

MAR 5 1996

Refer to: HNG-14

Mr. Tauhid Husain
Senior Engineer
Transpo Industries, Inc.
20 Jones Street
New Rochelle, New York 10801-6024

Dear Mr. Husain:

This is in response to your January 24 letter to Mr. Gerald L. Eller requesting Federal Highway Administration's (FHWA) acceptance of your double neck Pole-Safe breakaway support couplings for light poles, call boxes, and small sign posts. Transmitted with your letter were copies of two reports of pendulum testing conducted by Southwest Research Institute, static test reports from PSI/Pittsburgh Testing Laboratory, and drawings of the prototype and production couplings.

Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. We also recognize the testing and evaluation guidelines found in the National Cooperative Highway Research Program (NCHRP) Report Number 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.

Although the test results on the prototype couplings were in accordance with the evaluation criteria in the NCHRP Report 350, we do not believe that they fully demonstrate how the production units will perform. The NCHRP Report 350 states, in Section 2.3.1:

"The test article should be constructed and erected in a manner representative of in-service installations and should conform to specifications and drawings of the manufacturer or designer...deviations from fabrication, specification, or erection details should be delineated in the test report."

CONCURRENCES	
RTG. SYMBOL	HNG-14
INITIALS/SIG.	M. Husain
DATE	2-29-96
RTG. SYMBOL	HNG-14
INITIALS/SIG.	J. H. H.
DATE	4 Mar 96
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The drawings of the actual production model couplings differ substantially from the drawings of the couplings shown in the test reports. Among other differences, the tested couplings were machined with sharp valleys in the notches where the proposed couplings have rounded valleys. Therefore, we are unable to find the device acceptable for use on the National Highway System.

The testing conducted to date demonstrates that the concept of a double neck coupler should work, but we conclude that our acceptance must be based upon actual testing of the revised design. We understand that you are planning a single test of the revised design at high speed. Low speed testing of breakaway devices is usually more revealing for breakaway characteristics. The results of high speed testing depends a lot on the mass of the support that is above the breakaway device. We will not be able to find your company's revised coupling acceptable until and unless the low speed test is conducted and the high speed test run or the high speed test results inferred analytically.

Sincerely yours,

Original signed by
Seppo I. Sillan

Seppo I. Sillan, Acting, Chief
Federal-Aid and Design Division

Federal Highway Administration
HNG-14:NArtimovich:gm:2-29-96:61331:HUSAIN
copies to:
HPD-1 HNG-1 HNG-10 HNG-14
Reader, 3128 File, 3128

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APR 29 1996

Refer to: HNG-14

Mr. Tauhid Husain
 Senior Engineer
 Transpo Industries, Inc.
 20 Jones Street
 New Rochelle, New York 10801-6024

Dear Mr. Husain:

This is in response to your March 28 letter to Mr. Gerald L. Eller requesting the Federal Highway Administration's (FHWA) acceptance of your double neck Pole-Safe breakaway support couplings for light poles, call boxes, and small sign posts. Transmitted with your letter were copies of two reports of pendulum testing conducted by Southwest Research Institute, static test reports from Pittsburgh Testing Labs, and drawings of the couplings.

Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. These specifications have been adopted by the FHWA. We have also recognized the testing and evaluation guidelines found in the National Cooperative Highway Research Program Report Number 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.

An 816-kg pendulum fitted with a 10-stage crushable nose was used to simulate an impacting automobile. A summary of the testing on the two largest coupler sizes follows:

Test Parameter / Test #	TP - 4100	TP - 4125
Coupling designation	Model 4100	Model 4125
Nominal size (Bolt diameter)	25.4 mm (1.00 in)	31.8 mm (1.250 in)
Neck diameter	15.9 mm (0.625 in)	16.8 mm (0.660 in)
Mass of test article (weight)	432.2 kg (953 lbs)	432.2 kg (953 lbs)
Length of pole	15 m (48.5 ft)	15 m (48.5 ft)
Bolt circle diameter	330 mm (13.0 in)	330 mm (13.0 in)
Impact speed	9.8 m/s (32.2 ft/s, 22 mph)	9.8 m/s (32.2 ft/s, 22 mph)
Velocity change	1.9 m/s (6.3 ft/s)	1.9 m/s (6.1 ft/s)
Est. velocity change @100 km/h	4.5 m/s (14.8 ft/s)	4.8 m/s (15.7 ft/s)
Stub height	57 mm (2.3 in)	57 mm (2.3 in)

