



POLY-SET® HD
Information Brochure

Utility Structural Systems
2201 N. Collins St., Suite 240 • Arlington, Texas 76011
(800) 367-9273 • www.utilitystructural.com • info@poly-set.com

POLY-SET® HD

Backfill Systems

If you're still using concrete for setting your road signs and other in ground structures, let us show you how **POLY-SET® HD** can save you time and money.

POLY-SET® is a uniquely engineered backfill that was originally designed over 30 years ago to help the utility industry solve the problems they faced setting transmission and distribution poles in poor soil conditions. We improved the original **POLY-SET®** formulation and created **POLY-SET® HD** that was tested by the Texas Transportation Institute (TTI), and approved for use by Texas Department of Transportation for sign support applications. The timing is right for you to see how **POLY-SET® HD** can save you both time and money.

HOW IT WORKS. **POLY-SET® HD** is a specially modified, high density, polyurethane product that when properly prepared, transforms the two-part liquid components into a tightly packed, well-anchored foundation in minutes. The pole will stand on it's own in just minutes and you can hang your sign in as little as 15 minutes. This eliminates the need for a return trip to hang your sign which will save you time and money.

WHY IT WORKS. **POLY-SET® HD** expands up to 8.5 times its original volume and actually contours to the shape of the excavated area, essentially locking itself in place. The tightly packed molecular structure of **POLY-SET® HD** increases the bearing surface of the embedded structure by making the post part of the foundation.

WHY IT LASTS. Unlike alternative backfill materials, **POLY-SET® HD** is resistant to moisture as a result of its closed cell structure. Compared to conventional approaches it's more resistant to heat, cold, and microbacterial attack. By encapsulating the post, **POLY-SET® HD** acts as a protective shield against environmental elements.

APPLICATION ADVANTAGES

POLY-SET® HD is easy to use and sets fast to increase productivity.

- Eliminates hand mixing sand, gravel, concrete, and water for small signs
- Eliminates cleaning tools
- Eliminates concrete truck delays
- Eliminates the need for a return trip to erect a typical sign.

POLY-SET® HD is water insensitive and can be used in adverse soil conditions:

- Wet or dry soil conditions
- Sandy soils
- Rocky conditions

POLY-SET® HD is tolerant to cold weather and can be used in freezing weather conditions with the PoleMaster heated storage unit.

POLY-SET® HD is packaged in a variety of convenient light weight sizes designed specifically to meet DOT sign support applications.

If you need any additional information on our **POLY-SET®** Backfill Systems, or have any questions please contact USS at (800) 367-9273, or at www.utilitystructural.com.

POLY-SET® HD Kits

Information

HDPS- 30 Kit

One kit will fill 3.37 cubic feet of void and is designed primarily to set breakaway signpost stubs. Mixing instructions are on both the component pails. The “A” pails and “B” pails are shipped on separate pallets. A single pallet can hold up to 24 “A” pails or 60 “B” pails. The 5 Gal pail serves as the mixing container. A single kit contains:

- 1- 5 Gal Metal Pail “A”
- 1- 2 Gal Metal Pail “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



HDPS- 22 Kit

One kit will fill 2.47 cubic feet of void and is designed primarily to set breakaway signpost stubs. Mixing instructions are on both the component pails. The “A” pails and “B” pails are shipped on separate pallets. A single pallet can hold up to 24 “A” pails or 60 “B” pails. The 5 Gal pail serves as the mixing container. A single kit contains:

- 1- 5 Gal Metal Pail “A”
- 1- 2 Gal Metal Pail “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



HDPS- 15 Kit

One kit will fill 1.68 cubic feet of void and is designed primarily to set signpost stubs. Mixing instructions are on both of the jugs. The jugs are packaged together in a box and then put on pallets. Each pallet can hold up to 45 kits. The 2 Gal plastic jug serves as the mixing container. A single kit contains:

- 1- 2 Gal Plastic Jug “A”
- 1- ½ Gal Plastic Jug “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



HDPS- 10 Kit

One kit will fill 1.12 cubic feet of void and is designed primarily to set signpost stubs. Mixing instructions are on both of the jugs. The jugs are packaged together in a box and then put on pallets. Each pallet can hold up to 45 kits. The 2 Gal plastic jug serves as the mixing container. A single kit contains:

- 1- 2 Gal Plastic Jug “A”
- 1- ½ Gal Plastic Jug “B”
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



If you need any additional information on our POLY-SET® products, please contact your Sales Representative or Customer Service at (800) 367-9273.

