Design and Construction Issues

Bridget Malinowski and John Stevens

Agenda

- Design Submittal Quality
- Specifications
- Working with other agencies
- Role of the construction manager

MOVE ILLINOIS

The Illinois Tollway

DRIVING THE FUTURE

Design Submittal Quality

Reference the DSE Manual

- **All work developed by the DSE shall be submitted at various intervals as described in Section 4, “Design Phase Project Deliverables”.**

Phases of the Project

- **Final plan check design phase (100 percent)**
- **Pre-final design phase (95 percent biddable documents).**
- **Preliminary engineering phase (60 percent)**
  - Utility review submittal
- **Conceptual design phase (30 percent)**
- **Studies/reports (master planning/pre-concept reports)**

Design Submittal Quality

- **Conduct constructability review per section 7.4 of the DSE Manual**
  - Verify as-built plans
  - Verify ongoing construction projects in corridors
- **Address all comments**
- **Understand the schedule and identify critical path items**

Design Submittal Quality

- **Identify utilities**
  - Design around utilities
- **Coordinate with utilities**
  - Request atlas information
  - Send out Notice of Interference (NOI)
  - Utility confirms/denies
  - Design around conflicts
  - Utility submits work order
- **Identify right-of-way**

MOVE ILLINOIS

The Illinois Tollway

DRIVING THE FUTURE

Specifications

Barrier Warrant Analysis

- **Roadside safety MUST be part of the design process from the start – begins at concept**
- **Engage all disciplines**
  - Internal
  - External (sub-consultants)
- **Sub-consultants utilized for BWA must be engaged in design**

Barrier Warrant Analysis

- **Items that need to be coordinated**
  - Embankment Side Slopes
  - Drainage and Structures
  - Gutter Locations
  - Bridge type should be determined using the BWA process
- **BWA scope/work load reduced**

Illinois Department of Transportation
Bureau of Materials and Physical Research

Manufacturer	Raised Reflective Pavement Marker Casting	Raised Reflective Pavement Marker Casting (Bridge)	Replacement Reflector
Ennis Traffic 6565 West Howard Niles, IL 60714 Contact: Pete McCafferty Phone: 630-841-4711 Email: petem@ennistraffic.com	**Model 96LP** **Model 101LP**	**Model 96LPS** **Model 101LPS**	**Model 944** **Model C40**
Ray-O-Lite 1010 Brice Street Newark, OH 43055 Contact: Robert McCullohs Phone: 706-628-9550 Email: rmccullohs@rayolite.com	**Hallen Ironstar Model 664H** **Hallen Model H960** **Hallen Model H1010**	**Hallen Model H960B** **SnowLite Model 200**	**Model 2004**
Three M Three M Center Building 225-5S-08 St. Paul, MN 55144-1380 Phone: 1-800-553-1380 prompt # 1 Email: tnortheast@mmm.com			**Model RPM-190**

MOVE ILLINOIS

Snowplowable Raised Pavement Markers

- **Install per manufacturers requirements**

SNOWPLOWABLE MARKERS

INSTALLATION INSTRUCTIONS

This procedure outlines the recommended steps for the installation of the Stimsonite Models 96LPI/ 96LPS & 101/101LPI/101LPS/101LPCR Snowplowable Raised Pavement Markers.
Note: Do not install markers unless air temperature and humidity are within the specifications outlined by the epoxy manufacturer.

Determine where to locate the marker.

Locate the Snowplowable marker so that the reflective face is perpendicular to the roadway centerline. When using Snowplowable markers to supplement a solid pavement stripe, offset the markers 2" from the edge of the stripe. When using Snowplowable markers to supplement a dashed stripe, locate the marker in the center of the gap and in line with the pavement stripe. This permits painting of the line without affecting the Snowplowable marker. DO NOT locate Snowplowable markers in longitudinal or transverse pavement joints or in cracks in the pavement surface. Place the marker at least 2" from any joint or crack in the pavement surface.

Cut the pavement to fit the marker. NOTE: Markers must be installed in a new saw cut. Never attempt to re-use an existing hole that previously held a marker.

