

Company LOGO & Address

Date: ___/___/2021

TO: Robert Johnson
DeIDOT Safety Officer

FROM: Generic Construction Company

RE: Your Project Application # Here – Your Project Name
DeIDOT NCHRP 350 Submittal Project Location _____
Tax Map # _____

Generic Construction Company respectfully submits the attached certifications for the traffic control devices to be utilized for the aforementioned project.

If there are any questions or further paperwork please do not hesitate to contact our office.

Signature

Billy Bob Johnson
Project Manager
Direct Phone: 302-555-XXXX

SAMPLE



SIGN HOLDER MODEL 4860 K

SIGNHOLDER

Model 4860K

800-521-6776

8:30 am - 5:00 pm EST, Mon. - Fri.

"NCHRP-350" Compliant with rigid signs (aluminum / plywood)

SET-UP INSTRUCTIONS

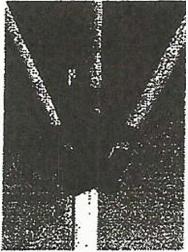
TO UNFOLD WINDMASTER®

1. Kick push pins or pull leg lock pins and allow all four legs to rest on ground.
2. Lift lower upright. Legs will snap into normal position.
BE SURE THAT LEGS ARE LOCKED.
3. Attach sign mounting bracket. (Refer to sign bracket mounting instructions below.)
4. Insert telescoping upright into lower upright. (This is for initial set-up only. After initial set-up, top upright slides down into bottom for storage.)
5. Slide telescoping upright upward, until it automatically locks in place.

Plastic Flag Bracket

(SA-10002)

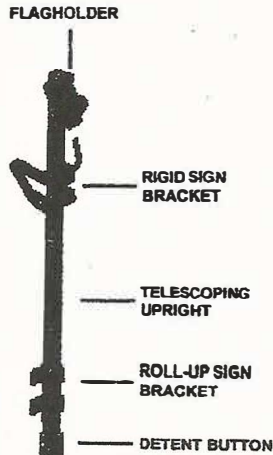
Locks wooden-dowel flags securely in place. Simply pull the top to install or release the flag dowel.



SAMPLE

4TH LEG SHOWN IN STORAGE POSITION (LOWER 4TH LEG FOR COMPLETE SET-UP)

LEG IN LOWER POSITION



TO FOLD

Depress detent button on lower upright and slide telescoping upright downward. Tilt signholder to relieve pressure on leg, kick push pin (or pull lock pin) and rotate leg until lock pin engages into top hole.

IMPORTANT

For maximum safety and stability, legs should be in normal position when unit is on flat terrain. Sign should be installed no more than 18" from ground with Model 4818K and no more than 60" (with rigid signs) or 72" (with roll-up signs) from the ground with Model 4860K.

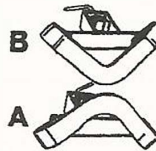
Plastic Roll-up Sign Mounting Brackets

SA-1000

Accommodates any diamond-shaped roll-up sign with 1 1/4"-wide fiberglass crossbracing. Move the bracket up or down to unlock or lock the signface crossbracing. Operate with top detent button behind bracket.



Rigid Sign Mounting Brackets



SA-01729

(for signs up to 3/4" thick)

SA-02555

(for signs up to 1/2" thick)

1. Remove telescoping upright by depressing detent button.
2. Attach bottom bracket to lower upright with curve signholder slot pointing up (A). This bracket should be positioned at a level which will allow the bottom of the sign to be 60" from the ground on model 4860K and 18" off the ground for model 4818K.
3. Attach top bracket to telescoping upright with signholder slot pointing down (B).
4. Replace telescoping upright, making sure brackets are on the same side of the uprights.
5. Always leave lower bracket in place, and adjust top bracket to secure sign.
6. Unit can be stored with brackets on it.

WARNING: For use on streets and highways, the user must comply with all laws and regulations and/or codes for temporary warning signs. Please refer to Manual on Uniform Traffic Control Devices and check with local enforcement agency for compliance.



U.S. Department
of Transportation
Federal Highway
Administration

MAY -9 2001

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

Refer to: HSA-1/WZ-69

Ms. Kathy Rogalla
Project Leader
Marketing Displays International
38271 W. Twelve Mile Rd
Farmington Hills, MI 48331-3041

Dear Ms. Rogalla:

Thank you for your letters of December 5, 2000, and January 24, requesting Federal Highway Administration (FHWA) acceptance of your company's portable sign stands as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letters were detailed drawings of the stands, reports from Safety Quest, Inc., and videos of the crash tests. You requested that we find your company's temporary sign stands acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features." A March 12 letter from Dr. Dean A. person of Safety Quest attested to the performance of these stands when used with plywood sign panels.

Introduction

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. The second guidance memorandum was issued on August 28, 1998, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This later memorandum lists devices that are acceptable under Categories I, II, and III.

A brief description of the devices for which you are requesting acceptance follows:

* Model 4860K, tested with Endurance panel and Aluminum panel:

[Tests MDI 3 and MDI 4]

This stand is manufactured with two vertically mounted steel coil springs to support 1219 x 1219 x 2 mm (48 x 48 x 0.080 inch) signs. The base of the sign stand consists of an autophoreic coated 5 mm thick steel base, four telescoping legs, and two coil springs. The legs are 3 mm x 32 mm x 32 mm (0.10 x 1.25 x 1.25 inch) 6061-T6 aluminum tubing. A 3 mm x 38 mm x 38 mm (0.10 x 1.5 x 1.5 inch) extruded aluminum lower mast is mounted to the top of the springs. The

lower mast is attached to the springs with two 10 mm x 64 mm (0.375 - 18 x 2.5 inch) bolts thorough an L-bracket. The lower mast is scored at the top of the L-bracket around its circumference and the corners are cut as to not penetrate all the way through the material. In addition, a 10 mm (0.375 inch) hole is drilled through the lower mast approximately 38 mm (1.5 inch) up from the top of the L-bracket through the axis parallel to the sign blank. A 3 mm x 32 mm x 32 mm (0.1 x 1.25 x 1.25 inch) 6061-T6 aluminum upright is mounted to the lower mast and held into place with push-button spring pins. The sign panel is attached to the upper and lower masts with a rigid steel mounting bracket that is clamped to the masts. Attached to the top of the upper mast is a steel flag lock bracket that holds three wood handled vinyl roll-up flags.

The overall height of the MDI 4860K sign stand with vinyl flags mounted above is 4013 mm (158 inches) and 3252 mm (128 inches without flags). The bottom of the sign is mounted 1524 mm (60 inches) above grade. The total weight of the sign stand with a 4.8 kg (10.5 pound) Endurance sign panel and flags is 26.3 kg (58 pounds) as tested in MDI 3. The total weight with a 2 mm (0.080 inch) 8.4 kg (18.5 pound) aluminum sign panel is 29.9 kg (66 pounds) as tested in MDI 4.

Model 4860K, with breakaway feature, tested with Aluminum panel and light:

[Test MDI 6]

This stand is manufactured with two vertically mounted steel coil springs to support 1219 x 1219 x 2 mm (48 x 48 x 0.080 inch) aluminum signs. The four legs of the stand are 32 x 32 x 2.5 mm (1.25 x 1.25 x 0.10 inch) square 6061-T6 extruded aluminum tubing. The coil springs attach the 5 mm (0.19 inch) thick anodized aluminum base to the telescoping upright. The two piece, upright, consists of a 32 mm (1.25 inch) bottom and 32 mm (1.25 inch) top square aluminum tube, supports the sign. The bottom upright has a scored "breakaway section" at 483 mm (19 inches) above grade when the stand is fully assembled. Eight sign mounting brackets support the aluminum sign at top and bottom and a steel flag lock bracket is attached to the top upright supporting three hardwood dowel flags. A barricade light assembly, consisting of two 6 volt batteries and a 178 mm (7 inch) polycarbonate lens, is mounted to the top upright above the flag bracket.

