

MPS 350i

Truck Mounted Attenuator



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Table of Content

About MPS 350i.....	3
Product Overview.....	4
Energy Absorbing Technique.....	5
Full Scale Crash Tests.....	6
What Does FHWA Think TMA´s Should Do.....	7
What Really Happens During an Offset Impact.....	8
In Service Evaluation.....	9
Typical Crash Sequence.....	10
Photos of TMA.....	11
Hot Dip Galvanized MPS 350i.....	12
Photos after Impact.....	13
Installation Instructions.....	14
Handling.....	33
Repair.....	36
Maintenance.....	38
Annex 1.....	Drawings



About MPS 350i™

A breakthrough in Truck Mounted Attenuator (TMA) technology, the new MPS 350i (Mobile Protection System) is completely different from conventional TMA cartridge construction. Instead, MPS 350i offers a unitized steel frame, wholly exposed for easy inspection, and made from durable steel construction so that nuisance and minor hits will not impair its capacity to perform. Its performance as a Test Level 3 TMA makes it the first TMA design to achieve this high level of safety capacity and compliance as certified by FHWA for NCHRP Report 350, Test Level 3. MPS 350i is CE marked in accordance to European regulations.

For a demonstration, watch our on-line video at www.highwayguardrail.com

How MPS 350i™ saves lives

The MPS 350i provides a controlled stop for an impacting vehicle through a progressive sequence of events. As the vehicle contacts the nose of the system, load is transferred through the frame to the bracket. The bracket will rotate down until it hits the bumper assembly connected to the frame of the support vehicle. At this point the rip plates will begin to pass over the cutter blades as the frame pushes under the support vehicle.

When to use MPS 350i™

The test with the light vehicle show that the MPS 350i can be used with an infinitely heavy support vehicle. A lightweight support vehicle will generally have a greater roll ahead distance but will “soften” the blow for any impacting vehicle. Therefore, the MPS 350i can be safely used on any vehicle with a total weight above 6 350 kg. Vehicles weighing less than 6 350 kg might experience steering problems with the MPS 350i due to it’s length and weight.

Why specify MPS 350i™

Interchangeable with mounts for conventional TMAs, MPS offers greater durability, simplicity, very low cost of repair, and built-in protection from conventional worries of sagging and vibration.

MPS 350i™ protects not only the largest and smallest vehicles required by NCHRP 350 testing criteria, but all sizes in between. MPS 350i innovative steel design makes it resistant to moisture, deterioration and sagging.

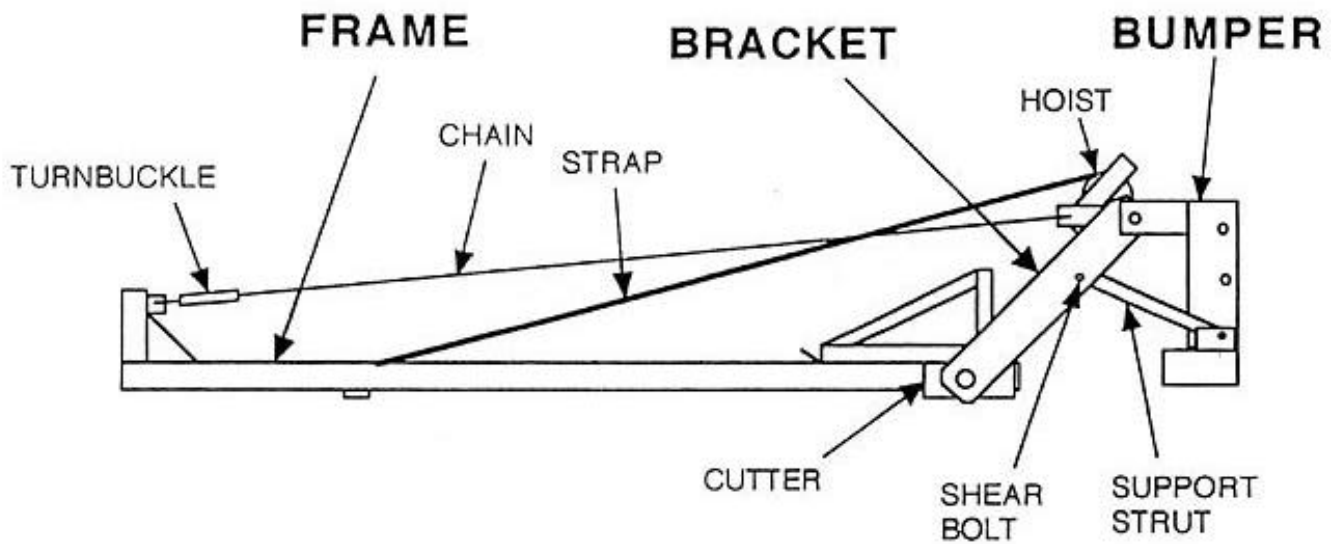
Streamlined, aesthetically pleasing, weather resistant and with an exposed structure for visual inspection, the MPS 350i durable steel structure is easily repaired after minor hits and maintenance yard bumps.



Product Overview

Dimensions

Length.....	4,200 mm
Width.....	1,800 mm
Height.....	1,100 mm
Height (raised).....	3,750 mm
Weight	731 kg



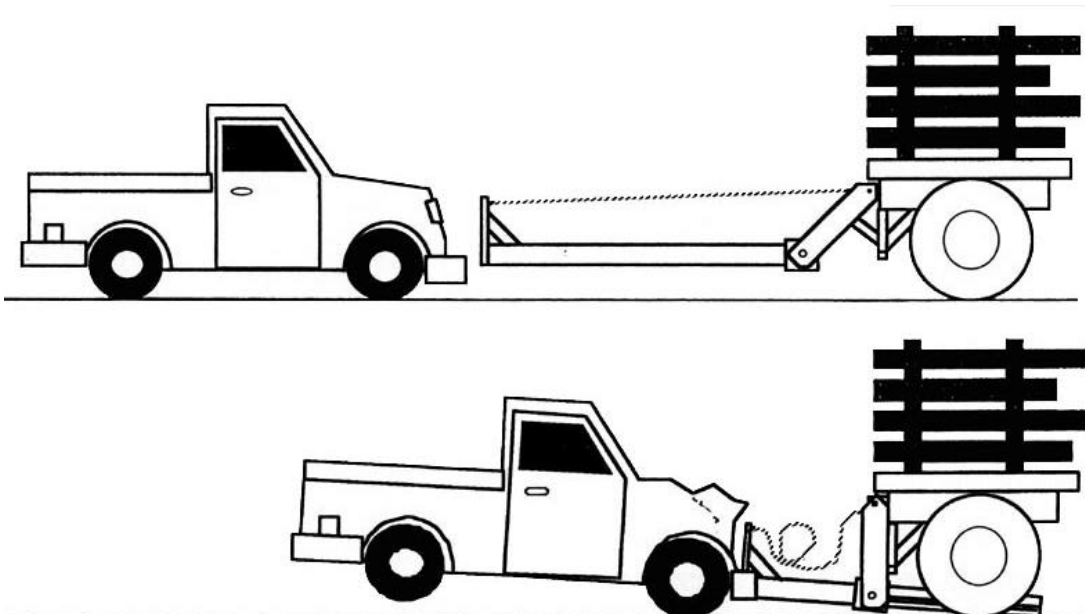
Main Parts of the MPS 350-III



Energy Absorbing Technique

The MPS 350i provides a controlled stop for an impacting vehicle through a progressive sequence of events. As the vehicle contacts the nose of the system, load is transferred through the frame to the bracket. The struts which support the bracket in its 45° position will release when the 3/8" bolts on one end shear. Upon release, the bracket will rotate down until it hits the bumper assembly connected to the frame of the support vehicle. At this point the rip plates will begin to pass over the cutter blades as the frame pushes under the support vehicle. The length of frame that passes over the cutters depends on the weight and speed of the impacting vehicle.

During the stroke of the MPS 350i, the rip plates provide a progressive stopping force for the errant vehicle. The first portion of the stroke cuts very thin metal that provides an appropriate force for small vehicles. As the stroke progresses, additional layers of thicker metal are added to the cutting zone after the smaller vehicles have been stopped. Multiple layers of thick metal toward the end of the stroke provide appropriate forces for large vehicles.





Full Scale Crash Tests

Truck Mounted Attenuators (TMA's) are crash cushions that are attached to a support vehicle, rear and/or front. TMA's can be used to reduce the severity of rear-end crashes on protective vehicles. Can also be used as protection on vehicle in mobile and moving work zones.

NCHRP Report 350 contains two recommended full-scale crash tests for TMA's and two optional test.

Standard	Level	Speed	Mass	Angle	Test No
NCHRP 350	3	100 km/h	845 kg	0	3-50
NCHRP 350	3	100 km/h	2,050 kg	0	3-51
NCHRP 350	3	100 km/h	2,000 kg	0 (1/3 offset)	3-52 (optional)
NCHRP 350	3	100 km/h	2,000 kg	10	3-53 (optional)