Cut the pavement to match the bottom contour of the marker. A single plunge cut using a stack of 18" diameter concrete saw blades, bordered by 20" diameter blades, is required. Using the marker as a gauge, inspect each cut for proper fit:

- The cut should have approximately 1/8" clearance (side to side movement.)
- All four leveling lugs must contact the pavement.
- The leading edge of the casting must lie below the pavement surface.

Clean and dry the saw cut.

The saw cut area **MUST BE DRY** and free of dust, dirt or any material which will adversely affect the bond of the adhesive.

Apply epoxy adhesive.

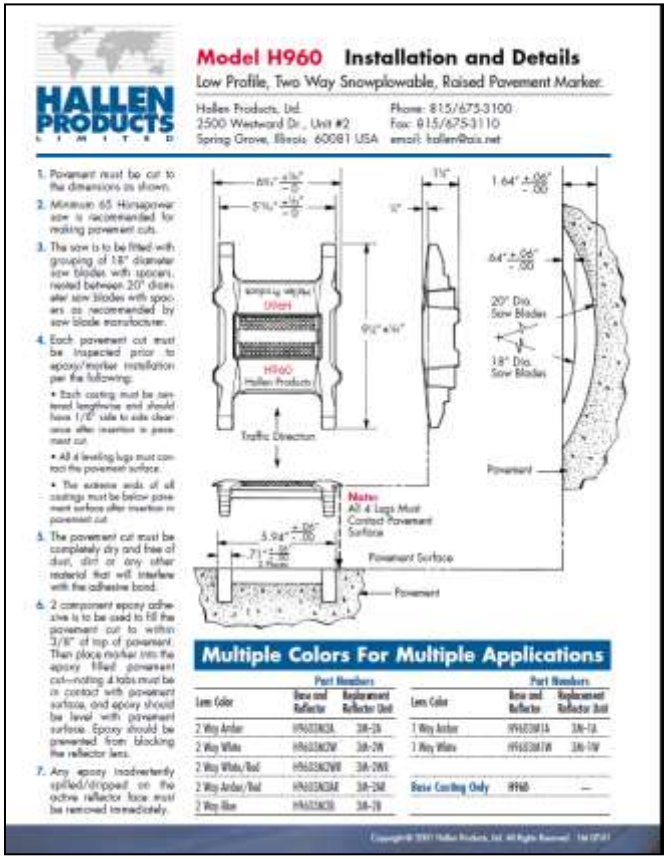
Combine and mix Stimsonite or other epoxy (meeting AASHTO Designation M 237, Type IV) just prior to anchoring the markers. Automatic dispensing equipment is recommended. Hand mixing should be limited to very small projects. When using Stimsonite epoxy, combine equal parts of component A and component B. Mix thoroughly. Properly mixed, the epoxy will be uniform gray, without visible streaks. (Follow manufacturer's instructions for other approved epoxy.) Pour the epoxy into the outer two grooves and the cut area between them. Fill to within 3/8" of the pavement surface. At this level, some adhesive should overflow around all edges of the installed casting to seal the saw cut area.
Caution: Epoxy adhesive cures best at temperatures above 60° F (15.5° C) and low relative humidity. Always follow epoxy manufacturer's guidelines for use.

Place the marker.

Place the marker by hand into the epoxy-filled saw cut. Note: It is critical that all four leveling lugs are resting directly on the pavement, and the leading edges of the rails are below the pavement surface. If this is not the case, then the installation is improper and the marker must be removed and reinstalled in a new saw cut. Make certain that the epoxy does not flow onto the reflective face or the plate in front of it. Protect markers from traffic until the epoxy completely hardens.

ENNIS

June 2006; Supersedes August 2005



HALLEN PRODUCTS LIMITED

Model H960 Installation and Details

Low Profile, Two Way Snowplowable, Raised Pavement Marker.