The overall height of the stand, with flags and light is 4115 mm (162 inches) and 3251 mm (128 inches) without the light and flags. The bottom of the sign is mounted 1524 mm (60 inches) above grade. The total weight of the sign stand is 31.6 kg (69.7 pounds) which includes the stand of 21.7 kg (47.7 pounds), the sign and flags of 8.4 kg (18.5 pounds) and the light of 1.6 kg (3.5 pounds) as tested in MDI 4.

SIGN HOLDER MODEL 4860 K

You also requested that we accept the following signs with the 4860K and the 4818 stands:

Size	Material	Weight	Thickness
915 mm (36"x36")	Aluminum	5.2 kg (11.5#)	2 mm (0.080")
1220 mm (48"x48")	Plywood	15.9 kg (35#)	16 mm (5/8")
915 mm (36"x36")	Plywood	15.9 kg (35#)	16 mm (5/8")
1220 mm (48"x48")	Endurance	4.8 kg (10.5#)	16 mm (5/8")
915 mm (36"x36")	Endurance	3.0 kg (6.5#)	16 mm (5/8")
1220 mm (48"x48")	Alpolic	4.8 kg (10.5#)	2.5 mm (0.10")
915 mm (36"x36")	Alpolic	3.0 kg (6.5#)	2.5 mm (0.10")
Tested Sign:			
1220 mm (48"x48")	Aluminum	5.2 kg (11.5#)	2 mm (0.080")

SAMPLE

You also requested the use of plywood signs but their weight, approximately twice that of the tested aluminum signs, caused us to ask for further analysis. The March 12 letter from Dr. Alberson predicts acceptable performance of this stand with plywood, stating that the increased sign inertia could assist in the activation of the breakaway mechanism and would serve to slow the angular rotation of the sign panel. There would be no greater likelihood that the sign would impact the test vehicle. Indeed, the increased sign inertia would allow the vehicle to pass under the rotating sign with additional clearance

Testing

Full-scale automobile testing was conducted on your company's devices. Two stand-alone examples of each device were tested in tandem, one head-on and the next placed six meters downstream turned at 90 degrees, as called for in our guidance memoranda. The complete devices as tested are shown in the Enclosure 1.

SIGN HOLDER MODEL 4860 K

The crash tests are summarized in the table below:

Test Number	MDI 3	MDI 4	MDI 6
Test Article	4860K	4860K	4860K Breakaway
Sign substrate	Endurance	Aluminum	Aluminum
Height to Bottom of Sign	1524 mm	1524 mm	1524 mm
Height to Top of Sign	3252 mm	3252 mm	3251 mm
Flags or lights	3 flags	3 flags	2 flags, light
Test Article Mass (each)	26.3 kg	29.9 kg	31.6 kg
Vehicle Inertial Mass	802 kg	802 kg	822 kg
Impact Speed, Head-on	101.7 kph	100.9 kph	98 kph
Vehicle damage	Punctured oil pan & radiator	Punctured oil pan & radiator	Scrapes and Dents
Occupant Compartment Intrusion	None	None	None
Windshield Damage	31.75 mm deformation*	None	None

SAMPLE

* Both layers of glass were broken but the plastic laminate was not punctured. The area of deformation was approximately one foot in diameter, with a maximum deformation towards the occupants of 31.75 mm (1.25 inches.)

** There was localized cracking from the end-on hit near the bottom of the passenger side windshield, and generalized cracking from the head-on impact, but there was no significant deformation, nor was cracking extensive enough to block the driver's view ahead.

Findings

Damage was limited to cracking of the windshield when the signs struck the glass, and to the undercarriage of the test vehicles. None of the damage modes appeared to have the potential for penetrating the passenger compartment. The results of test met the FHWA requirements and, therefore, the Model 4860K and Model 4818 stands, both with the breakaway feature, described above and shown in the enclosed drawings for reference are acceptable for use as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State.

- Because of the successful performance of these stands with Endurance (4860K) and aluminum (4860K and 4818) substrates we consider them to be acceptable with 2.5 mm Alpolyc substrate signs as well. Similarly, we consider the 4818 to be acceptable with the Endurance substrate as well.
- Because of the successful performance with the 48x48 sign panels, we will also consider them acceptable with the smaller 36x36 panels. However, the 4860K stand should support the 36x36 panel at the same height to the top as the tested 48x48 sign. This would

result in a mounting height of 1955 mm (77 inches) to the bottom. Tall sign stands, such as the 4860K perform in an acceptable manner in part due to the sign and mast striking the roof line of the test vehicle. If you use a 36x36 sign panel at the "regular" mounting height you lower the top of the entire assembly by 430 mm (17 inches) which may significantly alter the performance.

Because of the acceptable performance of the 4818 stand, and because of its similarity to the previously accepted Model 50SM (tested by Texas at TTI, letter WZ-3), we will also consider the 5018 stand acceptable with the breakaway feature when used with the sign materials and sizes discussed above.

Because of the acceptable performance of the breakaway feature, and the likelihood that the increased inertia of a plywood sign would enhance the breakaway performance of the system, the 4860K Breakaway and the 4818 Breakaway sign stands will be acceptable when used with 16 mm plywood signs.

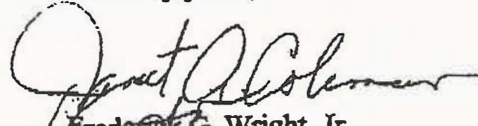
Summary

Please note the following standard provisions which apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-69, shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- MDI portable sign stands may include patented components and if so are considered "proprietary." The use of proprietary work zone traffic control devices in Federal-aid projects is generally of a temporary nature. They are selected by the contractor for use as needed and removed upon completion of the project. Under such conditions they can be presumed to meet requirement "a" given below for the use of proprietary products on Federal-aid projects. On the other hand, if proprietary devices are specified for use on 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,



Janet A. Coleman
Frederick G. Wright, Jr.
Program Manager, Safety

SAMPLE

07/29/2005 14:15



JAMES W. YOUNG
Executive Vice President

VIA FAX
202-366-2249

March 15, 2001

Mr. Nicholas Artimovich, Highway Engineer
Federal Highway Administration, Rm. 3407
Office of Safety (HAS-1)
400 Seventh St. SW
Washington, DC 20590

Dear Mr. Artimovich:

For use principally with Franklin's ribbed channel sign posts described in my letter to you of January 9, 2001, either nested together or nested with Franklin's flat back sign posts. Franklin is seeking FHWA acceptance of a generic bar spacer as shown on the enclosed drawing. This spacer is very similar to other bar spacers already accepted by FHWA but is dimensioned to fill solidly the space(s) between/lapped base post and uprights of Franklin ribbed and/or flat back posts. Grade 9 bolts remain at 4 inch (100 mm) centers, and maximum stub height is 4 inch (100 mm). Bolt holes are unthreaded, the same as the Franklin spacers previously approved in GARDAL'S SS-9, SS-28, and SS-59.

This spacer will also fit Marion ribbed back and Chicago Heights flat back posts, either together or in combination with Franklin posts, allowing users the flexibility of using multiple suppliers and/or existing posts.

Please let us know if you have any questions.

Sincerely,

A handwritten signature in black ink that reads 'JW Young'.