CONCURRENCE

RTG SYMBOL: HNG-14

INITIALS/SIG: [Signature]

DATE: 4/25/96

RTG SYMBOL: HNG-14

INITIALS/SIG: [Signature]

DATE: 25 Apr 96

RTG SYMBOL:

INITIALS/SIG:

DATE:

RTG SYMBOL:

INITIALS/SIG:

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DATE:



These results meet the change-in-velocity and stub height requirements adopted by the FHWA and the AASHTO. Therefore, your breakaway support couplings, Models 4125, 4100, and 4062 (externally threaded) and Models 5125, 5100, and 5062 (internally threaded), described above and/or illustrated in the enclosures are acceptable for use on the National Highway System (NHS) within the range of conditions tested, if requested by a State. Base bolt circle diameter is not a controlling factor in the breakaway performance of these couplings. The following conditions and limitations apply unless further crash testing indicates acceptability under other conditions:

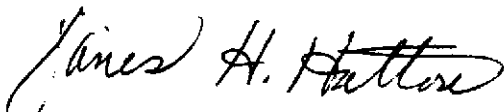
1. No more than one support may be used within a 2.1-meter width.
2. All supports shall be mounted to a structural concrete foundation that will not move in the soil if the support is struck by a vehicle.
3. Luminaire mounting height should not exceed 15.7 meters (55 feet).
4. Mass of pole, mast arms, luminaire and other hardware above the couplings shall not exceed 454 kg (1000 pounds).

Our acceptance is limited to the breakaway characteristics of your couplings and does not cover their structural features. Presumably, you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance. We anticipate that the states will require certification from Transpo Industries that the hardware furnished will have essentially the same chemistry and mechanical properties as that used in the tests, and that the geometry conforms to a design covered by this letter, and that it will meet the FHWA change in velocity requirements.

Because your breakaway couplings are to be patented and will be proprietary, to be used in Federal-aid highway projects, except exempt, non-NHS projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in

Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Seppo I. Sillan".

Seppo I. Sillan, Acting Chief
Federal-Aid and Design Division

2 Enclosures

Federal Highway Administration

HNG-14:NArtimovich:gm:4-25-96:61331:HUSAIN1

copies to:

HPD-1 HNG-1 HNG-10 HNG-14

Reader, 3128 File, 3128



U.S. Department
of Transportation
**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

JAN 16 1997

Refer to: HNG-14

Mr. Arthur M. Dinitz
Transpo Industries, Inc.
20 Jones Street
New Rochelle, New York 10801-6024

Dear Mr. Dinitz:

This is in response to your December 12, 1996, letter to Mr. Gerald L. Eller requesting Federal Highway Administration's (FHWA) acceptance of your double neck Pole-Safe breakaway support couplings for light poles, call boxes, and small sign posts. Transmitted with your letter were a report and video of full-scale testing conducted by E-Tech Testing Services, static test reports from PSI\Pittsburgh Physical Testing, and drawings of the couplings.

Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. We also recognize the testing and evaluation guidelines found in the National Cooperative Highway Research Report Number 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features.

Drawings of the Series 4000 and 5000 Pole-Safe couplings are enclosed. The various coupling series and sizes are manufactured of proprietary "E.T.D. 150" steel. Dimensions and physical properties of the couplings are summarized in the following table:

Model	4062	4100*	4125	5062	5100*	5125
Coupling:						
Length	188.9 mm	227.0 mm	257.0 mm	184.1 mm	227.0 mm	254.0 mm
Neck Diam.	11.18 mm	16.51 mm	16.51 mm	11.17 mm	16.51 mm	16.51 mm
U.T.S. **	133.5 kN	267 kN	267 kN	133.5 kN	267 kN	267 kN
Yield Strength	89 kN	191 kN	191 kN	89 kN	191 kN	191 kN

Model	4062	4100*	4125	5062	5100*	5125
Anchor Bolt:						
Threads	External	External	External	Internal	Internal	Internal
Diameter	16 mm	25 mm	32 mm	16 mm	25 mm	32 mm
Diam. (English)	5/8 "	1 "	1 1/4 "	5/8 "	1 "	1 1/4 "

*Couplings used in tests. Because the neck diameter of the largest of the three couplings in both the 4000 and 5000 series is the same as that of the tested coupling, similar performance can be expected.