Hallen Products, Ltd.
2500 Westward Dr., Unit #2
Spring Grove, Illinois 60081 USA

Phone: 815/675-3100
Fax: 815/675-3110
email: hallen@aix.net

1. Pavement must be cut to the dimensions as shown.
2. Minimum 65 Horsepower saw is recommended for making pavement cuts.
3. The saw is to be fitted with grouping of 18" diameter saw blades, with spacers, nested between 20" diameter saw blades with spacers as recommended by saw blade manufacturer.
4. Each pavement cut must be inspected prior to epoxy/marker installation per the following:
   - Each casting must be centered lengthwise and should have 1/8" side to side clearance after insertion in pavement cut.
   - All 4 leveling lugs must contact the pavement surface.
   - The exterior ends of all castings must be below pavement surface after insertion in pavement cut.
5. The pavement cut must be completely dry and free of dust, dirt or any other material that will interfere with the adhesive bond.
6. 2 component epoxy adhesive is to be used to fill the pavement cut to within 3/8" of top of pavement. Then place marker into the epoxy filled pavement cut—noting 4 tabs must be in contact with pavement surface, and epoxy should be level with pavement surface. Epoxy should be prevented from blocking the reflector lens.
7. Any epoxy inadvertently spilled/dripped on the active reflector face must be removed immediately.

Multiple Colors For Multiple Applications

Lens Color	Part Numbers: Base and Reflector	Part Numbers: Replacement Reflector Unit
2 Way Amber	HH60ABOA	3M-2A
2 Way White	HH60ABOW	3M-2W
2 Way White/Red	HH60ABOWR	3M-2WR
2 Way Amber/Red	HH60ABOAR	3M-2AR
2 Way Blue	HH60ABOB	3M-2B

Lens Color	Part Numbers: Base and Reflector	Part Numbers: Replacement Reflector Unit
1 Way Amber	HH60ABOA	3M-1A
1 Way White	HH60ABOW	3M-1W
Base Casting Only	HH60	—

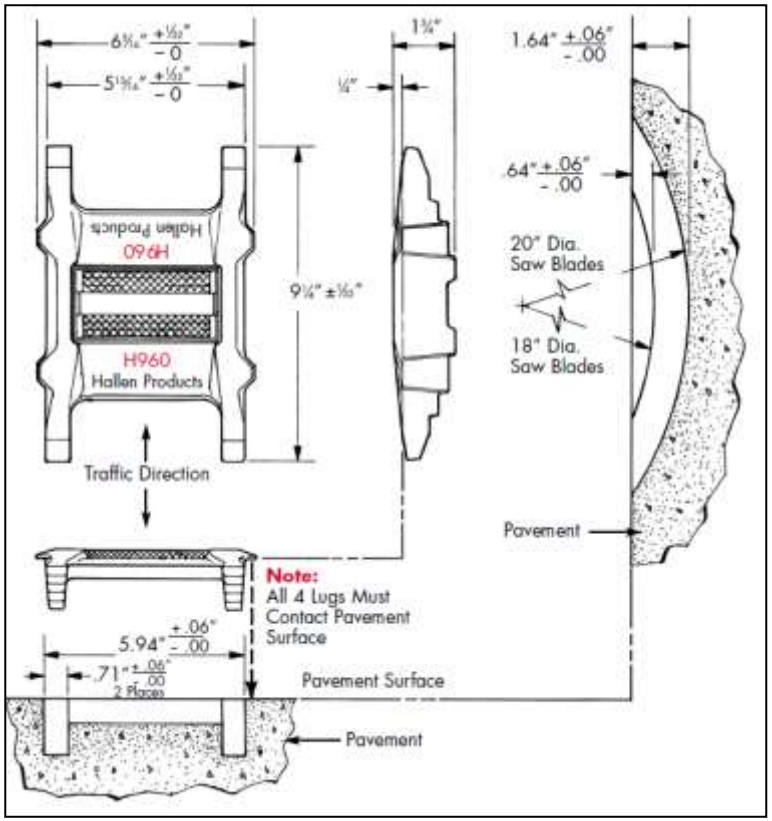
MOVE ILLINOIS

Snowplowable Raised Pavement Markers

- **Determine where to locate the marker**
  - Install in a new saw cut
  - Place at least two inches from any joint or crack in the pavement surface (longitudinal or transverse)