POLY-SET® HD Kits

Information

HDPS- 08 Kit

One kit will fill 0.9 cubic feet of void and is designed primarily to set signpost stubs. Mixing instructions are on both of the jugs. The jugs are packaged together in a box and then put on pallets. Each pallet can hold up to 45 kits. The 2 Gal plastic jug serves as the mixing container.

- 1- 2 Gal Plastic Jug "A"
- 1- ½ Gal Plastic Jug "B"
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



HDPS- 05 Kit

One kit will fill 0.56 cubic feet of void and is designed primarily for setting smaller signposts or straightening signposts. Mixing instructions are on both the ½ Gal jugs. All the kit components are packaged together in a box and palletized. Each pallet can hold up to 96 kits. The box serves as the mixing container. A single kit contains:

- 1- ½ Gal Plastic Jug "A"
- 1- ½ Gal Plastic Jug "B"
- 1- Pair of Vinyl Gloves
- 1- Stir Stick



HDPS- 02 Kit

One kit will fill 0.22 cubic feet of void and is designed primarily to straighten leaning signposts. All the kit components are packaged together in a box, along with instructions, and palletized. Each pallet can hold up to 96 kits. The ½ Gal plastic jug serves as the mixing container. A single kit contains:

- 1- Quart Bottle "A"
- 1- ½ Gal Plastic Jug "B"
- 1- Pair of Vinyl Gloves



If you need any additional information on our POLY-SET® products, please contact your Sales Representative or Customer Service at (800) 367-9273.

The amount each kit fills in void is base on temperatures of 78°F. Utility Structural Systems reserves the right to change these kits without notice. HD 11.17.04

POLY-SET® HD Kits

SHIPPING INFORMATION All shipments are FOB Houston, Texas.

Full pallet information:

Boxes Kits:

HDPS-02 Kits = 96 boxes per pallet

HDPS-05 Kits = 96 boxes per pallet

HDPS-08 Kits = 45 boxes per pallet

HDPS-10 Kits = 45 boxes per pallet

HDPS-15 Kits = 45 boxes per pallet

Pail Kits (“A” and “B” pail shipped on separate pallets):

HDPS-22 Kits = 24 “A” pails per pallet and 60 “B” pails per pallet

HDPS-30 Kits = 24 “A” pails per pallet and 60 “B” pails per pallet

We are happy to ship any quantity that the customer needs and the above numbers are provided for shipping information purposes only. If you need any additional information on our POLY-SET® products, please call your Sales Representative or Customer Service at (800) 367-9273.

DOT Product Evaluation / Vendor Information

UTILITY STRUCTURAL SYSTEMS

10.28.03

Trade Name:
POLY-SET® HD

Manufacturer:
Forward Enterprises Inc.
9430 Telephone Road
Houston, Texas 77075
(713) 991-1149 Phone
(713) 991-1737 Fax

Representative Company:
Utility Structural Systems
2201 North Collins Suite 240 Arlington, Texas 76011
Phone 1-800-367-9273 Fax (817) 277-3441

Manufacturer's Contact Phone Number:
800.367.9273

Web Address:
www.utilitystructural.com

Recommended Usage:
Recommended for setting and straightening small breakaway and non-breakaway roadside signs. POLY-SET® HD is recommended for state and municipal installation of roadside sign posts.



***Perforated Square Metal
Tubing
(Driven or Augered)***



***Texas Triangular
Slip Base***



***Wedge Anchor Thin
Thin Wall Tubing
(Driven or Augered)***

Used as Alternatives for:
POLY-SET® HD is a time saving, cost effective alternative for concrete, crushed rock and soil backfill for sign-post installations.