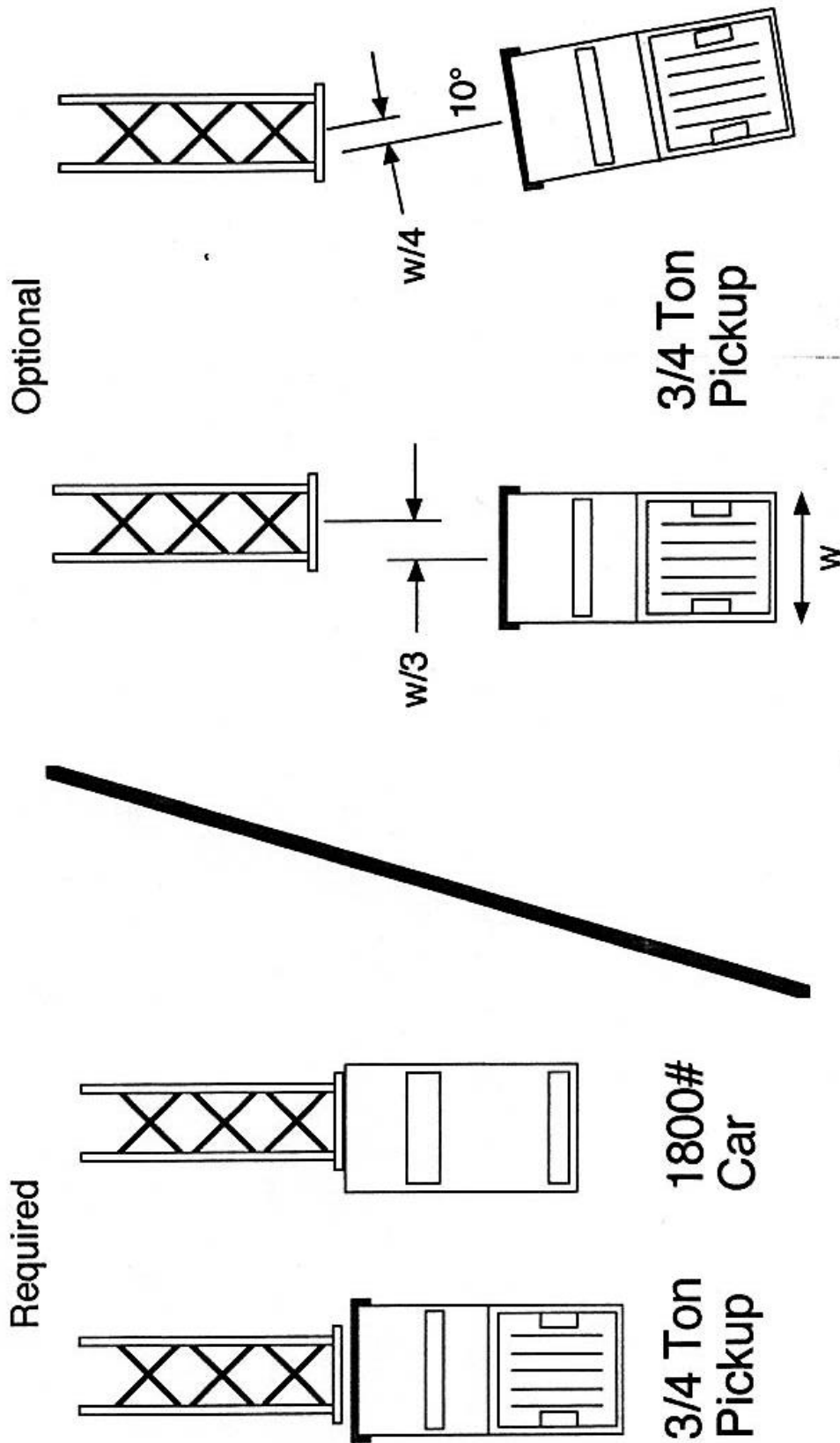
In all above mentioned tests MPS 350i has passed by filling or exceeding the criteria.

The tests are intended to evaluate the structural adequacy of the TMA, risks to occupants and the roll-ahead distance of the supporting vehicle for impact with a heavy passenger vehicle.

For more detailed information regarding Ridedown Acceleration, and Occupant Risk Values please contact us. We can also submit both videos and high-speed films from the tests if required.



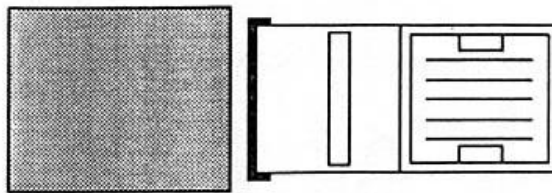
What Does the FHWA Think TMA's Should Do?



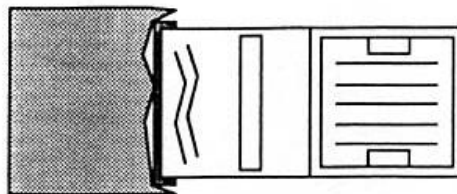
J. R. Albritton, P.E.
Exodyne Technologies, Inc.
817-560-1459



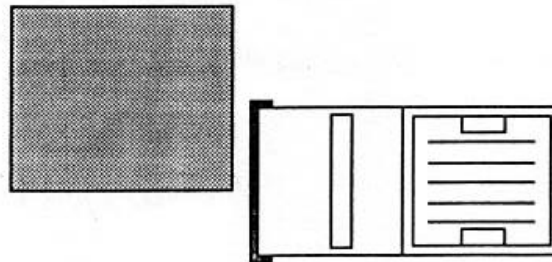
What Really Happens During an Offset Impact?



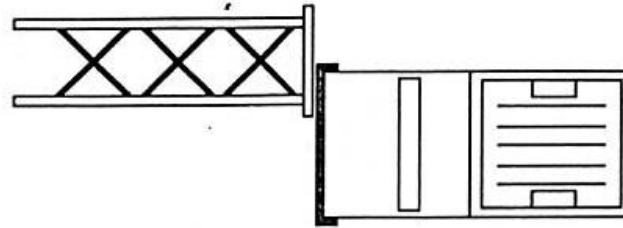
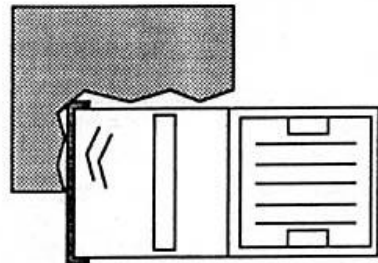
Traditional Cushion
Centered Impact



Traditional Cushion
Off-Centered Impact



SYRO MPS 350-III
Off-Centered Impact



J. R. Albritton, P.E.
Exodyne Technologies, Inc.
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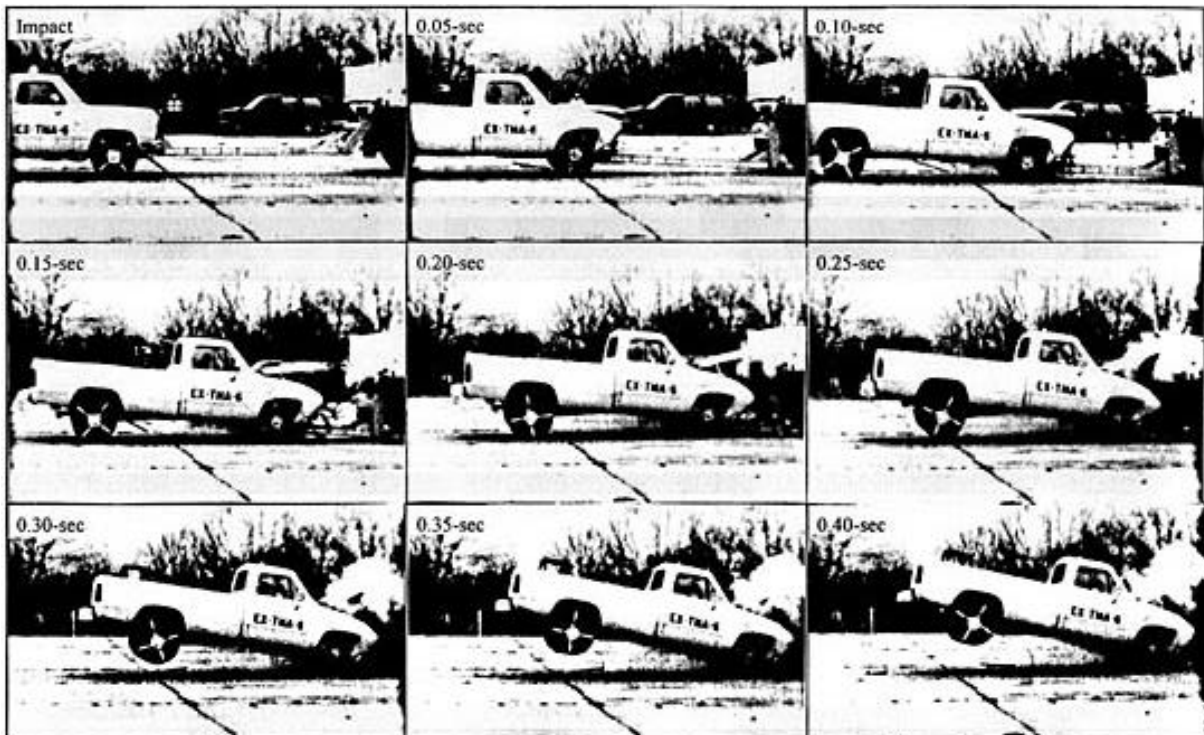
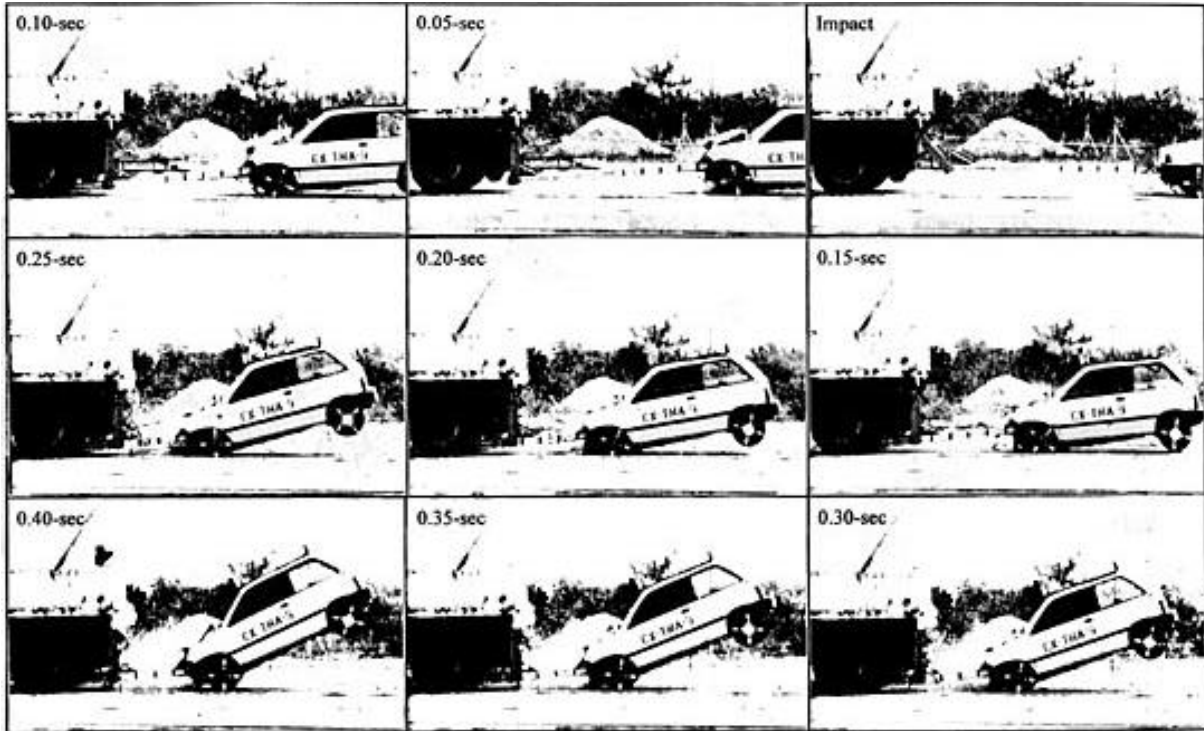
In Service Evaluation

In addition to the above mentioned tests the MPS 350i have also been hit in different angles under the most realistic circumstances - in the field. Since the summer of 1996 when we delivered the first unit there have been several accidents where the MPS 350i has been hit at an angle. To our knowledge there has not been reported any serious injuries due to a crash with the MPS 350i neither head-on nor at an angle. Please contact us for more specific information.