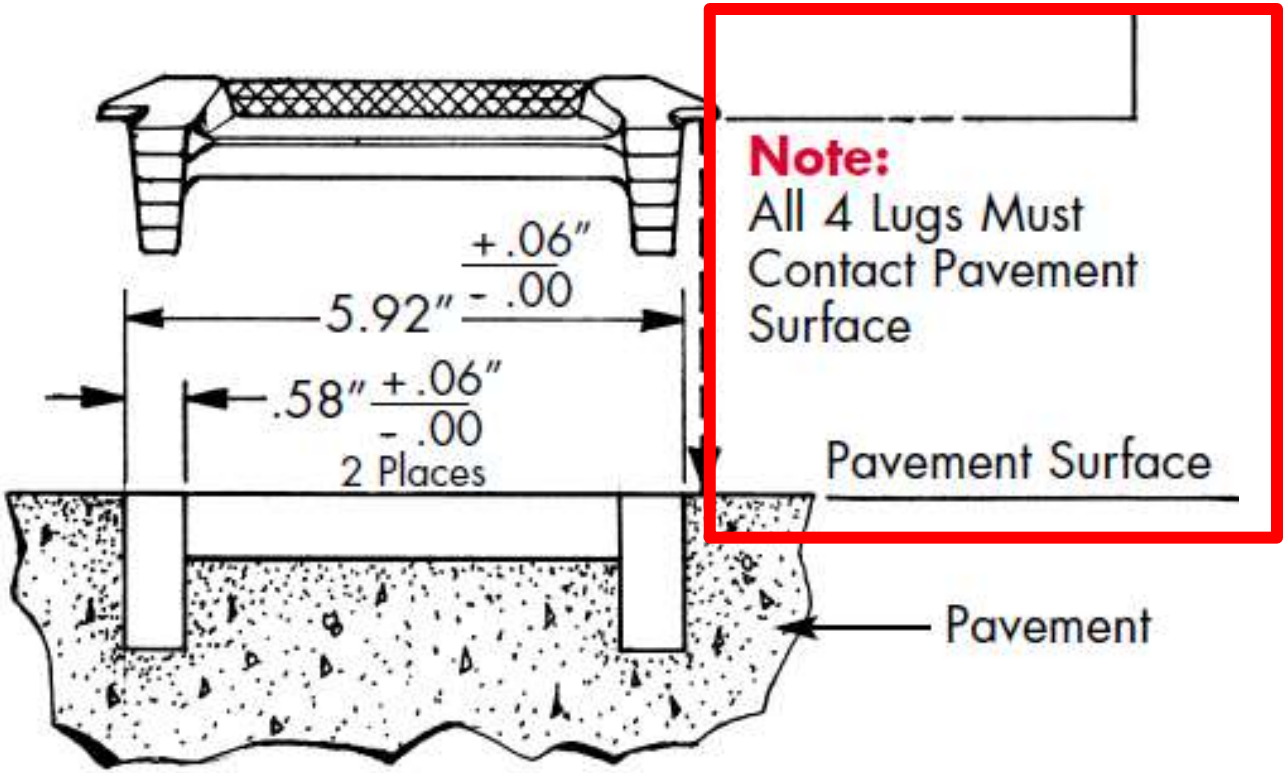
Manufacturer Specific

- **Cut the pavement to match the bottom contour of the marker**



Snowplowable Raised Pavement Markers

- **Using the marker as a gauge, inspect each cut for proper fit:**



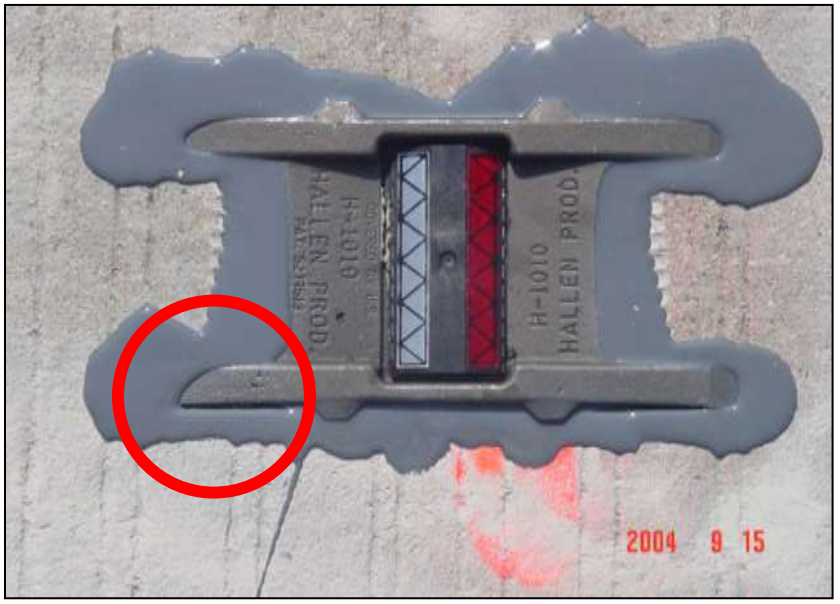
Snowplowable Raised Pavement Markers

- **Clean and dry the saw cut**
  - Pavement cut must be completely dry and free of dust, dirt or any other material that will interfere with the adhesive bond
- **Apply epoxy adhesive**
  - Follow manufacturer's recommendations