** Ultimate Tensile Strength of the coupling.

A summary of the crash testing is presented in the following table:

Test Number	03-8287-001	03-8287-002
Test Article - Model Number	4100	5100
Pole Mass	423 kg (1000 #)	423 kg (1000 #)
Pole Height	16.8 m (55 ft)	16.8 m (55 ft)
Vehicle Mass	829 kg (1828 #)	839 kg (1850 #)
Impact Speed	34.35 km/h (21.3 m/h)	101.56 km/h (63.11 m/h)
Occupant Impact Speed	4.35 m/s (14.37 ft/s)	3.27 m/s (10.73 ft/s)
Approximate Stub Height	54 mm (2 1/8 in)	25.4 mm (1 in) *

*Three couplings broke at the lower notch. The fourth broke at the upper wrench flat and was left nearly intact attached to the foundation. It was judged that the remaining coupling would not present a significant hazard.

The results of the tests meet the change-in-velocity and stub height criteria adopted by the FHWA. Therefore, Pole Safe Couplings Series 4000 and 5000, as noted in the table above, are acceptable for use on the National Highway System (NHS) within the range of conditions tested when requested by a State.

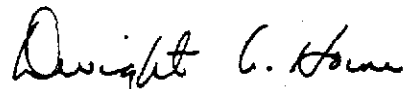
Our acceptance is limited to the breakaway characteristics of the couplings and does not cover their durability or structural performance. Presumably, you will supply potential users with sufficient information on design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Transpo Industries that the hardware

furnished has essentially the same mechanical properties and geometry as those used in the crash testing, and that they will meet the FHWA change in velocity requirements.

The loading eccentricity in the reported fatigue test was not very significant in comparison to an eccentricity in excess of half the bearing diameter of the hold-down nut that will result from an out-of-plumb anchor bolt. However, because our review does not include the structural adequacy of your new couplings, the fatigue testing is not relevant to our review. Our reason for commenting on the eccentricity is to ensure that we will not be interpreted as having accepted the distance used. In addition we have offered no opinion on the relevance of the loading range used in the fatigue testing from minus 6.3 percent to 17.4 percent of the reported minimum yield strength of the couplings. We would also point out that the fatigue test report supplied did not contain adequate descriptions of the items tested.

The Pole-Safe couplings are a proprietary product. To be used in Federal-aid projects, except exempt, non-NHS projects: they (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed.