Feature's and Advantages:

POLY-SET® HD is a patented high density, water-insensitive, polyurethane backfill that improves reliability of small road-side sign post structures while reducing installation time and labor costs. POLY-SET® HD is suitable for use in all weather conditions, and is exceptional in poor soil conditions. POLY-SET® HD resists the heaving and jacking effects of soil conditions that range from extremely dry to extremely wet. Unlike other backfills, signposts set with POLY-SET® HD can be set in 12-15 minutes.

Product Composition:

POLY-SET® HD is a patented product and component information is proprietary.

Laboratory Analysis:

Laboratory analysis is proprietary information. Prior to shipping, POLY-SET® products are thoroughly tested and required to meet the manufacturers QCM9308 Quality Control and Laboratory specifications.

Specifications Met:

ASTM: D1621 for compressive properties of rigid cellular expanded plastics procedure A. Tensile and Shear not performed.

NCHRP: Product conforms to NCHRP Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features". See the Texas Transportation Institute report information Test 3-60.

Other Specifications Met:**Texas Department of Transportation:****Sign Mounting Details for Small Roadside Signs SMD (1-4)-98.**

- Universal Anchor System Type A with a 16 square feet sign maximum.
- Texas Universal Triangular Slip Base. This includes types A, A-1,A-2, B, C, D-1, D-2, D-3, D-4, D-5, and F with maximum square footage of 16 square feet for schedule 10 steel post and 30 square feet for schedule 80 steel post.
- Perforated Square Metal Tubing (Driven or Augered). This includes the Type U Foundation with a 10 square feet sign maximum.

Sign Mounting Details for Small Roadside Signs SMD(1-5)-98.

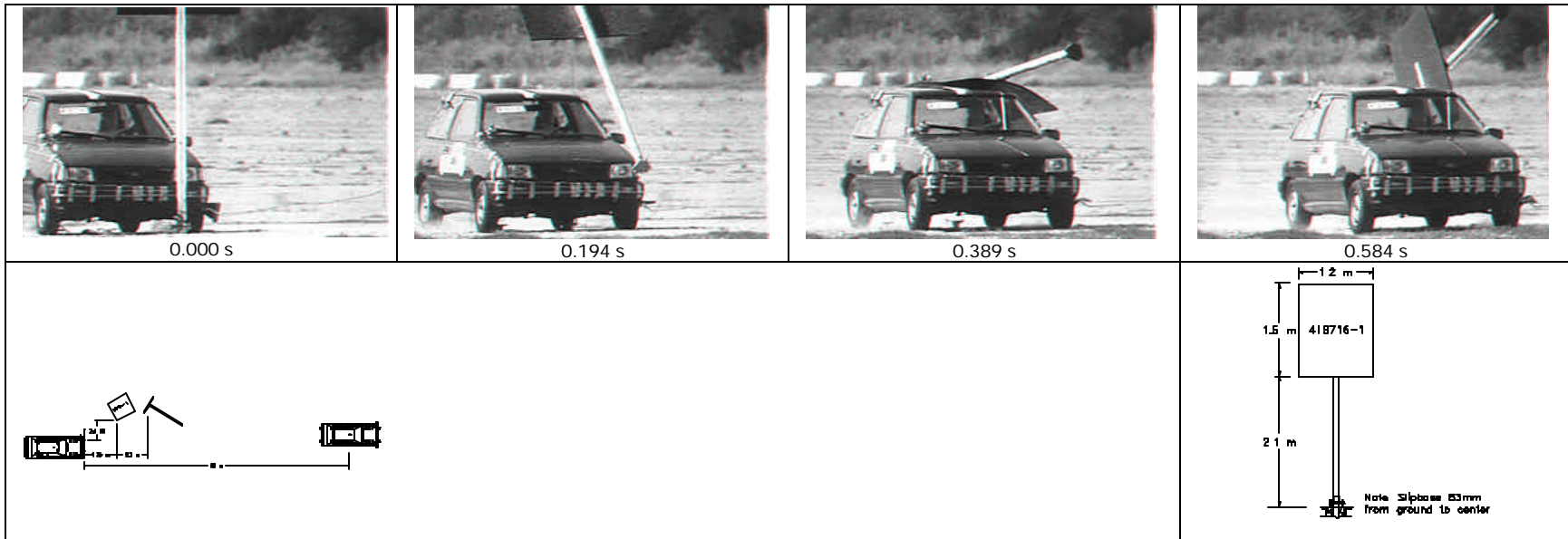
- Wedge Anchor Thin Wall (Driven or Augered). This includes Type A Foundation with a 10 square feet sign maximum.