Snowplowable Raised Pavement Markers

Asphalt Section Installation

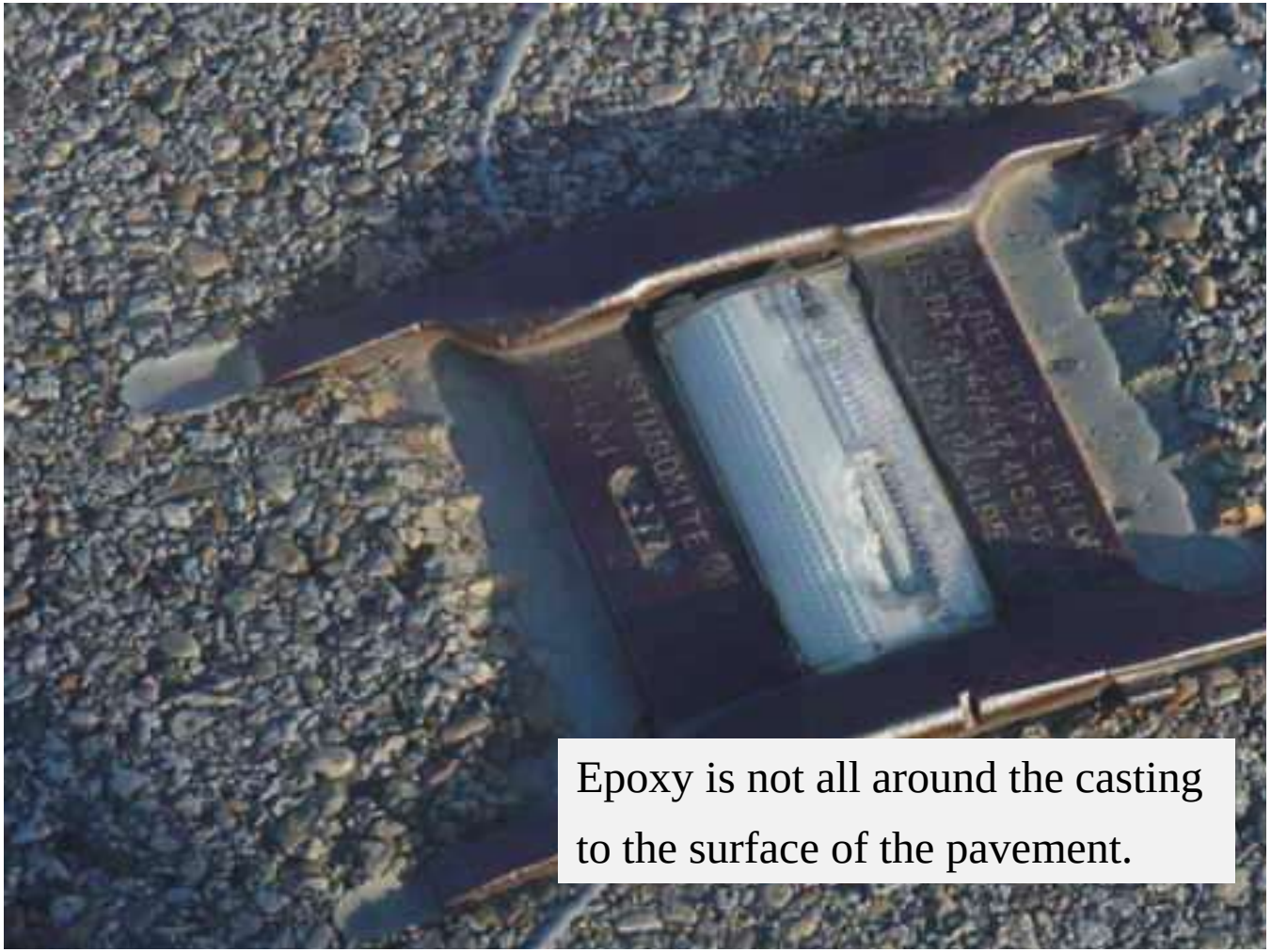
Concrete Section Installation



Completed Installation

RPM Castings are Poorly Installed

RPM Castings are Poorly Installed



RPM Castings are Poorly Installed

RPM Castings are Poorly Installed

Tort Immunity

Reflective Pavement Markers

Temporary Concrete Barrier (TCB)

- Seated on bare, clean pavement or paved shoulder