James W. Young

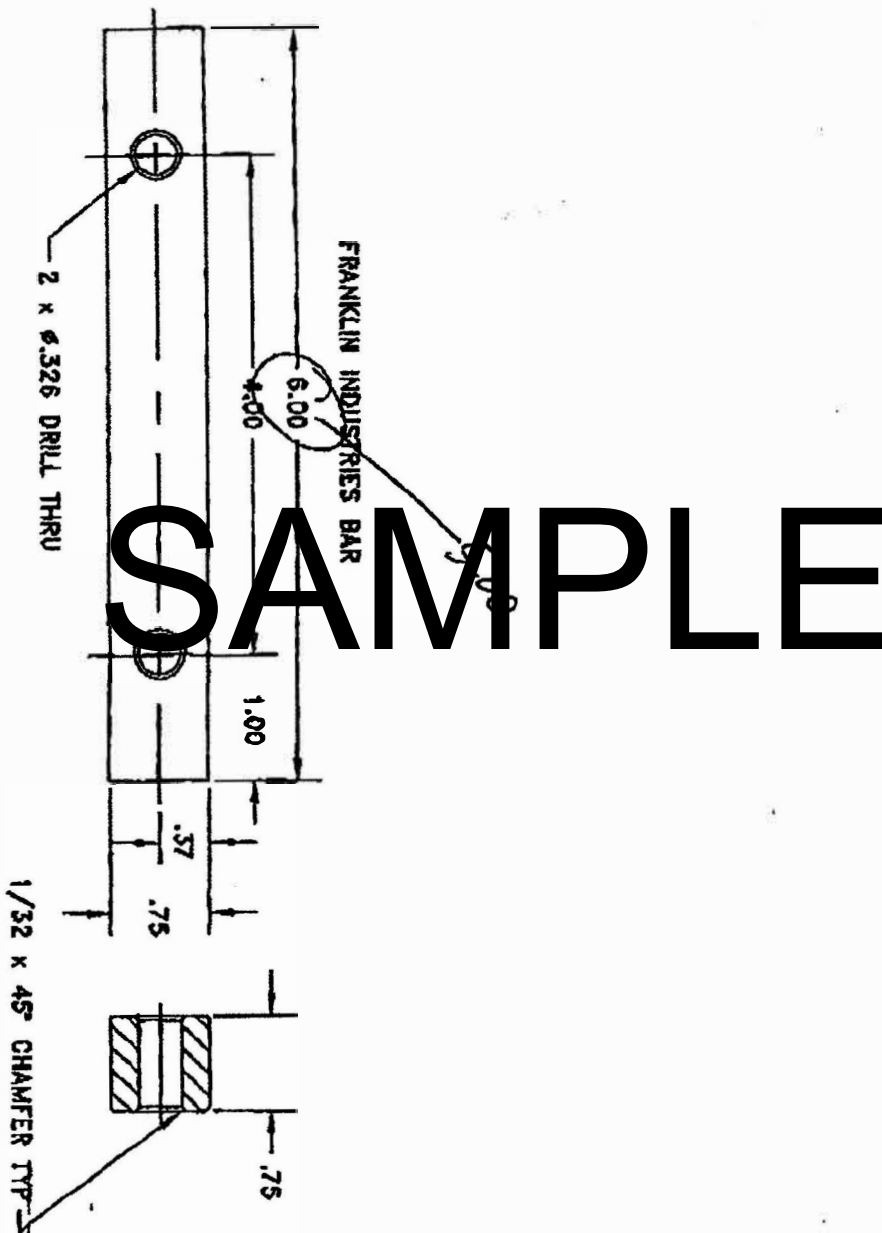
JWY/gb
Enclosure

PO Box 671 Franklin, PA 16323

(814) 437-3726

Fax (814) 432-7556

PERMANENT SIGN



CONES

working together

Los Angeles
12245 Florence Ave
Santa Fe Springs
CA 90670
T 866-PICK-JBC
F 562-777-0664

Houston
3232 East Loop North
Houston
TX 77029
T 866-PICK-JBC
F 562-777-0664

New Jersey
3390 Rand Road
South Plainfield
T 866-PICK-JBC
F 562-777-0664

This letter serves as notice of our self certification of our traffic cones. Under the NCHRP-350 requirements, type I products such as cones can be self certified by the manufacturer. Our product meets or exceeds all crash test criteria based on historical usage and like products. Historical performance of traffic cones has proven them to be highway usage safe

Additionally, we only use 3M reflective sheeting for our cones and this product is approved in all 50 states. If I can be of further assistance, please call me anytime. If

the inspector needs any additional information, please have him call me at the office

SAMPLE

Thanks

Jackson
JBC Safety Plastic

ORANGE VINYL

3M Brownwood Plant

PO Box 1669
Brownwood, Texas 76804-1669
915/646 3551



CERTIFICATE OF COMPLIANCE

TO:

~~THIS IS TO CERTIFY THAT THE MATERIAL SHIPPED AS INDICATED HEREIN~~
COMPLIES TO THE SPECIFICATION LISTED BELOW:

DESCRIPTION: "Scotchlite" Brand Reflective Sheeting, Diamond Grade Series.

<u>MATERIAL:</u>	<u>QUANTITY</u>	<u>SIZE - IN X YD</u>	<u>LOT NO</u>
3924 Fl Orange	1 roll	48 x 50	BPR21

SAMPLE

PURCHASE ORDER NO. VER. AD

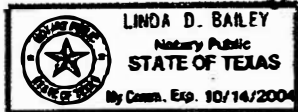
INVOICE NO: S 01641

SPECIFICATIONS:

Minnesota Mining and Manufacturing Company Specifications for Wide Angle Prismatic Reflective Sheeting.

SUBSCRIBED AND SWORN TO BEFORE ME ON August 30, 2004

Linda D. Bailey



Document Received From:
FACTORY QUALITY ASSURANCE
TRAFFIC CONTROL MATERIALS
BROWNWOOD, TEXAS 76801



Aluminum Certification Sheet

This is to advise that the material produced for your order conforms to the specifications outlined by the Aluminum Association. This material is identified as follows:

Skid: 00812001B-742867

Customer:

Right Way Flagging & Sign Co.

Order: 14456

PO:

178 Brenda Lane

Lot: 1465918

Part:

Suite D Bldg. 4

Camden, DE 19934

Description: .08/24/O
11117//

APR 28 2004

3105 Alloy
H18 Temper

Specs:

Chemical Composition

Si	Fe	Mg	Cu	Mn	Cr	Zn	Ti	Mn+Cr	Other
00-00.60	00-00.70	00.20-00.80	00-00.30	00.30-00.80	00-00.20	00-00.40	00-00.10		

Mechanical Properties

SAMPLE

	Results	T62 Results	T62 Results
Ultimate Tensile Strength Min (KSI)	31.00		
Ultimate Tensile Strength Max (KSI)	31.40		
Ultimate Tensile Strength Avg (KSI)	31.20		
Yield Strength Min (KSI)	28.10		
Yield Strength Max (KSI)	28.50		
Yield Strength Avg (KSI)	28.30		
Elongation Min (%)	4.90		
Elongation Max (%)	4.90		
Elongation Avg (%)	4.90		

Net Skid Weight: 4.473

Certified By: Susan Mudd



Commonwealth Aluminum
1372 State Road 1957, PO Box 480
Louisport, KY 42351-0480

Aluminum Certification Sheet

This is to advise that the material produced for your order conforms to the specifications outlined by the Aluminum Association. This material is identified as follows:

Skid: 01033001B-754144

Customer:

Order: 17412

PO:

Lot: 1814381

Part:

Description: .09/30/0
11117//

JUL 26 2004

3105 Alloy
H18 Temper

Right Way Flagging & Sign Co.
178 Brenda Lane
Suite D Bldg. 4
Camden, DE 19984

Specs:

Chemical Composition

Si	Fe	Mg	Cu	Mn	Cr	Zn	Ti	Mn + Cr	Other
00-00.60	00-00.70	00.20-00.50	00-00.30	00.30-00.80	00-00.20	00-00.40	00-00.10		

Mechanical Properties

SAMPLE

Ultimate Tensile Strength Min (KSI)	35.20
Ultimate Tensile Strength Max (KSI)	35.20
Ultimate Tensile Strength Avg (KSI)	35.20