Barricade and Construction Standards BC (3) –98.

- The Universal Anchor System as referenced above. Note: Barricades shall not be used as a sign support in this standard.
- Perforated Square Metal Tubing (Driven or Augered) as referenced above. Note: Barricades shall not be used as a sign support in this standard.

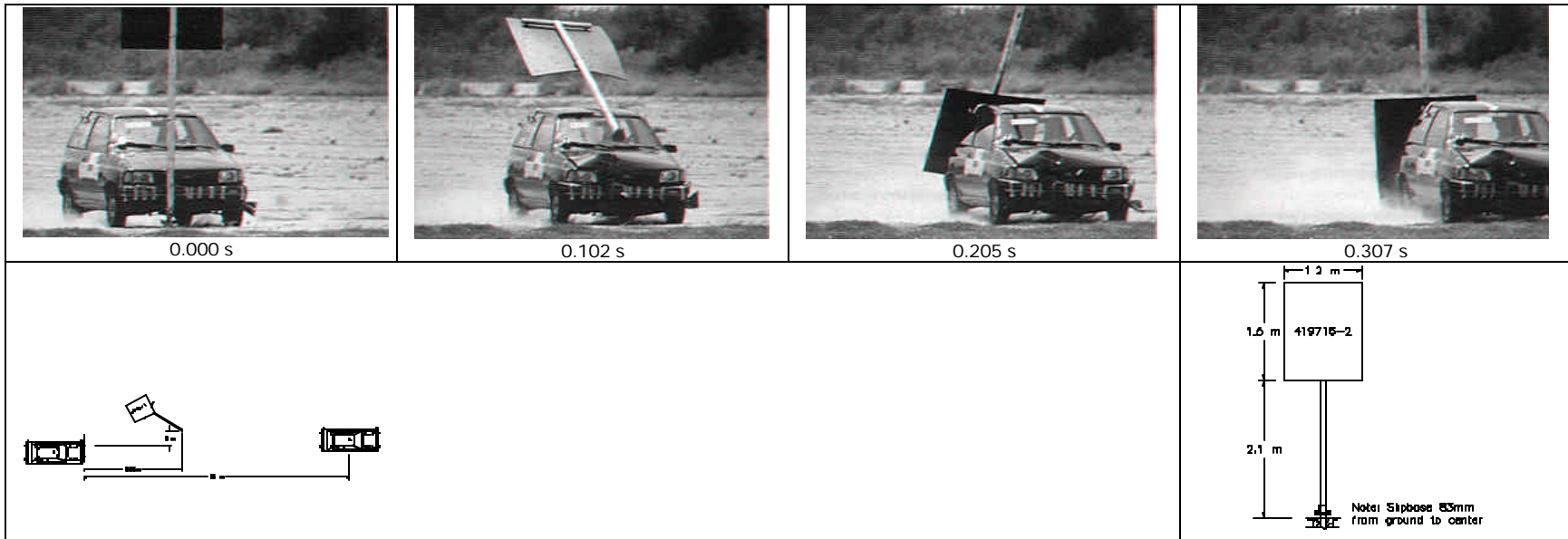
Product Availability:

Poly-Set HD is readily available and most orders ship within five business days from receipt of a verified purchase order.