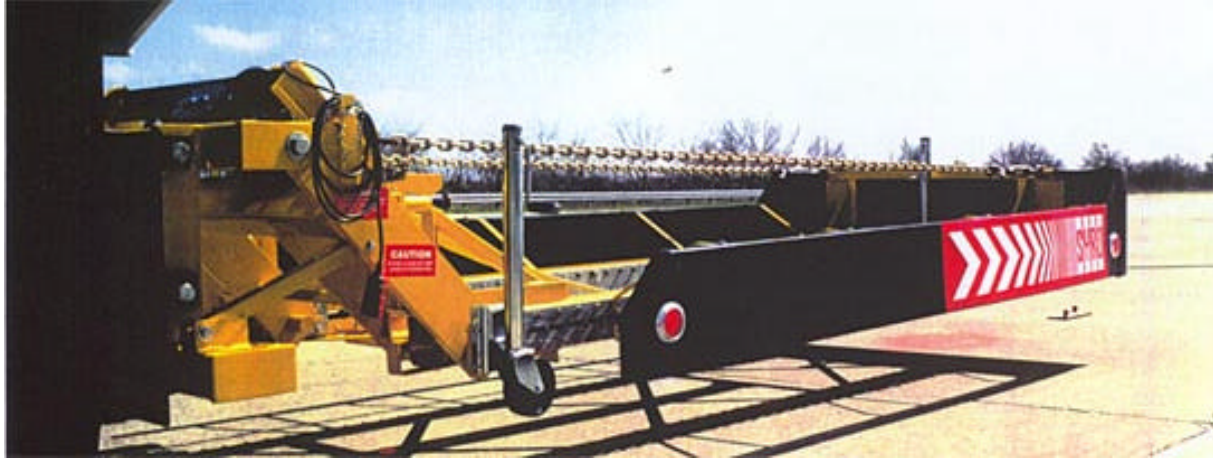
There are no official requirement for records of this type of accidents. In NCHRP Report 350 there are some optional tests described. However this is not required by FHWA and it seems uncertain when or if it will be. Collecting information and experience from the field will help us to develop our future products.

Typical Crash Sequence

Crash Tests conducted at Texas Transportation Institute, USA.

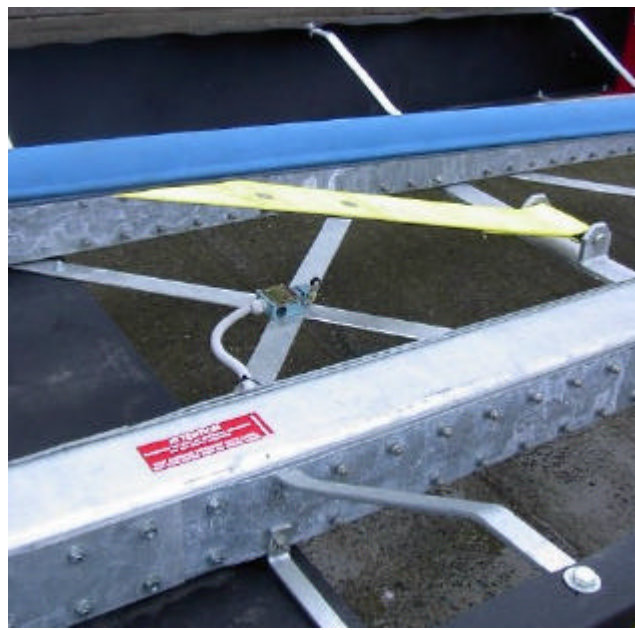
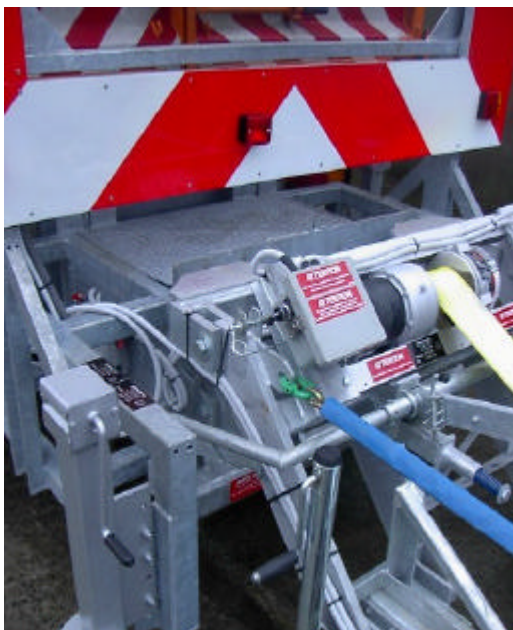


Photos of MPS 350i



NEW NOUVEAU NEU

Hot dip galvanized version of MPS 350i



Photos after impact





MPS 350i



Mobile Protection System

Product Manual

Installation, Operation, Maintenance



**An NCHRP Report 350 - TL3
Truck Mounted Attenuator**

**Trinity Industries, Inc.
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Dallas, Texas 75207**



Table of Contents

Figures and Tables	16
Customer Service	17
Inventory Parts List	18
Reference Parts List	19
Receipt and Installation	20
Receipt of System	
Inventory of Parts	
Installation of Bumper	
Installation of Bracket	
Installation of Frame	
Attachment of Nose Cover and Sideboards	
Installation of Lights	
Installation of Jacks	
Operation of Winch and Limit Switch	
Installation of Bottom Safety Sheet	
Product Guidelines	33
Positions for Use	
Travel Position	
In-Service Position	
Product Warnings	34
MPS 350i System Functions	34
In-Service Height	
Vertical Limit Switch	
Lowering the Unit	
Using the Jacks	
In Case The Unit Is Hit	36
Nuisance Hit	
Low-Speed Hit	
Medium-Speed Hit	
High-Speed Hit	
Maintenance	38
Winch	
Daily	
Weekly	
Monthly	
Three Months	



Figures and Tables

Figure A. MPS 350i Orientation Conventions.	21
Figure B. Main Parts of the MPS 350i.	21
Figure C. Fuel tanks should not be within 10'-6" of rear of vehicle.	22
Figure D. Bumper Installation.	22
Figure E. Bracket Installation.	23
Figure F. Frame Installation.	24
Figure G. Chain Assembly Installation.	25
Figure H. Light Location.	26
Figure J. Layout of Lights and Wiring.	27
Table 1. Wiring of Plug.	28
Figure K. Installation of Jacks.	28
Figure L. Limit Switch Detail.	30
Figure M. Electrical Control Box Detail.	30
Figure N. Chain Restraint Detail.	32
Figure O. The MPS 350i drops down and travels under the support vehicle when impacted.	36
Figure P. Shear Bolt Replacement.	39



CUSTOMER SERVICE

Trinity Industries, Inc., is committed to the highest level of customer service. Comments regarding the quality and workmanship of our products, their installation procedures, supporting documentation, and performance are welcome. Our goal is to enhance highway safety through continuous improvement and innovation. More information can be obtained in the following ways:

Corporate Contacts:

Telephone: 800-644-7976 (U.S. Calls)
214-589-8140 (International Calls)

Fax: 214-589-8423

E-mail: MPS.info@trin.net

Internet: www.highwayguardrail.com

Regional Telephone Contacts:

Telephone: +46 431 41 21 58 (Europe and Middle East)

Fax: +46 431 41 21 59

E-mail: peter.bergendahl@engelholm.se
peter.bergendahl@trin.net



INVENTORY PARTS LIST

Item Numbers Correspond to Foldout Drawing Where Applicable

NOTE: All replacement items should be obtained from Trinity Industries to ensure that form, fit, and function are maintained.

<u>Item #</u>	<u>Qty.</u>	<u>Part #</u>	<u>Description</u>
1	4	7417	Brace C4x5.4 x 3'0
2	1	5684	Bottom Safety Sheet (plastic)
3	1	7537B	Left Sideboard (plastic)
4	1	7538B	Right Sideboard (plastic)
5	1	7534B	Red & White Nose Cover (plastic)
6	8	7411	Sideboard Attachment Strap - Bottom
7	8	7410	Sideboard Attachment Strap - Top
8	3	5678	Jack
9	1	6805B	3-Light ICC Bar
10	4	7501	Light Plate - tail light attached
12	1	5628	Strap Connection Pin 1x8
13	1	5390	Cotter Pin 1/4x2
14	52	3217	Bolt 3/8x1 Gr. 5
15	52	3257	Whiz Nut 3/8"
16	48	3051	Flat Washer 3/8"
19	6	5477	Pop Rivet
49	1	6674	Electric Winch Up/Down Control
20	1	7412	Stage One Repair Kit
Repair Kit Consists of . . .			
--	1	various	Rip Plates (10 pieces)
41	4	6830	Trinity Specified Shear Bolt 3/8x3
43	4	3257	Whiz Nut 3/8"



REFERENCE PARTS LIST

Item Numbers Correspond to Foldout Drawing.

This list is provided for convenience in assembly and as a reference for future correspondence or replacement part ordering.

<u>Item #</u>	<u>Qty.</u>	<u>Part #</u>	<u>Description</u>
11	2	3085	Linchpin
21	1	960	Frame Assembly
22	1	961	Bracket Assembly
23	1	962	Bumper Assembly
24	2	7409	Frame Retainer Strap
25	2	3120	Bolt 1x5 Gr. 5
26	2	3103	Lock Washer 1"
27	2	3990	Flat Washer 1"
28	2	3992	Hex Nut 1"
29	1	7544	Latch Assembly
30	1	7554	Latch Handle Assembly
31	1	6830	Latch Handle Bolt 3/8x3
32	2	5638	Tension Spring
33	1	4523	Eye Bolt 3/16x1.5
34	1	5864	Hex Nut 3/16"
35	2	5679	Chain 3/8" Transport 9"-10 long
36	2	5680	Jaw and Eye Turnbuckle ³ / ₁₆ "
37	2	5673	³ / ₁₆ " Turnbuckle Lock Nut R
38	2	5674	³ / ₁₆ " Turnbuckle Lock Nut L
39	4	5685	Hammerlock 3/8"
40	4	7507	Support Strut Weldment
41	4	6830	Trinity Specified Shear Bolt 3/8"x3"
42	2	5551	Lock Washer 3/8"
43	2	4277	Hex Nut 3/8"
44	4	6829	Bolt 5/8x4 Gr. 5
45	4	3300	Flat Washer 5/8"
46	4	3310	Lock Washer 5/8"
47	4	4769	Hex Nut 5/8"
48	1	5676	Electric Winch
49	1	6674	Electric Winch Control
50	1	5637	Winch Strap 6" x 13' long
51	1	6623	Limit Switch
52	1	7555	Electrical Box Assembly



RECEIPT AND INSTALLATION

NOTE: The MPS 350i may be shipped partially assembled or separately as components. Steps 4 and 5 below apply primarily to separately shipped components but will serve as a reference should the system be disassembled.