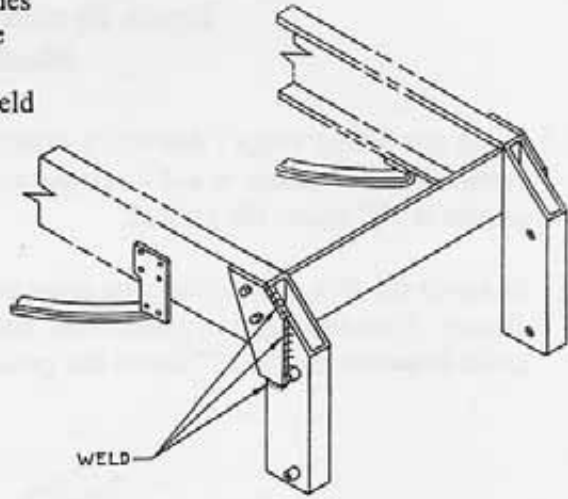
Yield Strength Min (KSI)	33.30
Yield Strength Max (KSI)	33.40
Yield Strength Avg (KSI)	33.35

Elongation Min (%)	4.30
Elongation Max (%)	5.00
Elongation Avg (%)	4.65

Net Skid Weight: 4.915

Certified By: Susan Mudd

5. Position the side plates as shown against the sides of the frame and the vertical tubes. Mark on the plate the position of two holes for $\frac{3}{4}$ " bolts. Drill these holes in the plates and the frame. Weld the edge of the plate to the vertical tube.



6. The truck frame weld areas should be spray painted to prevent rust. Install the four $\frac{3}{4}$ " bolts.
7. To reattach the TMA to the truck either use the 1" bolts supplied or the T-pins if these were purchased as an option.

Optional

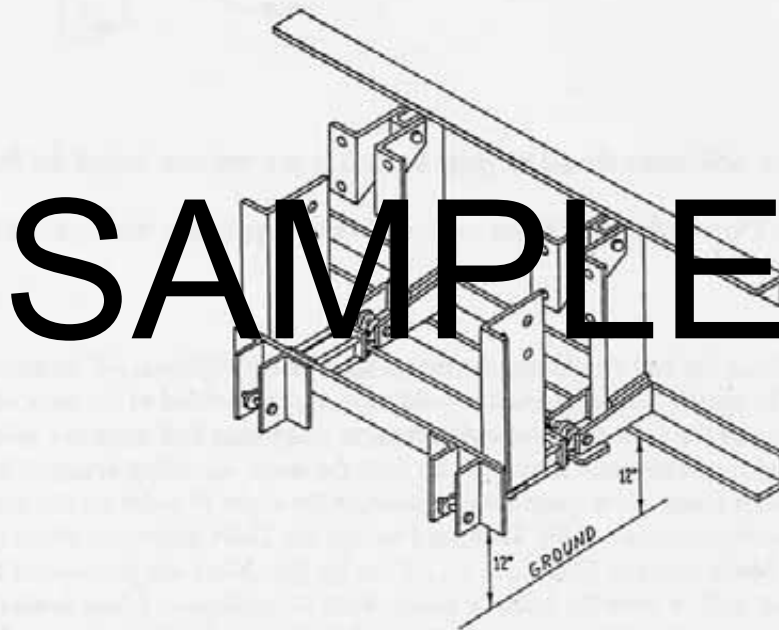
For some dump trucks, the bed overhangs the frame such that an optional 24" extension frame will be needed. The rear of the dump truck should have a plate welded to the back of its frame. Check the weld area on the plate to frame connection to make sure that there is a full strength connection. The optional extension frame comes with the truck mounting brackets bolted in place on the extension frame. It is quite easy to position the eight 1" holes on the truck rear plate by mounting the extension frame to the TMA and rolling the TMA extension frame up to the back of the truck. Make sure the TMA is at 12 1/2" in height. Mark the position of the 8 holes on the rear plate and drill or burn the holes in place. Bolt the extension frame brackets in place with the eight bolts supplied. Now remove the four 1" bolts securing the extension frame to the brackets. Use the four T-pins to hold the extension frame to the brackets.

For Trucks with No Support Posts

Truck Bracket Installation Model B



- 1-5. Read and follow steps 1 through 5 which are previously listed for the truck bracket installation of Models A and C. However, for Model B, cut-off the bottom of the angles at 17" above the ground.
6. Position the 4" x 4" x 42" angled cross brace on the bottom of the vertical angles as shown. Weld the angle in place. Note that the bottom of the cylinder brackets on the cross brace should be 12" above the ground.

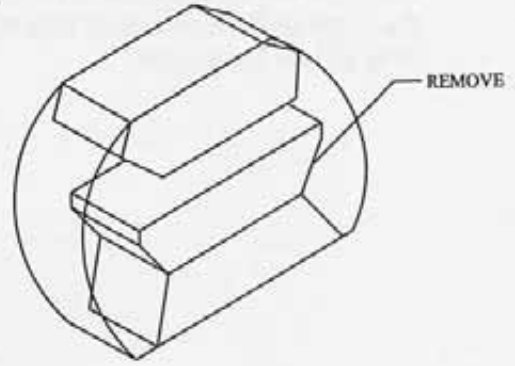


7. The truck frame weld areas should be spray painted to prevent rust.
8. The truck should have a 7 pin electrical connector attached for the TMA lighting system. The truck should have a minimum gauge size of #1 battery cable for both the positive and negative hydraulic motor connections.

Assembly of TMA Model A (TL-2)

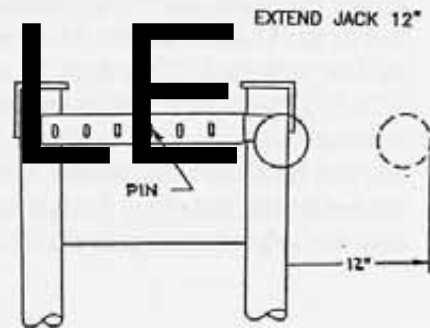


1. Inspect the pallet containing the cartridge for completeness against the packing list.
2. Note that the Warning Top Heavy means that caution should be used in moving the pallet. Use fork extenders and keep all personnel away while moving.
3. Unwrap the shrink-wrap from the pallet. Remove the box of accessories from the cartridge pallet. Also, remove the energy-absorbing container 17, positioned in the cartridge as shown.



4. The drop jacks 27 should be extended at this time to allow the cartridge to be placed 12" above the ground. Slip the retainer off the back of the pin and pull the pin out to reposition the leg. When the pin is out, pull the leg out 12" (measured from the bottom of the TMA) to position the leg

SAMPLE

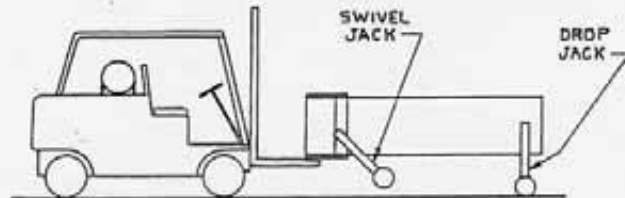


5. Use the forklift and several people to lower the pallet to the horizontal position as shown. Make sure that the pallet is tipped in the correct orientation with the hinges up as shown.

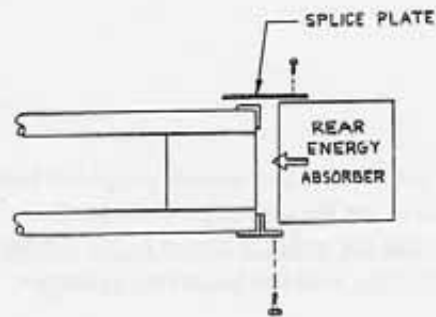
Caution – Do not rotate crank jacks until after the pallet is lowered to horizontal position.