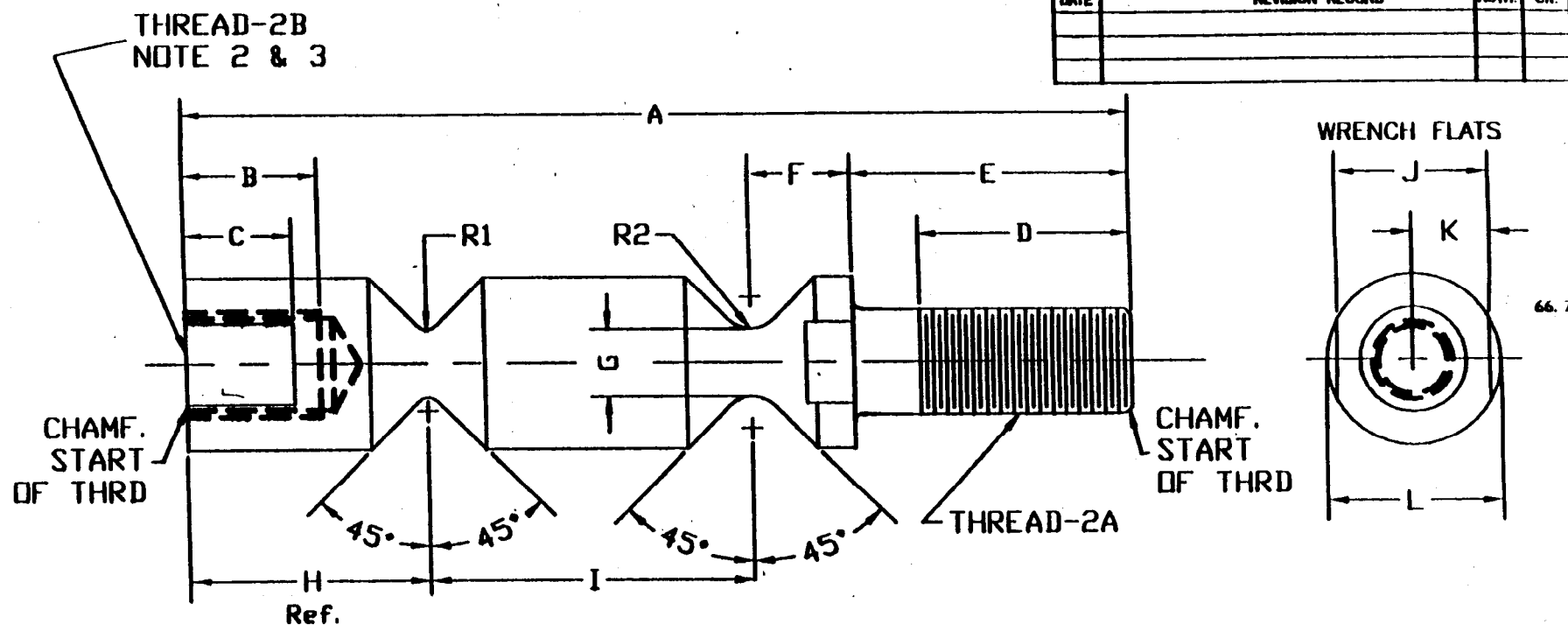
Sincerely yours,



Dwight A. Horne, Chief
Federal-Aid and Design Division

2 Enclosures

DATE	REVISION RECORD	AUTH.	CK.