STEP 1 RECEIPT OF SYSTEM

1. Inspect all components.
2. Report shipping damages to carrier truck driver immediately.
3. Note shipping damages on carrier's freight bill and have driver initial and date.
4. Report any discrepancies in writing to Trinity Industries, Inc., immediately.

STEP 2 INVENTORY OF PARTS

1. Inventory parts supplied with enclosed Inventory Parts List.
2. Report any missing parts to Trinity Industries, Inc., immediately.

STEP 3 INSTALLATION OF BUMPER

1. Figure A shows the orientation conventions for the MPS 350i. Figure B is for reference and shows the names of the main components of 350.

the MPS

WARNING: PRIOR TO MOUNTING THE MPS 350i, VERIFY THAT THE FUEL TANKS ON THE SUPPORT VEHICLE ARE MORE THAN 10'-6" FROM THE REAR OF THE SUPPORT VEHICLE. THE MPS 350i SHOULD NOT BE INSTALLED ON VEHICLES WITH FUEL TANKS WITHIN 10'-6" OF THE REAR OF THE VEHICLE. SEE FIGURE C.

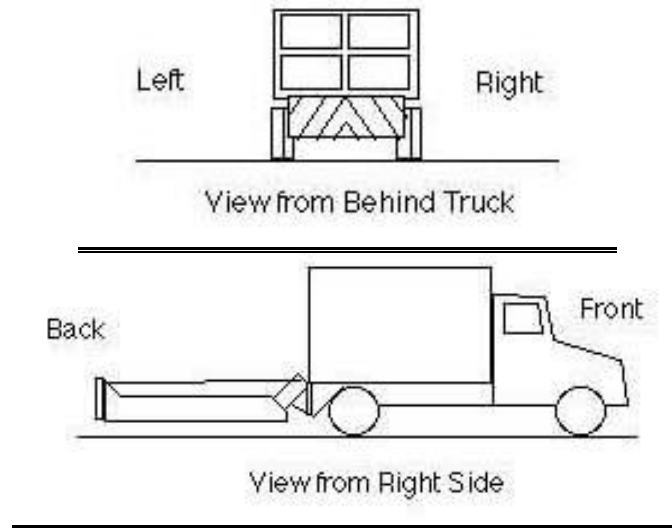


Figure A. MPS 350i Orientation Conventions.

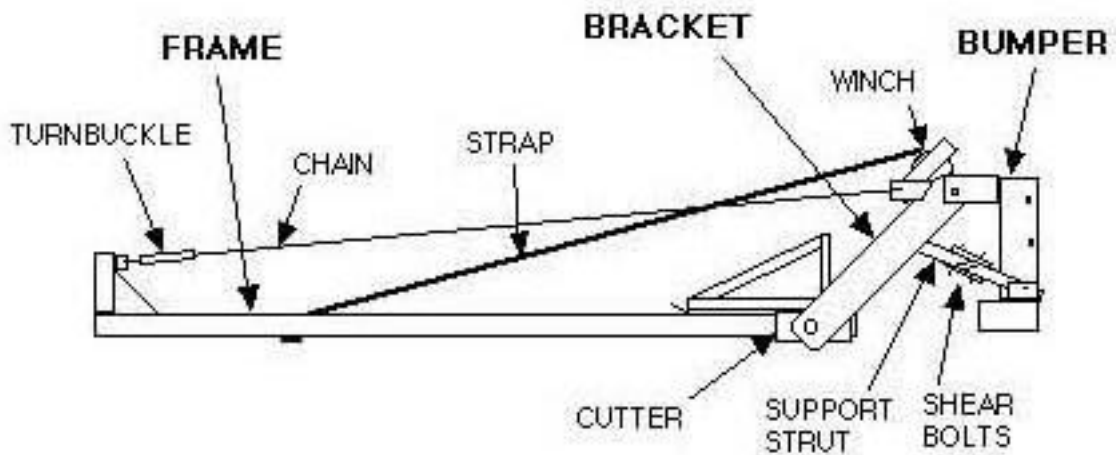


Figure B. Main Parts of the MPS 350i.

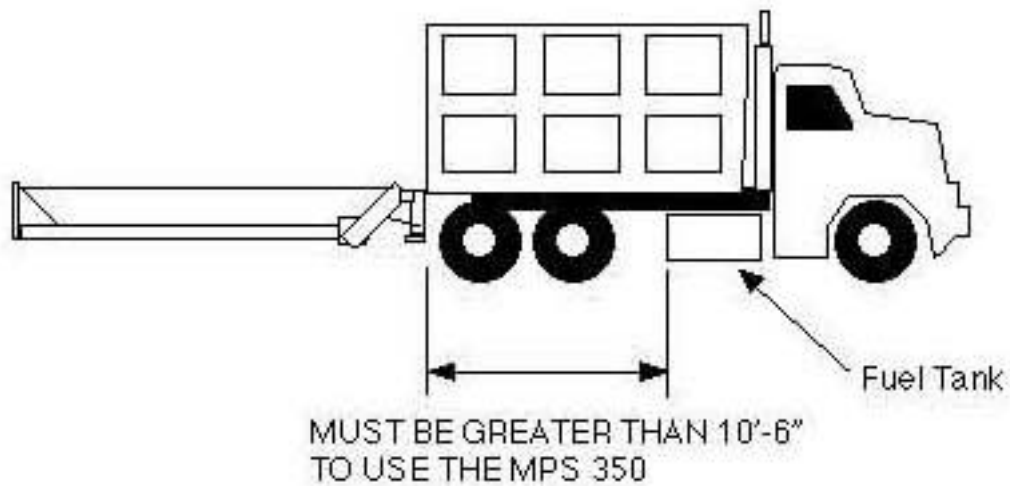


Figure C. Fuel tanks should not be within 10'-6" of rear of vehicle.

Note: The support vehicle must be ballasted to its desired weight (per local spec) prior to attaching the MPS 350i. Failure to do so may result in the system being mounted too low to function properly.

2. See Figure D for all dimensions related to Step 3.

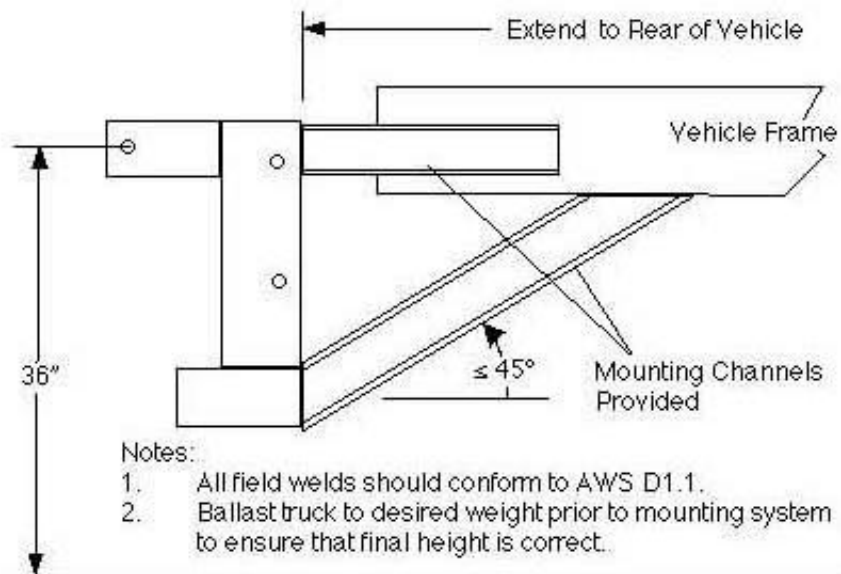


Figure D. Bumper Installation



3. Attach 4" channel braces (item 1) to main frame of vehicle insuring channels extend out even with or past the rear of the support vehicle. Attachment of channels to vehicle should be per the vehicle manufacturer's recommendations.
4. Weld the MPS 350i bumper assembly (item 23) directly to the channels (item 1) ensuring that the bumper assembly is level, plumb, and at the recommended height.
5. Brace the MPS 350i bumper assembly by welding a 4" channel (item 1) to each side of the front of the lower tube. The brace should attach to the vehicle frame as far forward as possible.

STEP 4

INSTALLATION OF BRACKET

1. See Figure E for bracket installation information.

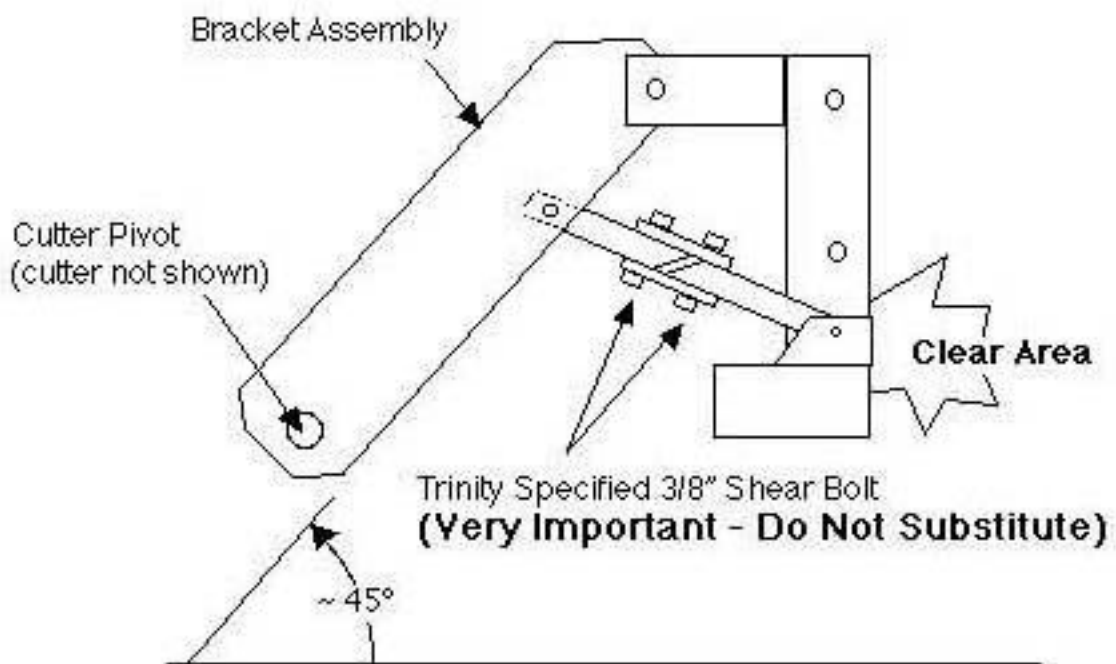


Figure E. Bracket Installation



2. Attach the MPS 350i bracket (item 22) to the bumper assembly (item 23) using the hardware provided (items 25, 26, 27, and 28).
3. Attach the support struts (item 40) to the bracket assembly and the bumper assembly using hardware provided (items 41, 42, 43, 44, 45, 46, 47, and 16). The bracket assembly should now extend off the rear of the support vehicle at a 45° angle.