| | | | |
|--|--------------------------------|------------------------------|--------------------------------------|
| 1 General Information | | Impact Conditions | Test Article Debris Scatter Area (m) |
| Test Agency | Texas Transportation Institute | Speed (km/h) | 35.8 (22.3 mi/h) |
| Test No. | 419716-1 | Angle (deg) | 0 |
| Date | 09/05/96 | Exit Conditions | Width |
| Test Article | | Speed (km/h) | 32.6 (52.5 mi/h) |
| Type | Single Slip Base Sign Support | Angle (deg) | 0 |
| Name | Slip-base in Foam Foundation | Occupant Risk Values | Vehicle Damage |
| Installation Height (m) | 2.13 (7.0 ft) | Impact Velocity (m/s) | Exterior |
| Size and/or dimension and material of key elements | | x-direction | 1.1 (3.6 ft/s) |
| Soil Type and Condition | Standard Soil, Damp | y-direction | 0.6 (2.0 ft/s) |
| Test Vehicle | | Ridedown Accelerations (g's) | Interior |
| Type | Production | x-direction | -0.3 |
| Designation | 820C | y-direction | 0.3 |
| Model | 1990 Ford Festiva | Max. 0.050-s Average (g's) | Post-Impact Behavior |
| Mass (kg) Curb | 847 (1866 lb) | x-direction | -1.0 |
| Test Inertial | 820 (1806 lb) | y-direction | 0.7 |
| Dummy | 75 (165 lb) | z-direction | N/A |
| Gross Static | 896 (1974 lb) | | |
| | | | Max. Roll Angle (deg) |
| | | | 3.1 |
| | | | Max. Pitch Angle (deg) |
| | | | -4.1 |
| | | | Max. Yaw Angle (deg) |
| | | | -1.1 |

Figure 9. Summary of Results For Test 419716-1, NCHRP Report 350 Test 3-60.



| | | | |
|--|--------------------------------|------------------------------|--|
| 1 General Information | | Impact Conditions | Test Article Debris Scatter Area (m) |
| Test Agency | Texas Transportation Institute | Speed (km/h) | Width |
| Test No. | 419716-2 | Angle (deg) | Length |
| Date | 09/05/96 | | |
| Test Article | | Exit Conditions | Vehicle Damage |
| Type | Single sign support | Speed (km/h) | Exterior |
| Name | Slip base sign in foam base | Angle (deg) | VDS |
| Installation Height (m) | 2.13 (7 ft) | | CDC |
| Size and/or dimension and material of key elements | | Occupant Risk Values | Interior |
| Soil Type and Condition | Standard soil, damp | Impact Velocity (m/s) | OCDI |
| Test Vehicle | | x-direction | Maximum Exterior |
| Type | Production | y-direction | Vehicle Crush (mm) |
| Designation | 820C | Ridedown Accelerations (g's) | Max. Occ. Compartment Deformation (mm) |
| Model | 1990 Ford Festiva | x-direction | |
| Mass (kg) Curb | 847 (1866 lb) | y-direction | |
| Test Inertial | 820 (1806 lb) | Max. 0.050-s Average (g's) | |
| Dummy | 75 (165 lb) | x-direction | Post-Impact Behavior |
| Gross Static | 896 (1974 lb) | y-direction | Max. Roll Angle (deg) |
| | | z-direction | Max. Pitch Angle (deg) |
| | | | Max. Yaw Angle (deg) |

Figure 15. Summary of Results For Test 419716-2, NCHRP Report 350 Test 3-61.

TEXAS TRANSPORTATION Researcher

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Students are on the **ALERT**TM Advanced Law Enforcement & Response Technology —story on page 6

In this issue:

2 Re-engineering the engineer: Training tomorrow's professionals

5 Bright ideas: Getting the most from traffic signs



9 Foot notes: Research focuses on biking, walking



New small-sign supports stand strong

Safer, more cost-effective sign supports show benefits in testing

Can Texas road signs stand the test of time? With a little support they can.

In a recently completed four-year study, TTI research engineers Roger Bligh and Hayes Ross Jr. developed new small-sign supports (the steel pipes typical of Stop signs) that perform better than old designs.

For years TTI has helped the Texas Department of Transportation (TxDOT) in the development and testing of safe, cost-effective sign supports. Still, researchers continue to make improvements in terms of both impact performance and cost of materials, installation, repair and maintenance.

