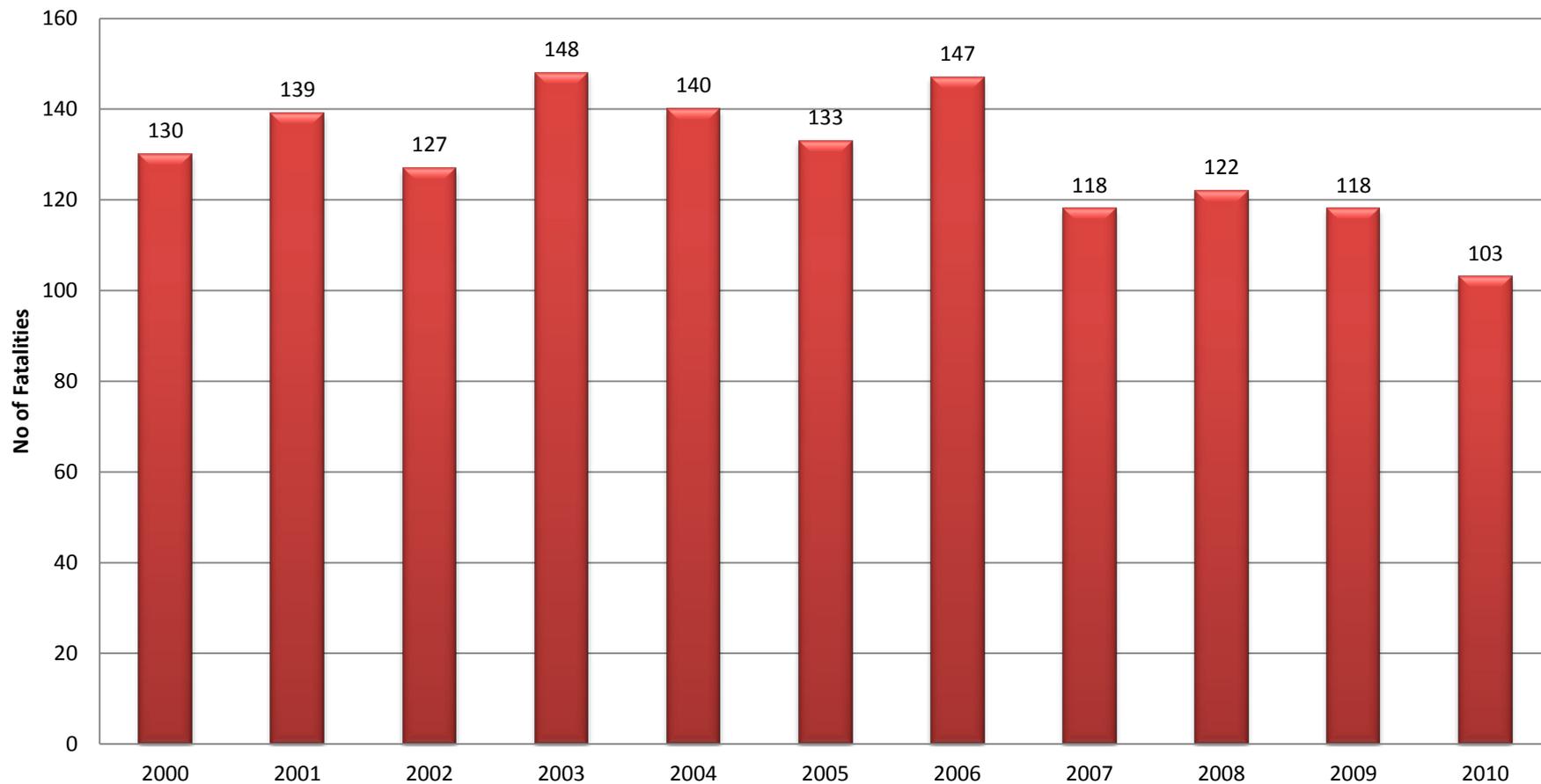


Introduction to Liability Issue

- Approximately 37,000 fatalities occur on highways in the U.S. each year.
- About 12,000, or over 28% of these fatalities involve Run Off the Road (ROR) crashes.
- Many of the incidents lead to litigation because of personal injuries or property damage caused by alleged negligence on someone's part. **Delaware has sovereign immunity.**
- The next few slides will provide you with information on how the Civil Court process is involved in cases that tend toward litigation.



Delaware Crash Data Trend



Duties of Transportation Agencies

- To ensure that all road work is done in accordance with pertinent plans and specifications.
- To warn the traveling public of defects, obstructions, and unsafe places on its streets, highways, and bridges by placing barriers, guardrails, lights, warning signs, or other markings which are reasonably sufficient for that purpose.

Duties of Transportation Agencies

- Willful or Wanton breach of that duty creates potential liability for the agency employee personally responsible.
- When a contractor is under contract with an agency, that contractor may be liable on a lower fault standard.