CAUTION: Do not substitute unapproved attachment bolts (item 41) for the support struts. The 3/8" diameter bolts are designed to shear at a specific load. **Do not substitute.**

WARNING: Be sure a clear area is available forward from the support struts as shown in Figure E. Support Struts must have a clear path for forward motion during impact.

STEP 5 INSTALLATION OF FRAME

1. Slide the open end of the frame onto the cutter plates approximately 6" as shown in Figure F.

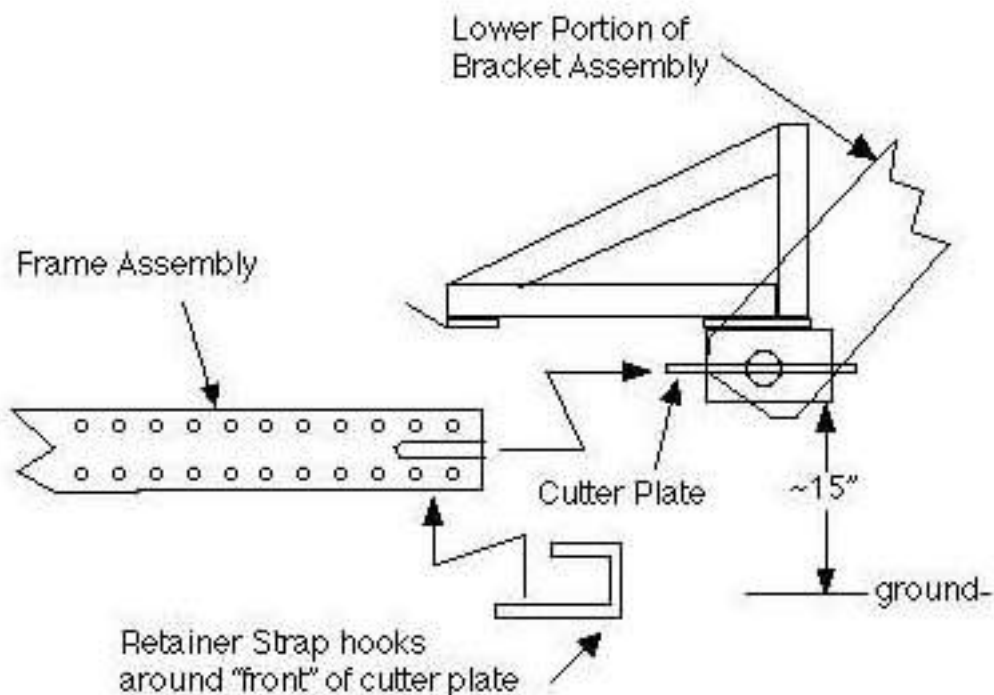


Figure F. Frame Installation



2. Attach the Frame Retainer Straps (item 24) to the bottom of the frame beams making sure that the J-hook end of the strap extends up and around the front of the cutter plates as shown in Figure F.
3. Attach the chain assemblies (items 35, 36, 37, 38, and 39) as shown in Figure G with the adjustment turnbuckles (item 36) toward the rear of the system.

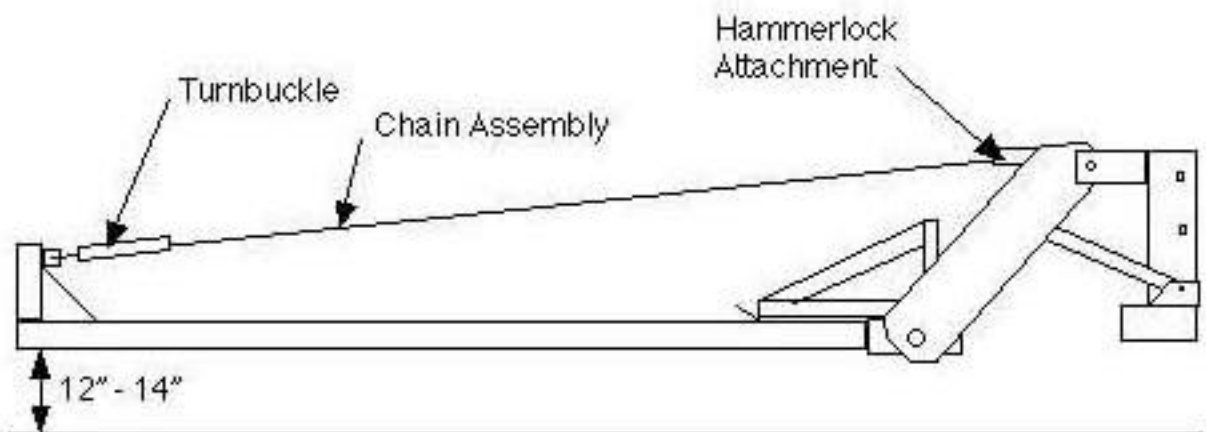


Figure G. Chain Assembly Installation

4. Attach the winch strap (item 50) to the centrally located attachment point on the frame using the pin provided (items 12 and 13).
5. Attach the winch electrical wiring per the winch manufacturer's installation instructions. Be sure to use properly sized wires and cover the positive connection on the winch to minimize the potential for accidental contact.
6. Use the winch to adjust the chain assembly turnbuckles so that the rear of the MPS 350i is 12" – 14" off the ground.

STEP 6

ATTACHMENT OF NOSE COVER AND SIDEBOARDS

1. Slide the Nose Cover (item 5) over the rear of the frame (item 21) and secure with supplied hardware (items 14, 15, and 16).
2. Attach the Sideboards (L & R) (items 3 and 4) to the sides of the frame assembly using the attachment straps (items 6 and 7) supplied.



3. Sideboard attachment straps should be attached to the frame assembly at the 9th set of bolts, the 17th set of bolts, the 29th set of bolts, and the 41st set of bolts. Bolts should be counted beginning at the bracket end of the frame. Through-bolts have been installed in the frame assembly at these points for convenience. Remove the whiz nuts, locate the attachment strap, and replace the whiz nut in each location.
4. Sideboards should be inserted into the Nose Cover assembly (item 5) and over the sideboard attachment straps (items 6 and 7) prior to securing with supplied attachment hardware (items 14, 15, and 16). For best results use a flat washer in contact with all plastic surfaces.

STEP 7**INSTALLATION OF LIGHTS**

1. The MPS 350i is delivered with the lights attached to the light plates (item 10) and packed separately for their protection. Each light plugs into either the main line located in the right main beam of the MPS 350i or into another light in the system. Figure H shows the location of each light on the MPS 350i. Figure J shows how the individual lights plug into each other and into the main line.