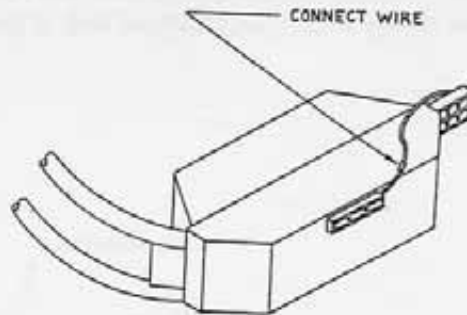
6. Caution – when the steel banding is cut the TMA cartridge may fall a few inches. Keep personnel away from the TMA when the steel bands are cut. Keep feet away from pallet when pallet is pulled free of the cartridge because it will drop a few inches.
Caution- Do not rotate crank jacks until after the pallet is lowered to horizontal position.
7. Use the forklift to lift the backup end of the cartridge 12". Unlock the crank jacks 26 and rotate the wheels to the down position. Rotate the crank on both jacks until they support the strut 12" off the ground.



8. Attach the black rear energy absorber 17 to the rear of the TMA as shown. Make sure to position the box with the ICC bar line 23 on top. Use eight $\frac{1}{4}$ " x $1 \frac{1}{4}$ " bolts with washers to attach the energy absorber. Use one small washer at the head of the bolt and back the small washer with one larger washer before installing. Torque the allen head bolts until the large washers just start to dish inward.

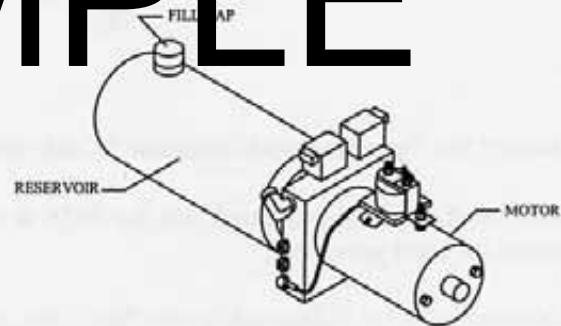


9. The rear ICC bar light 23 (on top of the black box) has two wires extending from it with plugs, connect the plugs into the electrical wire plugs at the light.



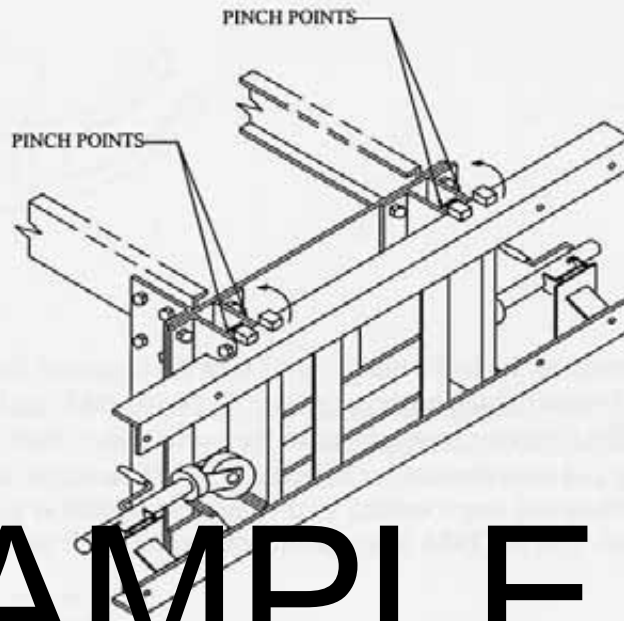
10. Fill the reservoir on the hydraulic pump 67 with the hydraulic fluid (three quarts) and attach the electrical wires (minimum gauge size of #1 battery cable for both the positive and negative hydraulic motor connections) to the motor cables. Push the up button on the yellow controller 68 and raise the rear backup plate 90° . Fill the reservoir a final time (2 quarts). Cycle the system two times waiting 15 min. between cycles to get the air bubbles out of the system. Finish with the TMA in the down position to attach the truck:

SAMPLE



11. The TMA is now ready to attach to the truck. Roll the TMA back to the truck and bolt the four angle brackets 11 to the rear plate (eight 1" bolts) 110. Use full manual torque with a breaker bar and a wrench.
12. Crank the jacks 26 on the sides of the backup to the full up position. Pull the pins and rotate the jacks 90° with the wheels facing inward. The pin should spring lock the jacks in place.
13. Push the up button and raise the cartridge to 10° . Release the lock pins on the drop jacks 27 and push the jacks up to the full up position. Re-pin the jacks in the up position.

14. Warning the two hinges on the backup (the 90° tilt mechanism at the rear of the truck) have a pinch point 11 when the cartridge is raised to the vertical position. Make sure personnel do not have their hands in this area while raising the TMA. Also, check that the control cable is brought out below the hinge area. Push the button and raise to the 90° position. Attach the chain as shown to provide a manual lock in the 90° position.



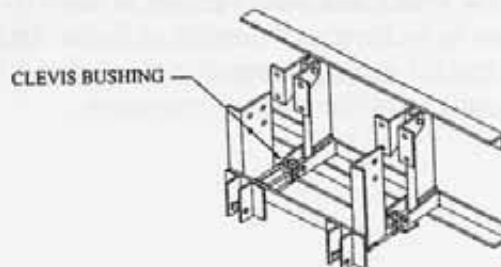
SAMPLE

15. Connect the 7-pin electrical connector 76 and verify that all the lights function correctly.
16. Road test the system and check that the TMA in the horizontal position is $12'' \pm 1''$ above the ground on level pavement.
17. Check all bolts for tightness after the first 3 hrs. of running time and refer to the maintenance section of the manual to set up regular maintenance.

Assembly of TMA Model B (TL-3)

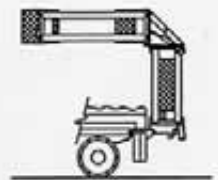


- 1-16. Read and follow steps 1 through 16 which are listed for the TMA assembly Model C.
17. Fill the reservoir with hydraulic fluid (three quarts) and attach the battery wires (minimum gauge size of #1 battery cable for both the positive and negative hydraulic motor connections) to the motor battery cables. Push the up button on the yellow controller and extend the lower hydraulic cylinders on the backup. Continue to push the up button and raise the cartridge to 90°. Fill the reservoir a final time (three quarts). Cycle the system several times waiting 3 min. between cycles to get the air bubbles out of the system. Top the reservoir off with (2 quarts). Finish with the TMA in the down position to attach to the truck.
18. The TMA is now ready to attach to the truck. Roll the TMA back to the truck and bolt the four angle brackets to the rear plate (eight 1" bolts). Use full manual torque with a breaker bar and a wrench.
19. Bolt the two lower hydraulic cylinder clevises in place using the two 1" diameter bolts. Tighten the nuts on the two 1" bolts.
20. Crank the jacks on the sides of the backup to the full up position. Pull the pins and rotate the jacks 90°, with the wheels facing inward. Lock the jacks in place.
21. Push the up button and raise the cartridge to 90°. Continue to push the up button and raise the strut to the full up 10° position. Release the lock pins on the drop jacks and push the jacks up to the full up position. Re-pin the jacks in the up position.
22. Connect the 7-pin electrical connector and verify that all the lights function correctly.
23. Road test the system and check that the TMA in the horizontal position is 12" ± 1" above the ground on level pavement in the down position. If the TMA is not 12" ± 1" at the rear of the TMA push the up button and raise the TMA a few inches. Drop the drop jacks to support the TMA. Unbolt the clevis on the horizontal cylinders and adjust the clevis bushing length using the washers supplied to lengthen or shorten the clevis bushing distance.

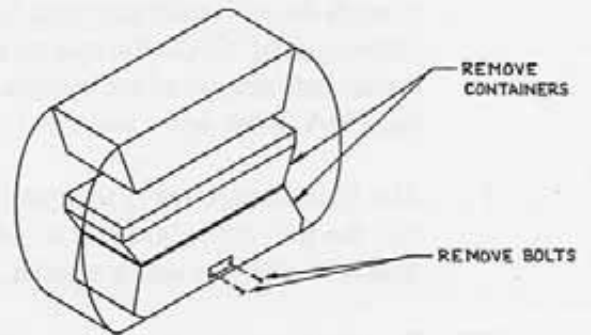


24. Check all bolts for tightness after the first 3 hrs. of running time and refer to the maintenance section of the manual to set up regular maintenance.