Sponsored by TxDOT, this TTI study was divided into three areas. The first was to determine the wind-resistance capacity of a thin-wall-tube support bracket, which provides bracing for large sign panels. Older designs use pipe that must be cut using a torch and welded together on-site. The new bracket uses thin-wall tubing, which is easy to cut and can be bolted to the top of standard supports. Therefore, researchers found a reduction in

both material and labor costs associated with installation.

The second task involved the development and testing of a universal triangular slip-base system that would be compatible with various sizes of steel-pipe sign supports. (Slip-base systems are designed so that the base will break away on impact, limiting damage and injuries.) The design incorporates a ductile iron casting that fits into the end of the pipe support and bolts to the foundation base plate. To save TxDOT labor and maintenance costs, TTI extended the concept to encompass the four sizes of pipe supports used by TxDOT.

"The universal triangular slip base serves as an all-purpose support system for pipe supports," Bligh says. "The insert concept simplifies installation and permits removal and reuse of the casting in the event the support pipe is damaged during an impact." The system includes a common base to which any of the four supports could be mounted, which permits upgrading of an installation to a larger support without replacing the footing. Researchers also successfully crash-tested the system in both single- and dual-post configurations.

In the third task, Bligh and

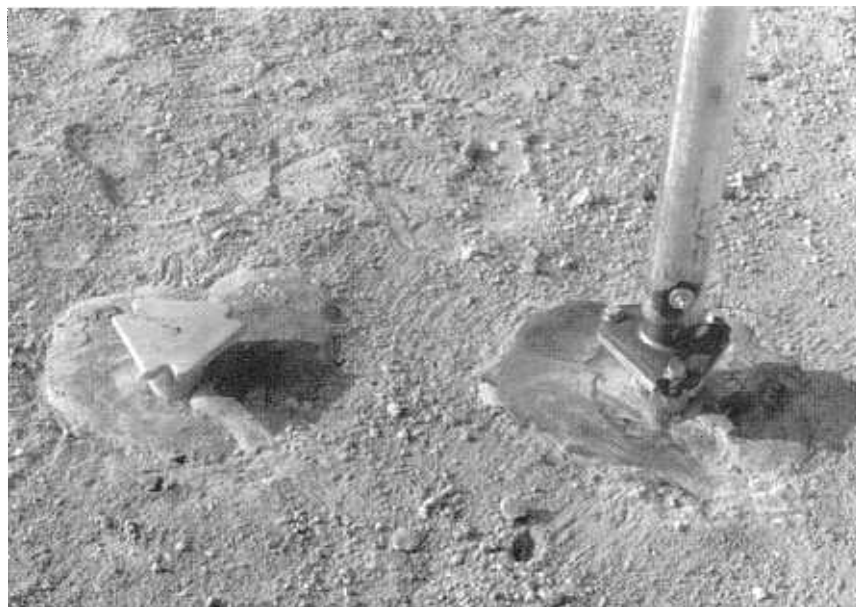
Ross investigated the use of a modified rigid polyurethane foam as an alternate foundation material to concrete in support installations. This foam expands inside the foundation hole to several times its premixed volume. Bligh says the foam is strong enough to accommodate the various sizes of pipe supports used by TxDOT and to stand up under full-scale crash tests.

"The benefits of using this material are its ease of application and quick setting time," Bligh says. "The foam hardens quickly and develops enough strength to install the sign support after about 15 minutes. This allows a sign crew to complete an installation in a single trip rather than having to wait for a conventional concrete footing to cure." Thus, the labor cost savings are considerable.

"These new concepts and innovations are intended to simplify installation procedures, reduce

maintenance and repair costs, and provide improved safety performance for drivers," Bligh says. "The goal is to enable the states to maintain a high level of safety in a cost-effective manner." ●

For more information on the study, contact Roger Bligh at 409/845-4377 (e-mail: rbligh@tamu.edu) or Hayes Ross Jr. at 409/845-4368 (e-mail: hayes-ross@tamu.edu).



The universal triangular slip base pictured above utilizes an insert concept. Pictured left is the base plate. The casting, which consists of a plate and solid rod that extends inside the pipe support, is bolted to the base plate (pictured right fully assembled).



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