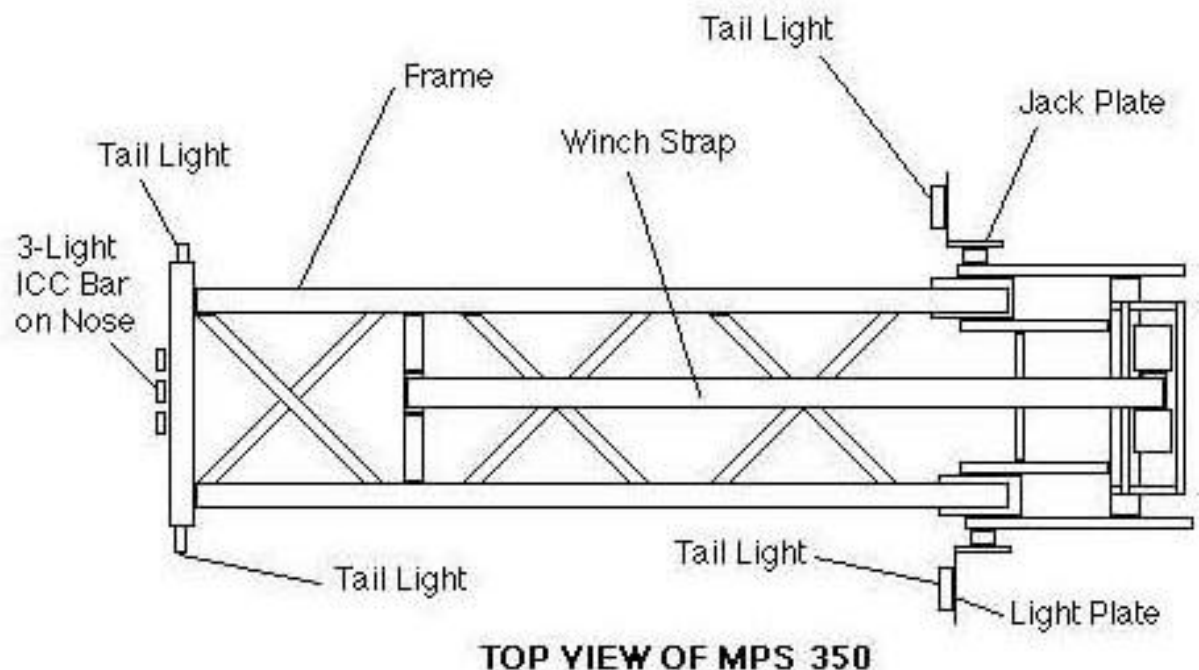


Figure H. Light Location

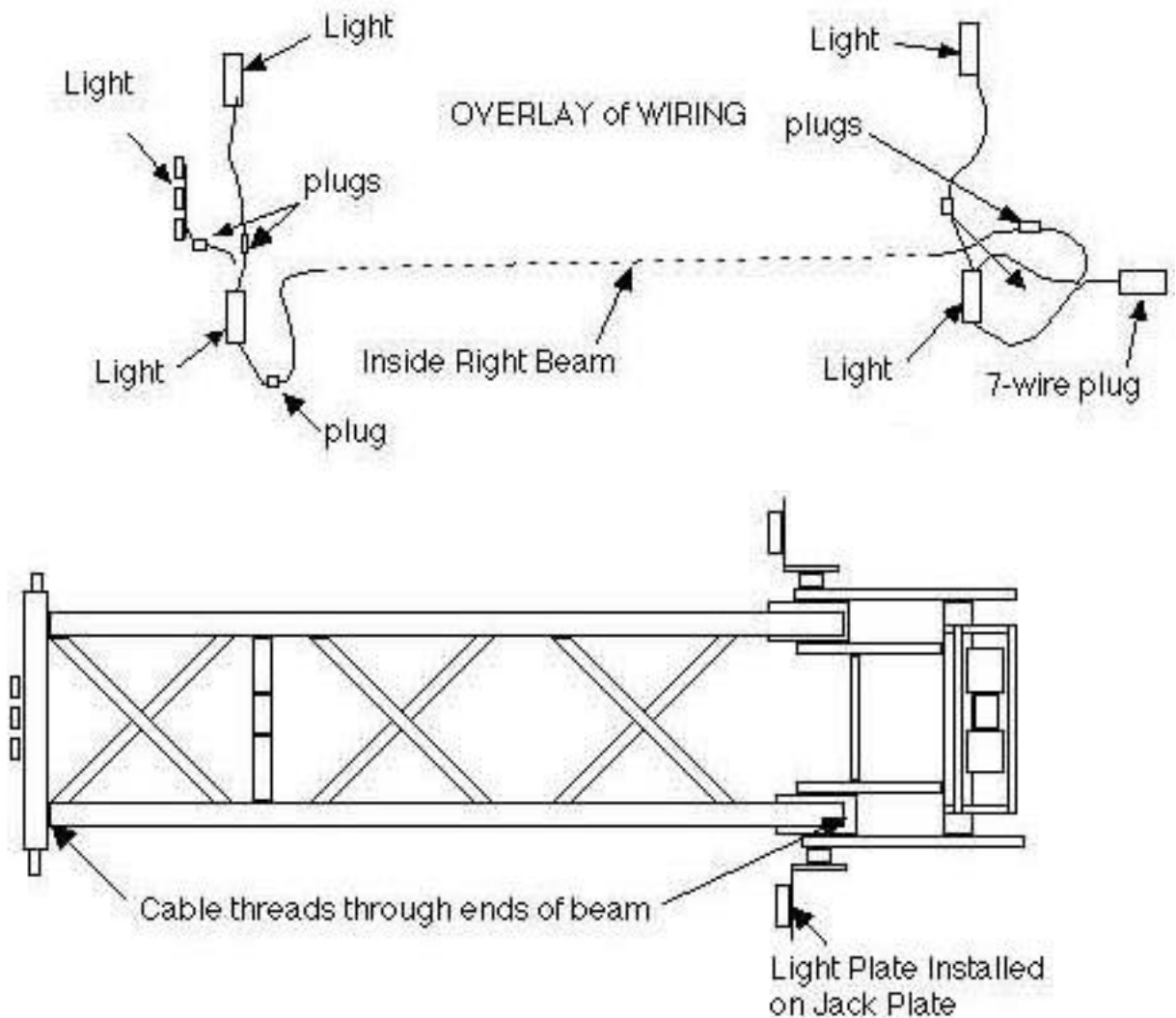


Figure J. Layout of Lights and Wiring

2. Unpack the light plates (item 10) and pull the wires out to maximum extension. The light plates bolt to the frame and bracket in the locations shown in Figure H using the hardware provided (items 14 and 15). Two of the light plates attach to the outsides of the vertical channels on the nose of the system. Two more attach to the jack attachment plates located on the outside of the bracket assembly covering the cutter pivots.
3. Attach the 3-light ICC bar (item 9) to the outside of the plastic nose cover (item 5) using the appropriate hardware (item 19). A hole is provided for threading the cable through to the inside of the cover where it may be plugged into the right rear tail light.

4. Verify the proper function of the lighting system. Table 1 shows the wiring detail for the large plug at the front of the system. A mating plug should be provided from the support vehicle electrical system.

Table 1 Wiring of Plug
White - Ground
Brown - Tail
Green - Right turn/stop
Red - Dead
Yellow - Left turn/stop
Black - Dead
Blue - Dead

STEP 8 INSTALLATION OF JACKS

1. See Figure K for the location of the height adjustment jacks.

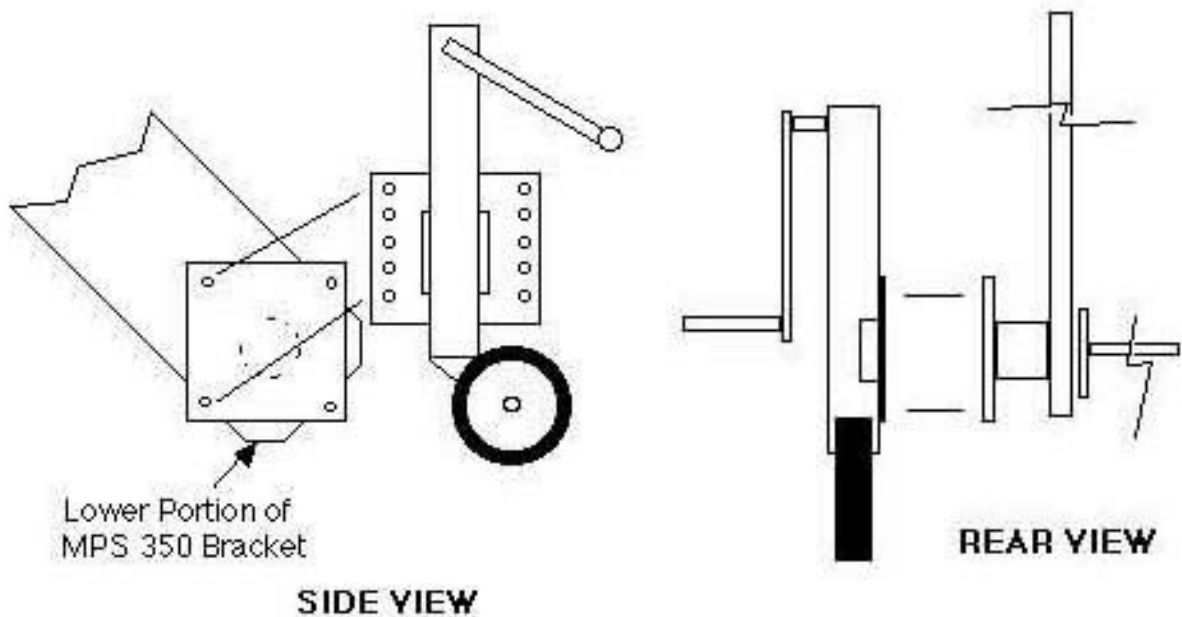


Figure K. Installation of Jacks



2. Use the provided hardware (items 14 and 15) to attach the jacks (item 8) to the jack plates located on the sides of the bracket and inside the rear portion of the frame. Note the location and assembly of the light plates (item 10) in conjunction with the installation of the bracket jacks.

Note: On vehicles with a long overhang behind the rear axle, the bracket jacks should be removed from the jack plates during operation of the MPS 350i to ensure that they do not drag the ground during operations. Failure to do so could result in damage to the bracket jacks and/or failure of the shear bolts in the bracket support struts.

STEP 9

OPERATION OF WINCH AND LIMIT SWITCH

1. The MPS 350i is equipped with an electric winch (item 48) that raises and lowers the frame portion of the system. The winch should be wired to the support vehicle using appropriately sized cables per the winch manufacturer's instructions enclosed with the MPS 350i. A cover should be placed over the positive connection to the winch to ensure that contact cannot be made with objects which might cause an arc.
2. The upward motion of the MPS 350i frame is limited by a switch (item 51) located on the left side of the latch assembly. Power to the electric winch is interrupted when the spring-loaded latch automatically falls into place over the main crossmember on the frame. See Figure L.
3. The electric winch can be operated from beside the system using the up-down switch located on the electrical control box. It may also be operated remotely using the up-down control pendant that plugs into the upper side of the electrical control box. See Figure M.

WARNING: In the event of an emergency situation, all power to the electric winch can be interrupted with the Emergency Power Kill Switch located on the lower side of the electrical control box.

Note: If you desire cab operation for your MPS 350i winch, please contact a Trinity Industries representative at 1-800-644-7976.

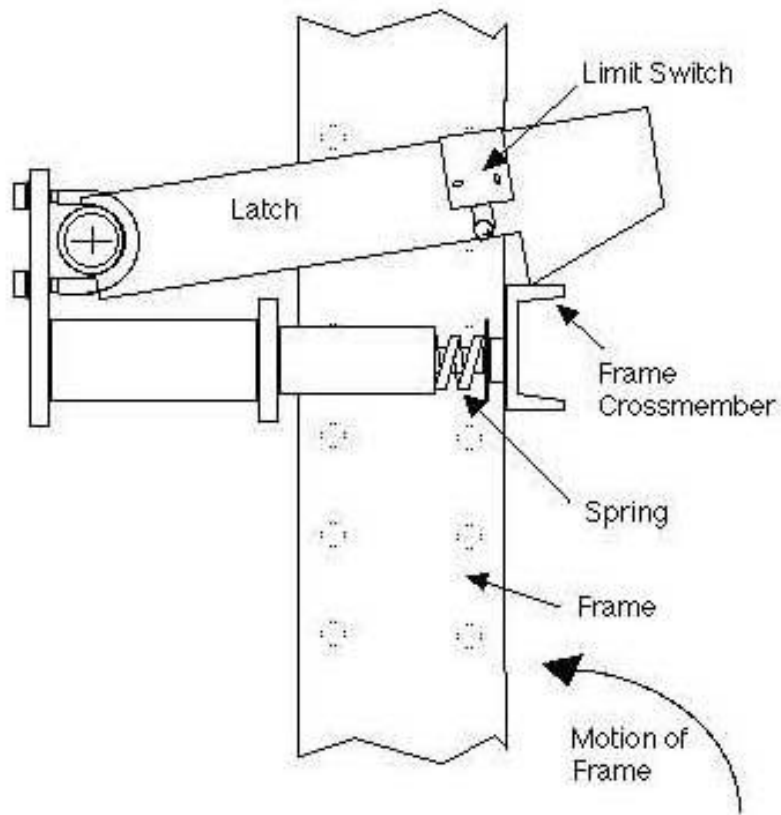


Figure L. Limit Switch Detail.

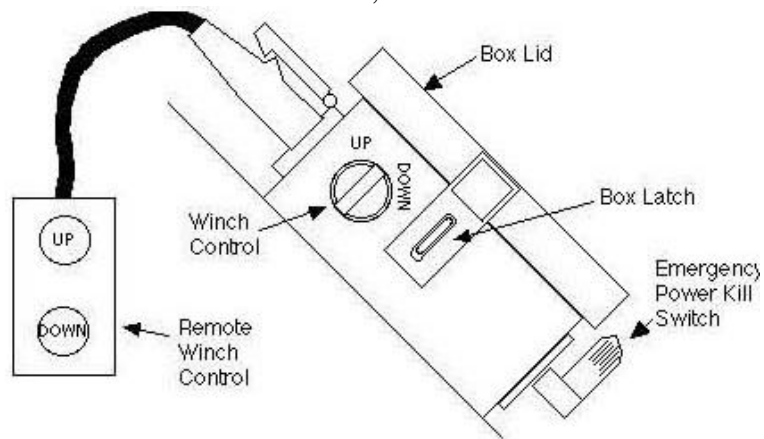


Figure M. Electrical Control Box Detail.