Assembly of TMA Model C (TL-3)

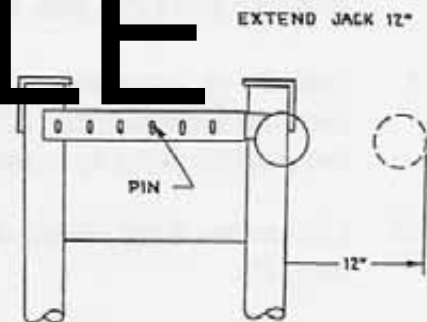


1. Inspect the two pallets containing the cartridge (tallest) and the strut for shipping damage and for completeness against the packing list.
2. Note that the **Warning Top Heavy** means that caution should be used in moving the pallets. Use fork extenders and keep all personnel away while moving.
3. Unwrap the shrink-wrap from the pallets. Caution: When the steel banding is cut, the steel bracket on top of the two containers will fall. Remove the box of accessories from the cartridge pallet. Also, remove the two energy-absorbing containers 17, 19 positioned in the cartridge as shown. Note: two bolts are used to temporarily hold the electrical connector box 77 – remove both bolts.

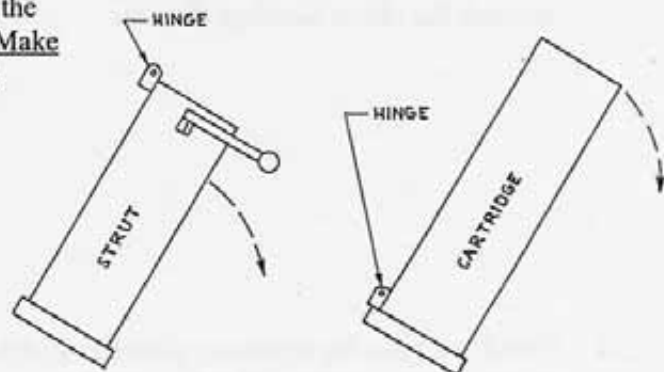


4. The drop jacks 27 should be extended at this time to allow the strut (shorter) to be placed 12" above the ground. Slip the retainer off the back of the pin and pull the pin out to reposition the leg. With the pin out, pull the leg out 12" (measured from the bottom of the TMA) and repin the leg.

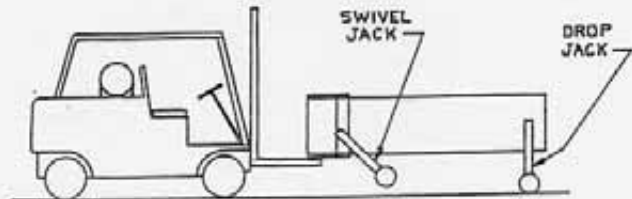
SAMPLE



5. Use the forklift and several people to lower the pallets to the horizontal position as shown. Make sure that the pallets are tipped in the correct orientation with the hinges up as shown.

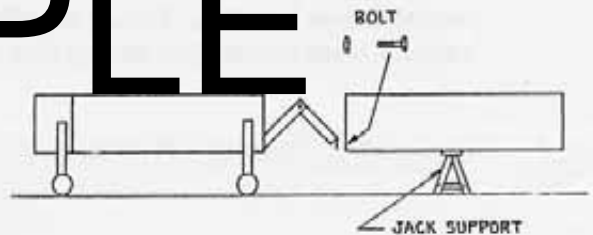


6. Caution – when the steel banding is cut the TMA cartridge and strut may fall a few inches. Keep personnel away from the TMA when the steel bands are cut. Keep feet away from pallet when pallet is pulled free of the cartridge because it will drop a few inches.
7. Use the forklift to lift the backup end of the strut 12". Unlock the crank jacks 26 and rotate the wheels to the down position. Rotate the crank on both jacks until they support the strut 12" off the ground.

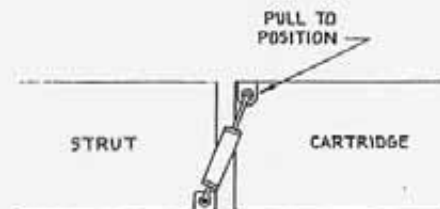


8. Position automotive roller jacks or other supports under both sides of the cartridge. The supports should be about midway between front and back and about 12" high.

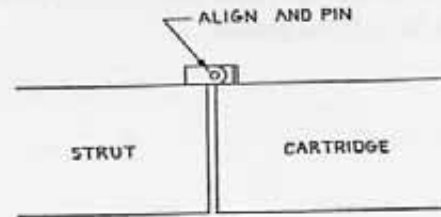
9. Roll the strut into position next to the cartridge. With the strut about 12" away from the cartridge extend the folded arm 29 positioned on the strut such that the arm extends and touches the cartridge. Use the two 1/2" bolts to bolt the lower hinge part of the arm to the holes located on the bottom cross brace of the strut. Make sure the bolts heads are placed on the cartridge side and the nuts placed on the hinge side. Tighten the nuts and bolts.



10. Now push the strut up against the cartridge with the top hinges 9 positioned close to good pin alignment. Do not pin the hinge yet. Pull on each of the large hydraulic cylinder clevises until they match the hole positions on the aluminum upper hinges. Pin the cylinders in place with the 1" pins supplied and insert the safety pins.

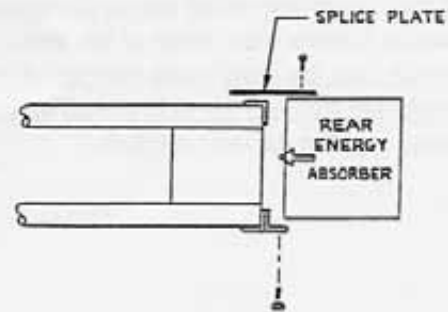


11. It is now time to put the 1" pins 116 into the aluminum upper hinges. This will be difficult unless a tapered pry bar is used. Align the holes using the pry bar and hammer the pins into position. Place the 1" ID washer on each pin and insert the cotter pins 132. Bend one leg of the cotter pin.

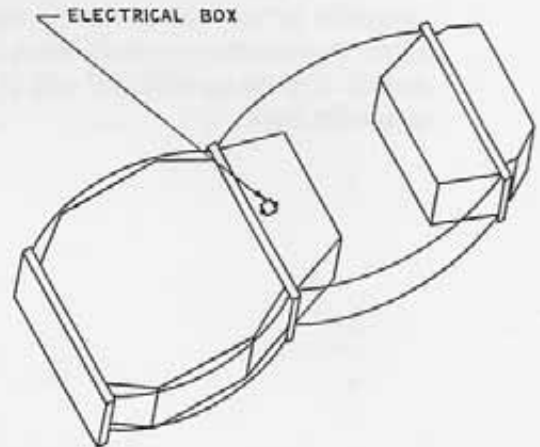


12. Remove the automotive roller jacks or supports from under both sides of the cartridge.
13. Attach the black rear energy absorber 17 to the rear of the TMA as shown. Make sure to position the box with the ICC bar light 23 on top. Use eight $\frac{1}{4}$ " x $1 \frac{1}{4}$ " bolts with washers to attach the energy absorber. Use one small washer at the head of the bolt and back one small washer with the large washer before installing. Torque the allen head bolts until the large washer just starts to crush and

SAMPLE

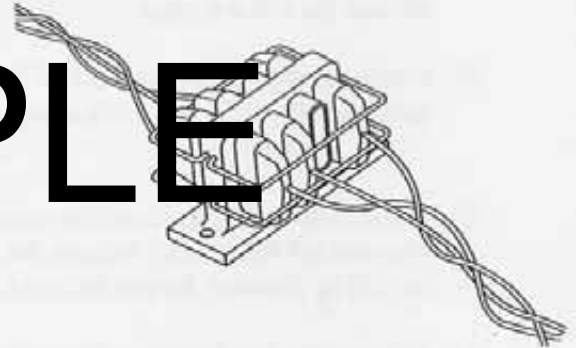


14. Attach the yellow energy-absorbing cartridge 19 as shown (cartridge that was removed in step #3). Use two of the bolts to reattach the electrical connector box. Use eight $\frac{1}{4}$ " x $1\frac{1}{4}$ " bolts with washers to attach the energy absorber. Use one small washer at the head of the bolt and back the small washer with one larger washer before installing. Torque the allen head bolts until the large washers just start to dish inward.