- Pinned together in a smooth, continuous line
- Barrier unit at each end shall be secured using six anchoring pins
- End barrier unit facing oncoming traffic shall be shielded with a temporary impact attenuator
- Third party verification throughout the season
- Elevate conflicts

Temporary Concrete Barrier

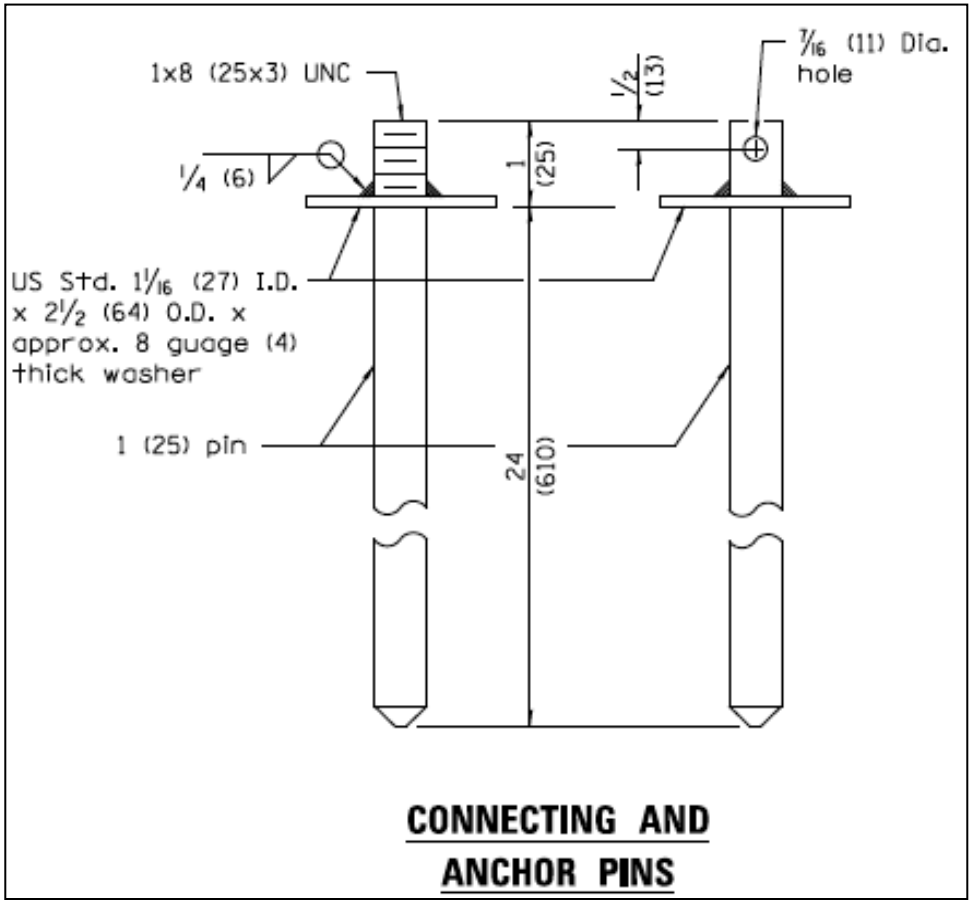
Free-standing system

Free-standing TCB placement consists of the end barrier units being anchored into pavement or deck.