**STEP 10****INSTALLATION OF BOTTOM SAFETY SHEET**

1. Raise the MPS 350i to the vertical traveling position.
2. Ensure that the latch (item 29) has functioned properly and that the system is locked in place.
3. Restrain the chains using the linchpins (item 11) and the restraint tabs on top of the bracket. See Figure N.

Note: Later models of the MPS 350i may be equipped with protective chain covers that do not allow the linchpins to restrain the chains as shown in Figure N. In that case, the protective covers may be cut in two at the appropriate location to allow the insertion of the linchpin.

4. Attach the plastic safety sheet (item 2) to the bottom (now vertical) of the MPS 350i frame assembly using the hardware provided (items 14, 15, and 16). Clamp the sheet in the desired location noting that attachment holes have been provided in the X-bracing between the main beams of the system. Match drill the bottom sheet to the x-bracing and to the bottom of the sideboards using a 3/8" diameter bit. For best results use four bolts on the x-bracing and three bolts on each sideboard. Always use flat washers in contact with the plastic.

Note: The orientation of the safety striping should be per local specifications. In the absence of specifications, an inverted ÖVÖ is recommended.

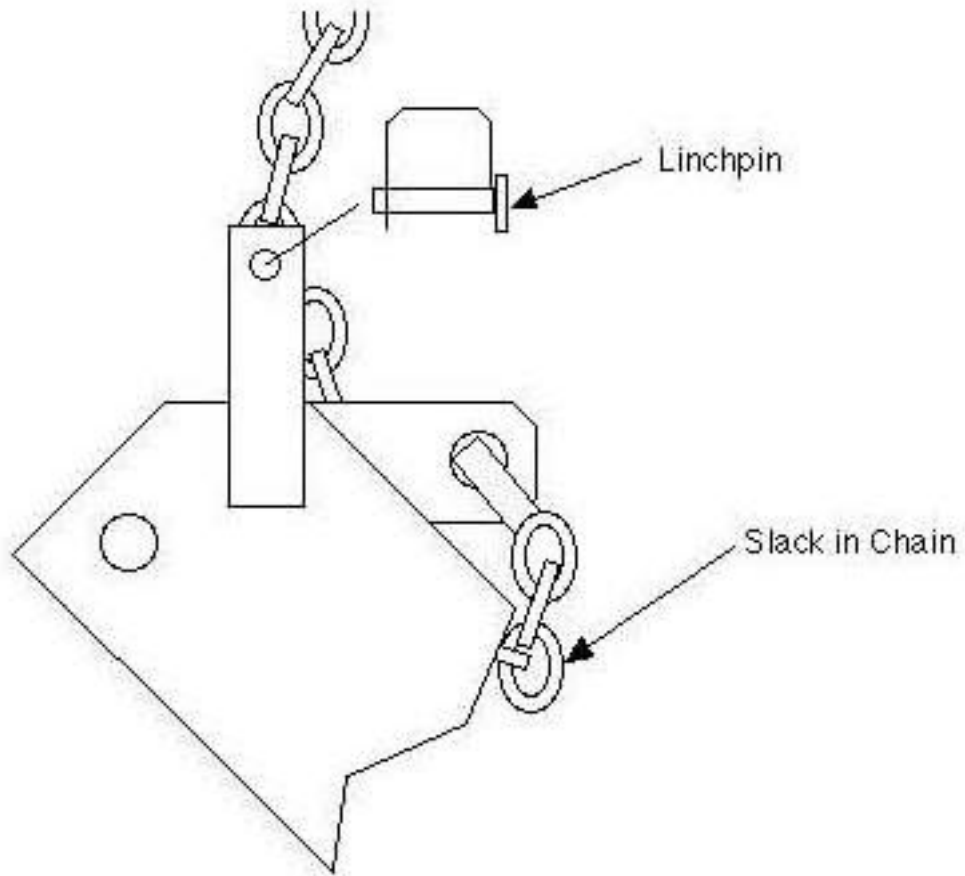


Figure N. Chain Restraint Detail



PRODUCT GUIDELINES

POSITIONS FOR USE

Travel Position: When unit is not in use or is in transit to or from a work zone, the unit should be in the raised position and securely locked in place. The winch will raise the unit until it reaches the positive stops located on the bracket assembly where it will automatically lock in place. The chains should be restrained while the system is up by passing the supplied linchpin through the chain and the tabs provided at the top of the bracket assembly.

In-Service Position: The unit should be lowered to the horizontal position with its full weight resting on the support chains. The turnbuckles should be adjusted to ensure a traveling height of 12" –14" under the rear of the system.

CAUTION: Care should be taken to ensure that the entire weight of the system is resting on the support chains when the unit is in the In-Service position. Failure to do so could result in damage to the electric winch and its support structure.



PRODUCT WARNINGS

1. Do not install the system if suspended fuel tanks on the support vehicle are less than 10' – 6" from the rear of the vehicle.
2. Do not install the system until support vehicle is ballasted to proper operational weight (per local spec).
3. Do not release the latching mechanism with excessive slack in the winch strap.
4. Do not allow winch strap to support any system weight when the unit is in the down position.
5. Do not stand under the unit as it is being raised or lowered.
6. Do not use the unit to transport any loads at any time.
7. Do not replace support strut shear bolts from source other than manufacturer.
8. Do not stand or sit on any part of the unit at any time.
9. Do not replace rip plates from source other than manufacturer.
10. Do not put unit in service until bumper assembly is braced to vehicle frame per installation instructions.
11. Do not attach unauthorized accessory equipment to unit without prior approval of Trinity Industries, Inc.
12. Do not modify the system in any way without prior approval of Trinity Industries, Inc.
13. Do not travel to and from work zone at highway speeds with the unit in the down position.
14. Do not allow unit to bounce excessively when encountering known road hazards.
15. Do not operate unit without light system connected and functioning properly.
16. Do not operate unit with more than 14" of ground clearance under the nose.
17. Do not operate unit without verifying proper function of the winch limit switch and automatic latching system.

MPS 350i SYSTEM FUNCTIONS

- ITEM 1** **IN-SERVICE HEIGHT:** The MPS 350i can be adjusted by raising the system with the electric winch and then adjusting the turnbuckle in each chain assembly. The system should be adjusted for 12" –14" of ground clearance under either rear corner.
- ITEM 2** **VERTICAL LIMIT SWITCH:** The MPS 350i can be raised to a vertical position using the electric winch and the control pendant supplied with the winch. As the frame approaches the vertical position, a pair of coil springs located on the bracket assembly will contact a structural crosspiece on the frame. The frame will compress the springs until the safety latch drops into place. As the latch drops into place, the limit



switch should stop the upward motion of the frame prior to it bottoming out against the tubes that contain the springs. If the limit switch fails to contact the structural crosspiece on the frame in a way that actuates the switch, it may be necessary to add a piece of thin shim material to the side of the crosspiece to fill the resulting gap. **Failure to ensure proper function of the limit switch may result in failure of the electric winch.**

ITEM 3 **LOWERING THE UNIT:** The MPS 350i can be lowered from the vertical traveling position to the horizontal deployed position by manually raising the safety latch and then lowering the unit with the electric winch. The limit switch described in Item 2 interrupts power to the electric winch until the latch is raised. Both up and down power return at that time.

Lower the unit all the way down so that its weight rests on the support chains. If weight is left on the winch strap while the system travels over the road, the winch and the attachment point to the frame will be damaged.

CAUTION: The lift strap on the MPS 350i should always go over the top of the electric winch drum to ensure proper function of winch system.

ITEM 4 **USING THE JACKS:** The MPS 350i is supplied with three screw-type jacks that can be used to maneuver the system around the support vehicle. When not in use, the jacks should be fully retracted to ensure that they are not damaged during operations. When moving the system away from the vehicle, use the jacks to ease disconnection and then lower the system at all three jack points prior to rolling the system around.

On vehicles with a long overhang behind the rear axle it may be necessary to remove the bracket jacks from the jack plates to ensure that the jacks are not damaged during operations.

ITEM 5 **CHAIN RETAINERS:** The MPS 350i is supplied with a linchpin and a pair of tabs located at the top of the bracket assembly. When the system is raised to the full vertical position, the operator should lock the chains between the tabs with the linchpin. This will keep the chains from swinging and will provide an additional level of safety.

Note: Later models of the MPS 350i may be equipped with protective chain covers that do not allow the linchpins to restrain the chains as shown in Figure N. In that case, the protective covers may be cut in two at the appropriate location to allow the insertion of the linchpin.

IN CASE THE UNIT IS HIT

During a high-speed, design impact, the MPS 350i will function as a series of events:

1. The 3/8" diameter shear bolts will release the bracket from the support struts.
2. The bracket will rotate to a vertical orientation until it hits the bottom crosspiece on the bumper assembly.
3. The frame assembly will begin to move forward and under the vehicle as the galvanized plates on the sides of the beams are cut by the cutter plates.
4. The impacting vehicle and the MPS 350i frame will come to rest together after some distance that depends on the speed and weight of the impacting vehicle.
5. Figure O shows how the unit drops down and travels under the vehicle.

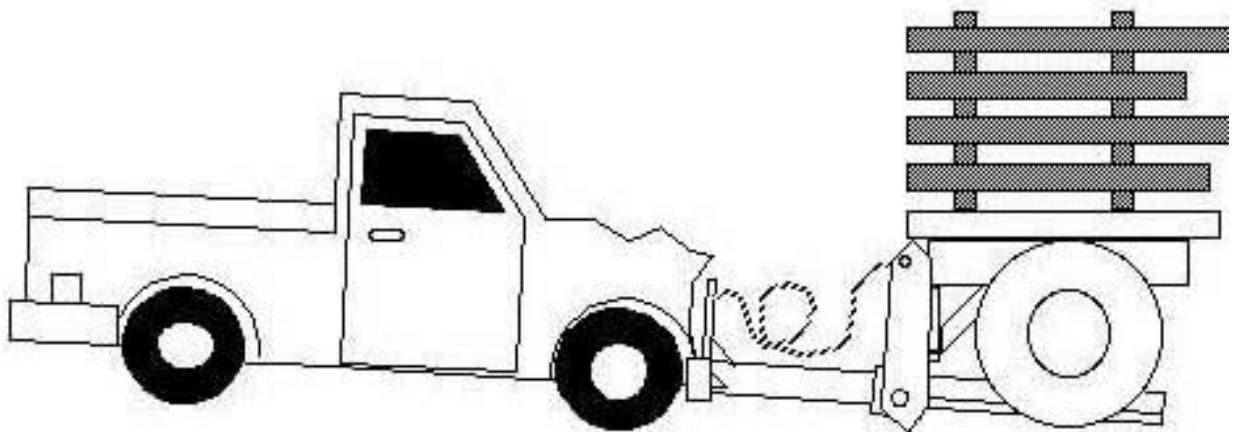


Figure O. The MPS 350i drops down and travels under the support vehicle when impacted.