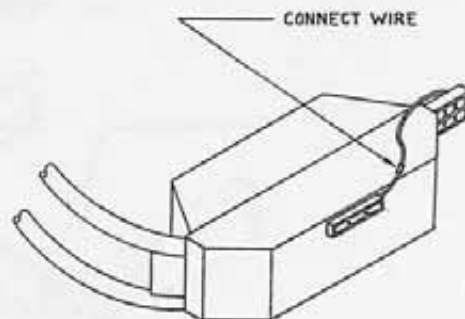


15. Plug the main power cable 80 from the strut (left side) into the electrical connector box on the cartridge. Snap the wire retainers in place on the electrical connector box 77 and wire tie the retainers together.

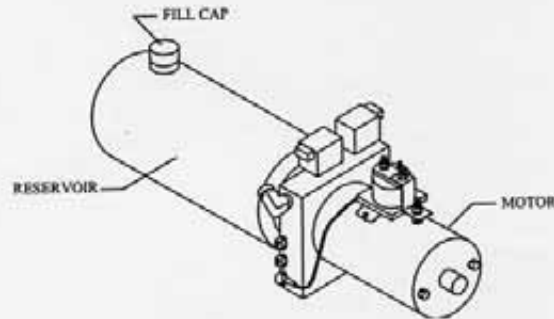
SAMPLE



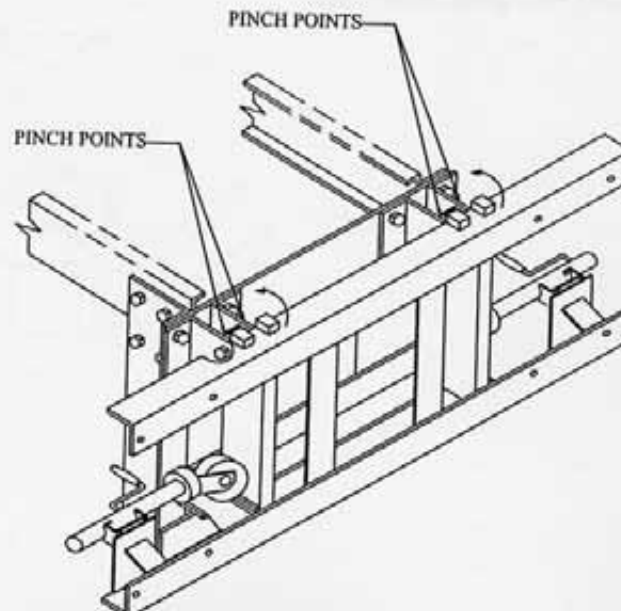
16. The rear ICC bar light 23 (on top of the black box) has two wires extending from it with plugs, connect the plugs into the electrical wire plugs at the light.



- Fill the reservoir on the hydraulic pump 67 with the hydraulic fluid (three quarts) and attach the electrical wires (minimum gauge size of #1 battery cable for both the positive and negative hydraulic motor connections) to the motor cables. Push the up button on the yellow controller 68 and raise the rear backup plate 90° . Fill the reservoir a second time (2 quarts). Cycle the system two times waiting 3 min. between cycles to get the air bubbles out of the system. Top the reservoir off with (2 quarts). Finish with the TMA in the down position to attach the truck:

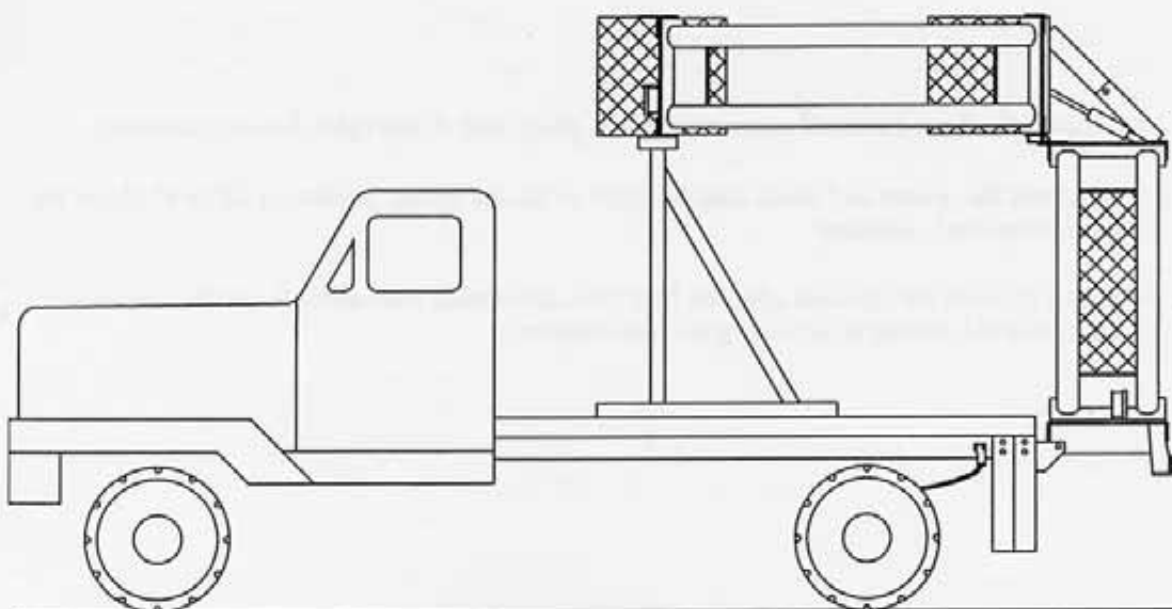
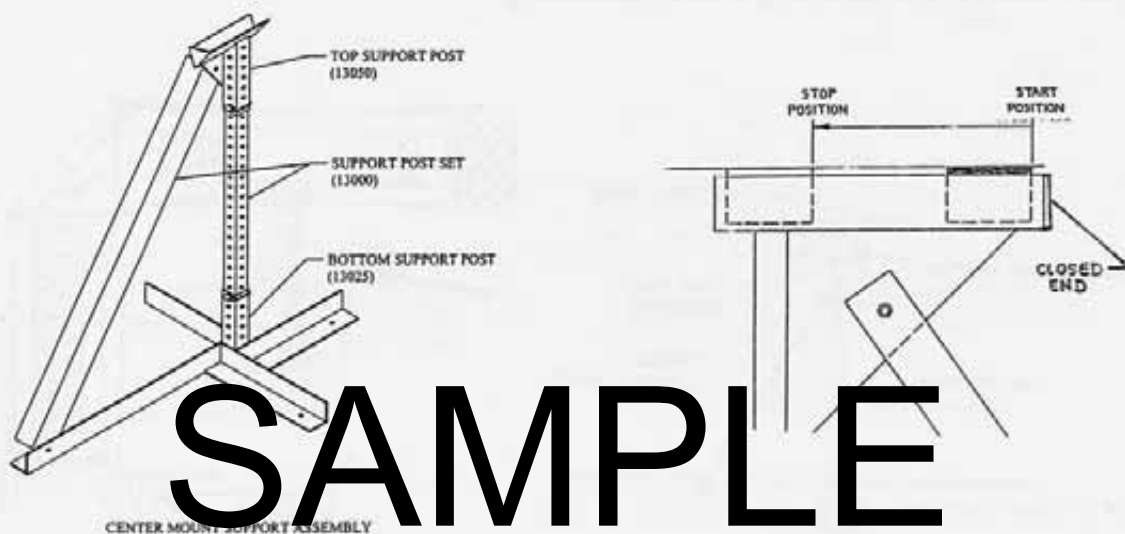