Individual barrier units set atop pavement which are attached together by a constrained pin and loop type connection.

Free-Standing System

Temporary Concrete Barrier



Temporary Concrete Barrier

Temporary Concrete Barrier

- **Anchored systems**

Counterflow lanes
TCB anchored to pavement
on both sides of barrier
six pins per section

TCB anchored on
traffic side face of barrier
three pins per section

Anchored Systems

MOVE ILLINOIS

The Illinois Tollway

DRIVING THE FUTURE

Agency Coordination

John Stevens

Agency Permit Coordination

Starts with design; not the contractor's responsibility

- **Permits are required for various roadways**
- **Need to be coordinated through the Tollway identified point of contact**
- **Need to be specific**
  - Send a cover letter summarizing the specific request
  - Submit with the applicable drawings/specifications
  - Highlight or note the specific pages to reference
  - Confirm the correct recipient received the plans
  - Follow up with the Tollway point of contact for progress

One Point of Contact for Permits

- **Staff identified to coordinate specific corridors**
  - EOWA
    - Manar Nashif, mnashif@getipass.com
  - I-90
    - Jim Mayer, jmayer@getipass.com
  - Systemwide
    - Erik Stanley, estanley@getipass.com
- **All emails and letters should be signed by one of the above names**

Once Permit is Received…

- **Contractors and construction managers are responsible for reading the permit**
- **Adhere to the permit stipulations**
  - Note the construction access provided or stipulations
  - Adhere to the working hours identified and plans
  - Follow the lane closure times

MOVE ILLINOIS

The Illinois Tollway

DRIVING THE FUTURE

Role of the Construction Manager

Primary Role of the Construction Manager

- **Assign staff as stated in the Statement of Interest**
- **Manage change**
  - Schedule
  - Cost
    - Look ahead – maintain potential change order log
    - No work without an approved ATP
    - C5 Committee Procedure

Authorization Limit	Approving Authority
Credits	Project Manager
Up to $30,000	Project Manager
Up to $100,000	Chief Engineer
Up to $150,000	Executive Director
Up to $200,000	Chair of the Board
More than $200,000	Board of Directors

CM Responsibilities

- Confirm quantities and maintain project records according to the IDOT documentation procedures
- Inspect and monitor project construction activities
- Have thorough knowledge of the plans and specifications
- Provide quality assurance testing of materials
- Monitor contractors quality control program
- Provide updates to Tollway Communications Department through PM (timely response)
- Submit DBE/EEO reports (Quarterly EEO supplement)

CM Responsibilities

- **Utility coordination**
  - Invite utility representatives to weekly progress meetings
  - Verify the relocation is
    - Being performed in accordance with the plan
    - The relocation actually works for the project
- **Submit timely documentation**
- **Erosion control inspection and documentation**
- **Maintenance of traffic inspection and documentation**

Managing Schedule

- Timely submittal of monthly updates
- Thorough and timely review of contractor schedule
- Ensure the schedule meets the contract requirements
- Monthly update vs. revised schedule

Managing Schedule: Time Extension Requests

New checklist available

- **Are production rates being met?**
  - Work hours
  - Working days
  - Utilization
- **Does delay affect critical path?**
- **Can delay be mitigated by modifying staging or re-sequencing work?**
- **Time extensions need to include detailed explanations and analysis, not simple recommendations**

Managing Costs

- Communicate PCOs EARLY
- Confirm quantities and costs as the project proceeds
- Claims Process – contract dispute resolution
- Maintain record drawing changes and provide changes to the DSE, especially on corridors
- Constructability reviews

Timely Documentation is Required

Use e-Builder for project documentation

- **Monthly Status Reports due the first Thursday of the month**
  - Complete all of the fields
  - Provide progress photos
- **Review all submittals (not all submittals need to be approved by the DSE)**
- **Material substitutions must be submitted and approved by designer and GEC (noisewall, pipe liners)**
- **Pay estimates should be submitted at least monthly**
- **RFI responses due in seven days or less**
- **Submittals due in 14 days or less**

Items From the Designer

- Design calculations (as needed)
- Quantity calculations
- Permit information and related correspondence
- Bridge condition report
- Utility agreements and correspondence

THANK YOU