A NUISANCE HIT is one that shears the 3/8" bolts and drops the bracket but does not cut any of the galvanized plate. The system can be returned to service in the following way:

1. Disconnect the chain assemblies on the rear of the system.
2. Run out a small amount of slack in the electric winch strap.
3. Use the bracket jacks to raise the bracket back to its original 45° position.
4. Replace the 3/8" shear bolts with approved replacement items.
See Figure P for details of shear bolt replacement.
5. Retract the jacks to their traveling position.
6. Raise the frame with the electric winch and / or the rear jack.
7. Reconnect the chain assemblies.
8. Retract the rear jack to its traveling position (if used).
9. Continue operations.

Note: In step 3, function of the jacks will initially be at a 45° angle. This angle can be reduced by pulling the support vehicle slightly forward while the MPS 350i remains attached but still resting on the ground.

A LOW-SPEED HIT is one that rips less than 45" of the galvanized rip plates. This length includes the precut 6" slot on the front of the frame assembly. Should such an impact occur, the bracket can be released from the bumper and the bracket and frame then transported to a repair facility by a wrecker. In some cases the electric winch can be used to lift the nose of the system slightly off the ground and then the system can be transported by the support vehicle in a low ground clearance condition. The first 45" of rip plate can be replaced and the entire system reused.

A MEDIUM-SPEED HIT is one that rips between 45" and 87". The system can be released from the support vehicle and transported by wrecker as described above. The frame assembly must be replaced. If damaged, the bracket and bumper must also be replaced.

A HIGH-SPEED HIT is one that rips beyond 87" of rip plate. The system can be released from the support vehicle and transported by wrecker as described above. The frame and bracket must be replaced. The bumper must also be replaced if it was damaged.



MAINTENANCE

WINCH Refer to the winch manual for specific guidelines on operation and maintenance.

DAILY

1. Check operation of limit switch and automatic latch.
2. Visually inspect system for loose bolts, damaged parts, etc.
3. Check for 12" – 14" of ground clearance under nose. Adjust.
4. Inspect turnbuckles to ensure that lock nuts are tight.
5. Check light system for correct operation.

WEEKLY

1. Visually inspect support strut 3/8" shear bolts.
2. Inspect winch strap and hardware for damage.
3. Inspect latch system and springs.

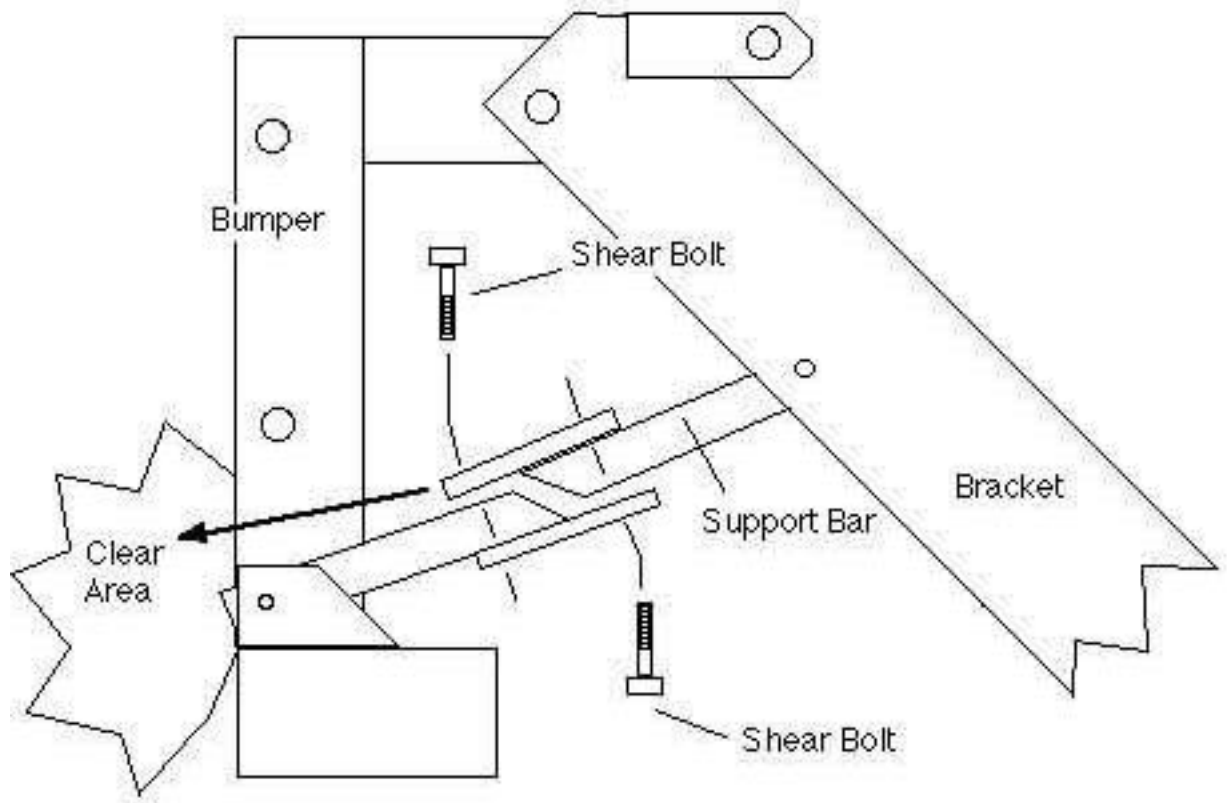
MONTHLY

1. Inspect demarcation markings on nose of system.
2. Inspect caution and warning decals.
3. Inspect frame retainer straps to ensure that bolts are tight and strap is undamaged.
4. Inspect electrical wiring and plugs.
5. Inspect sideboards and connection hardware.
6. Inspect rip plates and attachment hardware.

THREE MONTHS

1. **Replace** 3/8" shear bolts in support struts with approved bolts. See Figure P for details of shear bolt replacement.
2. Ensure that all fasteners are secure.

Note: Replacement of 3/8" shear bolts should be done more often if unit is subjected to excessive bouncing during operations.



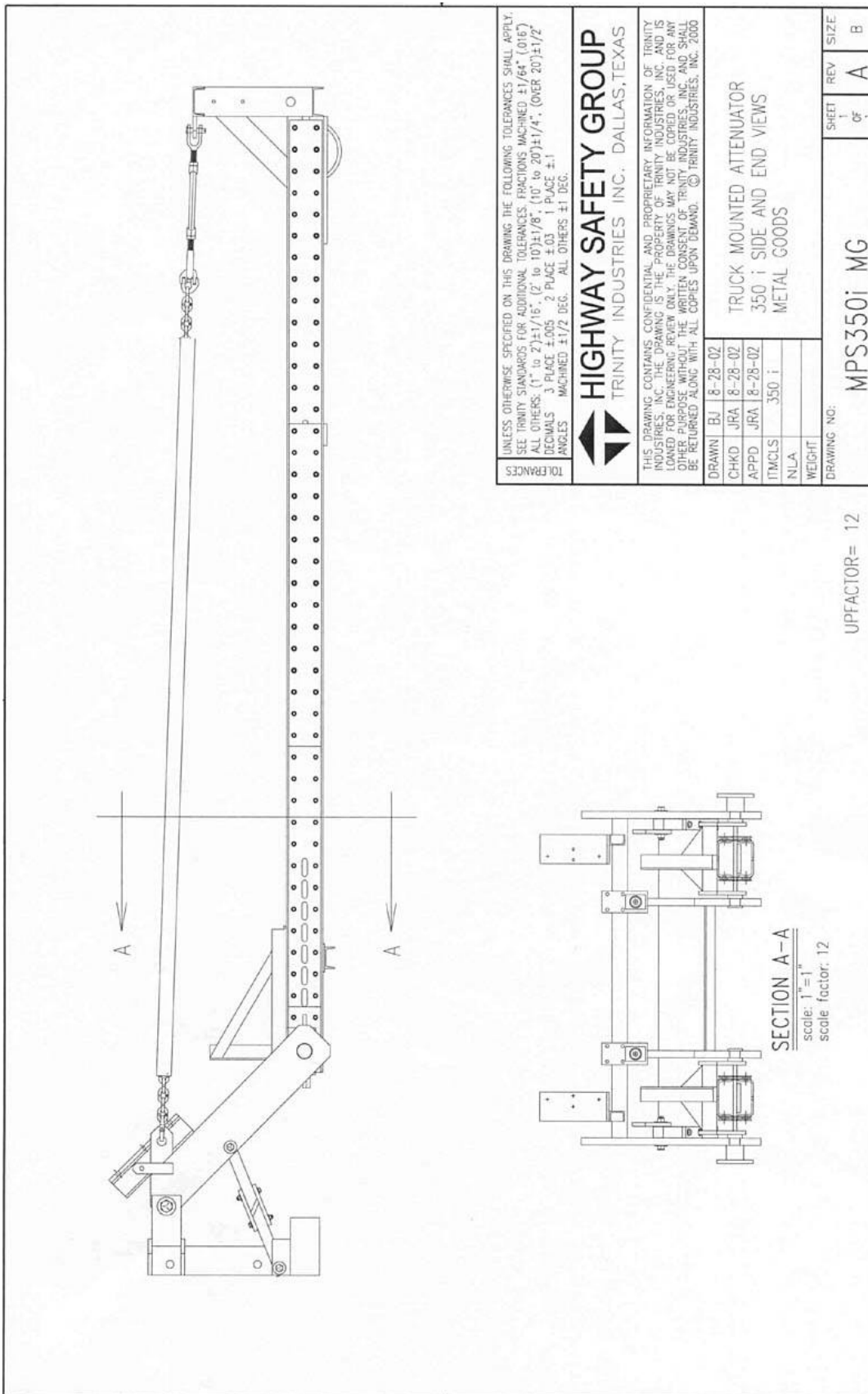
Bolts and bars must be installed exactly as shown.
Failure to do so will result in damage to the unit.

Figure P. Shear Bolt Replacement.



Annex 1

Drawings



Have also a look at our Hexcel TMA...



Flyers for Distribution