- The TMA is now ready to attach to the truck. Roll the TMA back to the truck and bolts the four angle brackets 11 to the rear plate (eight 1" bolts) 110. Use full manual torque with a breaker bar and a wrench.
- Crank the jacks 26 on the sides of the backup to the full up position. Pull the pins and rotate the jacks 90° with the wheels facing forward.
- Push the up button and raise the cartridge to 90° . Continue to push the up button and raise the strut just off the ground. Release the lock pins on the drop jacks 27 and push the jacks up to the full up position. Re-pin the jacks in the up position.
- Warning the two hinges on the backup (the 90° tilt mechanism at the rear of the truck) have a pinch point 11 when the strut is raised to the vertical position. Make sure personnel do not have their hands in this area while raising the TMA. Also, check that the control cable is brought out below the hinge area. Push the button and raise to the double 90° position. The cartridge will stop at greater than 90° so push the down button until the cartridge is horizontal.



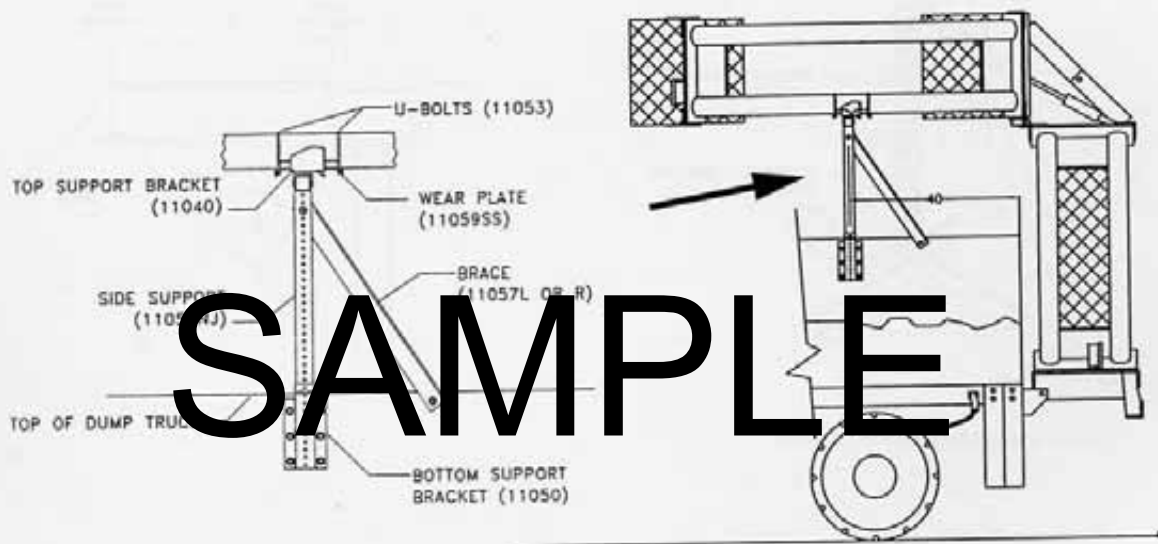
Flat Bed Trucks

22. To assemble the support post 30-32 that the cartridge will be supported on, first measure the height from the cartridge to the truck bed and pin the support post together at this height. Position the support post under the cartridge with the rear of the top support even with the rear of the V on the cartridge. Cut diagonal angle iron brace to length, drill the hole at the end, and bolt the brace in place. Use the four 1/2" bolts 123 supplied to bolt the bottom of the stand to the truck. Push the up bottom to bring the cartridge down and forward (usually 4") on the support post. The TMA is now locked in position for driving.



Dump Trucks

23. For dump trucks the cartridge is supported on side supports. To properly position the side supports: First raise the cartridge section until it is level and parallel with the top of the truck. Position the bottom support bracket directly below the side light which is on the cartridge tube. Mark the position on each side of the truck the same distance and drill the four 9/16" holes needed to mount the brackets as shown. Place the side post in the bottom support brackets and pin to the correct support height. The aluminum bracket at the top should have the sloped end facing the front of the truck. Use the U-bolts to hold the wear plates in place on the cartridge tubes. The wear plates should rest in the saddle of the top support bracket. Now place the left and right braces for the support posts as shown. They are notched to provide bolting to the unistrut tubing.



24. Connect the 7-pin electrical connector 76 and verify that all the lights function correctly.
25. Road test the system and check that the TMA in the horizontal position is $12'' \pm 1''$ above the ground on level pavement.
26. Check all bolts for tightness after the first 3 hrs. of running time and refer to the maintenance section of the manual to set up regular maintenance.

TMA Limited Warranty

TraFFix Devices warrants to the purchaser that the Scorpion Truck Mounted Attenuator (TMA) is free from any defects in materials and workmanship. If this product proves to be defective in material or workmanship during the period of this warranty, TraFFix Devices will repair or replace, at its option, the defective product free of charge (except for transportation charges). The period of this warranty is the one year period beginning from the date the purchaser puts the unit into service or one year from the date of purchase.

To obtain warranty service, the purchaser or distributor must first fill out a warranty authorization form and fax same to TraFFix Devices to have our technical services department evaluate the problem and recommend repair procedures. **TraFFix Devices will then issue a signed warranty work approval form** to authorize the distributor or customer to repair or replace any items, which TraFFix deems to have been defective. All replacement parts claimed to be defective will be invoiced at the time of shipment, and upon receipt and evaluation a credit memo will be issued.

This warranty does not extend to any failure of the Scorpion TMA caused by misuse, abuse or material alteration of this product, or any negligence in connection with the installation, service, or use of this product. For the correct installation, service, or use of this product refer to the installation manual, the operator's deployment instructions, and the operator's checklist.

Warranty Authorization Form

1. Company Name _____
2. Address _____
3. Phone, Fax Number, and E-mail _____
4. Name of Customer _____
5. Date _____
6. Serial number of TMA near controller outlet: _____
7. Repair parts are listed in which section of the installation manual listed below?

A. Main Parts	page 9	E. Nuts & Bolts	page 18
B. Back-up Parts	page 12	F. Hydraulic Parts	page 19
C. Support Assy Parts	pages 13-16	G. Electrical Parts	page 20
D. Lock Out Parts	page 17	H. Pump Unit Parts	page 21
8. List part numbers of replacement or repair items:

9. Describe the problem and reason for failure: _____

10. Fax this form and e-mail any pictures. Then phone TraFFix Devices technical services.
Phone: (949) 361-5663 Fax: (949) 361-9205 E-mail: info@traffixdevices.com

**TRAFFIX SCORPION
TRUCK MOUNTED
ATTENUATOR SPECIFICATIONS**



SAMPLE

Features and Benefits (NHTSA 35, T-7 & TL-3 approved)

- Aluminum cartridge and truck weighs only (1,620 lbs.)
- Curved aluminum tube frame **provides protection** against vehicles impacting into coffin corner area at the rear of truck.
- Open cartridge area – **very low wind resistance** and no buffing at high speeds
- System fully extended length is only **13 feet**.
- System crushes in progressive stages – **lower repair costs**
- **Modular system** allows for easy replacement of all parts
- Diamond grade reflective tape and extensive rear lighting helps warn oncoming vehicles
- Four built-in jacks allow system to be stored with cartridge in the vertical position
- 90 degree tilt is hydraulic with hydraulic pump and cab controls
- Coating is durable polyester powder coat for maximum longevity
- Energy absorbing cartridges are aluminum honeycomb in environmentally sealed aluminum containers
- Second 90-degree tilt allows for minimum truck overhang and extension and minimum transport height of only **10' 6"**.