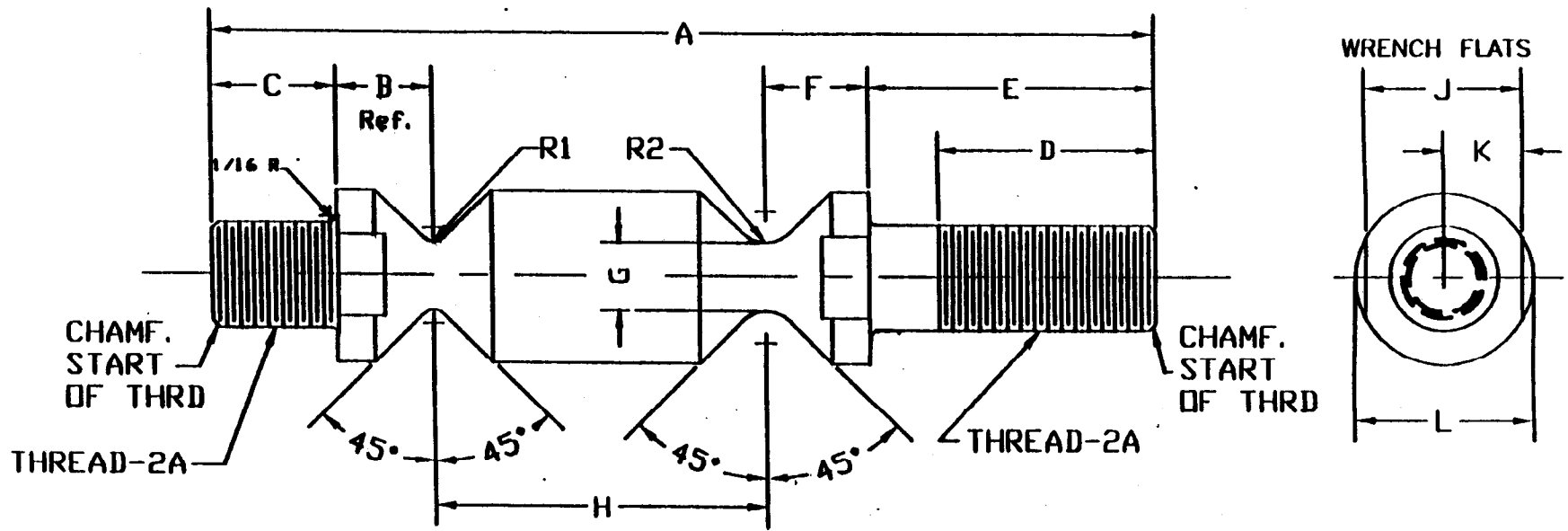


MODEL NO.	THREAD	A		B		C		D		E		F		G		H		I		J		K		L		R1		R2	
		MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
4062	5/8"-11UNC	109.87	7/16	22.3	7/8	18.9	5/8	34.9	3/8	60.8	2	17.8	11/16	11.18	9.440	41.3	5/8	78.2	3	23.36	0.92	11.68	0.48	28.5	1/8	3.17	0.125	5.08	0.20
4100	1"-8UNC	227.00	1/4	31.7	1	28.4	1	44.4	3/4	69.8	2	23.8	5/16	16.81	9.690	94.0	1/2	78.4	3	38.32	1.43	18.18	0.715	41.3	5/8	3.17	0.125	5.08	0.20
4125	1 1/4"-7UNC	287.00	1/4	41.3	5/8	31.7	1/4	50.8	2	82.5	1/4	28.6	1/8	16.81	9.690	66.7	3/4	78.4	3	48.72	1.8	22.86	0.90	50.8	2	3.17	0.125	5.08	0.20

- NOTES:
- HOT DIP GALV. PER ASTM A153.
 - INTERNAL THREADS TO BE TAPPED AFTER GALV.
 - INTERNAL THREADS TO BE TAPPED OVERSIZE AS FOLLOWS:
OVER 7/16" - 1" --- 0.021" OVERSIZE
OVER 1" --- 0.031" OVERSIZE

TOLERANCES (EXCEPT AS NOTED)	 20 JONES ST., NEW ROCHELLE, NY 10801		
FRACTIONAL + 1/32 IN. - [0.8MM]	TITLE POLE-SAFE COUPLING 4000 SERIES		
ANGULAR ± 1.0°	DATE 7/26/95	DRAWING NO. SPC4000	

DATE	REVISION RECORD	AUTH.	CK.



MODEL NO.	THREAD	A		B		C		D		E		F		G		H		J		K		L		R1		R2	
		MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN	MM	IN
5062	5/8"-11UNC	104.1	1/4	17.5	1/16	22.2	7/8	34.9	3/8	60.8	2	17.5	1/16	11.17	0.440	78.2	3	23.30	0.92	11.00	0.48	28.5	1/8	3.17	0.125	5.08	0.20
5100	1"-8UNC	227.0	19/16	25.4	1	28.0	1/4	44.4	3/4	69.8	2	23.8	1/8	16.51	0.650	79.4	1/2	36.32	1.43	18.10	0.710	41.3	5/8	3.17	0.125	5.08	0.20
5123	1 1/4"-7UNC	254.0	10	28.0	1/8	34.9	3/4	60.8	2	62.5	1/4	28.0	1/8	16.51	0.650	79.4	1/2	48.72	1.8	22.80	0.90	50.8	2	3.17	0.125	5.08	0.20

NOTES:
1. HOT DIP GALV. PER ASTM A153.

TOLERANCES (EXCEPT AS NOTED)	 20 JONES ST., NEW ROCHELLE, NY 10801		
DECIMAL + 0.015 IN - [0.4MM]	"E.T.D." 150 STEEL	N.T.S.	APPROVED BY:
FRACTIONAL + 1/32 IN. - [0.8MM]	TITLE POLE-SAFE COUPLING 5000 SERIES		
ANGULAR ± 1.0°	DATE 7/26/95	DRAWING NO. SPC5000	

SPECIFICATION

Breakaway Support Couplings (longitudinally grooved) conforms to AASHTO standards for breakaway supports for light poles and are approved for FHWA participation.

Tensile strength 25.0 kips min.
 Restrained shear 3.6 kips min., 6.5 kips max.
 Nut torque 175 ± 25 ft. lbs. or

Coupling coating controlled by torque nut
 Irridite and Nylon
 (Mil-C-5541)
 internal thread EM626
 (Mil-L-8937)

Standard Anchor 1"-8 UNC HDG to ASTM 123
 Bolt 2-1/2"-3" above foundation

Installation note: Support coupling is installed 1/8" to 3/8" off the anchor foundation and provides for leveling.

INTENDED USE

The breakaway support coupling is used with anchor base equipped poles which will be installed in locations exposed to vehicular collisions, on standard 1" anchor bolts, HDG to ASTM 123.

**BREAKAWAY SUPPORT COUPLINGS
 FOR LIGHT POLES-FOR STANDARD ANCHOR
 BOLTS (1")
 Model No. 201 - (H or T)**

pole-safe BY **TRANSPD**
 INDUSTRIES, INC.