Definition of Terms in Tort Law

- **Tort:** a private or civil wrong or injury, including action for bad faith breach of a contract, for which the court will provide a remedy in the form of an action for damages.
 - Someone filing a civil action in tort must allege and prove that a duty owing to him was violated and that he was injured because of the violation.

Definition of Terms in Tort Law

- ***Negligence***: the omission to do something which a reasonable person, guided by those ordinary considerations which regulate human affairs, would do,

-or-

- The doing of something which a reasonable and prudent person would not do.
 - Negligence is an unintentional tort, involving harm which was not intended but could have been prevented by reasonable precaution.

Required Elements of a Tort

- The three elements of a tort case that must exist in order for there to be a trial based on negligence are:
 1. A duty owed by the defendant to exercise due care.
 2. Breach of duty by the defendant.
 3. A causal relationship between the defendant's conduct and the harm done to the plaintiff and damages.



Establishing Expected Level of Performance

- “Standard of care” by which people must conduct themselves in relation to others:
 - Most commonly used: that care expected from an ordinary, reasonable, prudent person.
 - May be set forth in a statute or ordinance.
 - May be an accepted standard in a profession, trade, or industry.
 - Examples in highway construction: 2011 DE *Manual on Uniform Traffic Control Devices* (MUTCD) or the AASHTO *Roadside Design Guide*

Responsibilities

➤ Responsibility of the *Agency*:

- State transportation agencies have a duty to maintain highways, streets, and sidewalks in a reasonably safe condition for the traveling public (road user).
- A motorist using a public highway has the right to presume that the road is safe for usual and ordinary traffic. He is not required to anticipate extraordinary danger, impediments, or obstructions to which his attention has not been directed.

Responsibilities

➤ Delaware Tort Law and Insurance Coverage for DeIDOT Employees

- State law provides sovereign immunity for DeIDOT and its employees, if no insurance coverage exists for the claim.
- DeIDOT fleet is covered by insurance, so immunity waived up to insurance limits.
- Once limits reached, immunity returns.
- Employees have same immunity when they do what is expected, or were only negligent.

Responsibilities

- DeIDOT Employees may face personal liability:
 - If the employee acted with gross negligence, outside reasonable scope of DeIDOT expectations.
 - “I don’t care” attitude may cost you, but not the State.
 - State will provisionally defend its employees when charged with gross negligence, but may decide to drop the defense if the facts warrant.

Responsibilities

➤ Your Best Bet:

- Do what your job requires to best of abilities.
- Keep safety first.
- Keep to specs and DeIDOT standards.
- Care about what you do, and show it.

Responsibilities

➤ Responsibility of *Contractor Employees*:

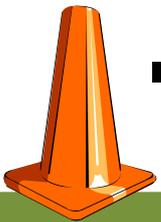
- The contractor is an agent of the State, so he is also responsible to maintain the roadway in reasonably safe condition.
- The contractor also has an obligation to provide a safe working environment for his employees.
- Contractor employees are responsible to ensure that their personal safety is at its highest level by using the training skills learned, following proper tool, equipment and material practices, and by maintaining a good and safe work environment.

Risk Management in Highway Work Zones

➤ To minimize risk, to prevent or minimize litigation, and to help defend lawsuits:



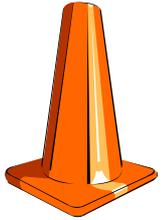
- Clearly define traffic control responsibilities in the contract.
- Consider unit-cost pay for the maintenance and protection of traffic functions and devices.
- Require contractors to submit and obtain approval for traffic control plans.
- Hold a pre-construction conference to discuss traffic handling, noise, dust, and hours of operation.



Risk Management in Highway Work Zones

continued:

- Comply with traffic control procedures set forth in manuals such as the 2011 DE MUTCD.
- Inspect traffic control zones to ensure that motorists are responding appropriately.
- Photograph the route through construction sites and on detours.
- Provide properly functioning traffic control devices at work sites.



Risk Management in Highway Work Zones

continued:

- Inspect the traffic control zone at regular intervals to ensure reasonable maintenance of the zone and servicing of the devices.
- Record all inspections.
- Document all actions related to traffic control procedures or devices in work zones.
- Store material and equipment a safe distance from the traveled way.



Risk Management in Highway Work Zones

- Specific to guardrail installation work zones:
 - Select products and devices that meet the requirements of NCHRP 350 or MASH.
 - Install guardrail and associated systems in accordance with the plans and specifications and per the recommendations of the manufacturer.
 - Placement of guardrails should be as specified in the *AASHTO Roadside Design Guide*.

Session 7 Outcomes

- Inspect barrier and terminal installations to ensure conformity with appropriate plans and specifications.
- Document inspections.
- Limit State and contractor tort liability in case of work related crashes.