

BARRACUDA®

Barricade System



Portable interconnecting barricade that is highly effective as a longitudinal channelizer, traffic delineator and visual marker.



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Installation/Maintenance

BARRACUDA®

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Important Introductory Notes

Proper deployment, installation design, and maintenance of the BARRACUDA are essential to assure maximum performance. Take the time to review this manual thoroughly before performing the necessary work. Do not attempt to install any BARRACUDA sections without the proper plans and installation manual from the manufacturer.

If you need additional information, or have questions about the BARRACUDA, please call Safe-Hit Customer Service Department. See the back cover for the phone number.

System Overview

The BARRACUDA is a highly portable and crashworthy barricade especially suited for use as a temporary delineator, longitudinal channelizer, or to provide a means of visual direction.

BARRACUDA provides several unique advantages over traditional traffic barricades and barriers:

- * Energy-absorbing (when ballasted)
- * Quick and easy deployment and retrieval
- * Stackable (for storing and transporting)
- * Lightweight
- * Economical
- * Delineation and channelization

BARRACUDA is crashworthy and has been tested to the National Cooperative Highway Research Program Report 350 (NCHRP 350) testing procedures. FHWA Acceptance letter HSA-10/WZ-191.

Function

BARRACUDA functions as a portable longitudinal channelizer to guide road users or warn them of conditions created by work activities in or near the roadway.

BARRACUDA Longitudinal channelizer absorbs impact energy and cushions vehicular impacts while significantly reducing the risk to occupants of the impacting vehicle.

WARNING!

The BARRACUDA® does NOT provide intrusion protection. A vehicle could pass through the line of connected devices and enter the delineated zone. This device is only intended to provide visual direction, delineation and channelization. Do not use the BARRACUDA® in applications where people or equipment must be protected. Contact Energy Absorption Systems, Inc. or your local dealer for information on protective barrier products.

Construction

A BARRACUDA® installation is constructed from a series of individual barricade sections. See Figures 1 & 2 for approximate physical dimensions, capacities and items included with each section.

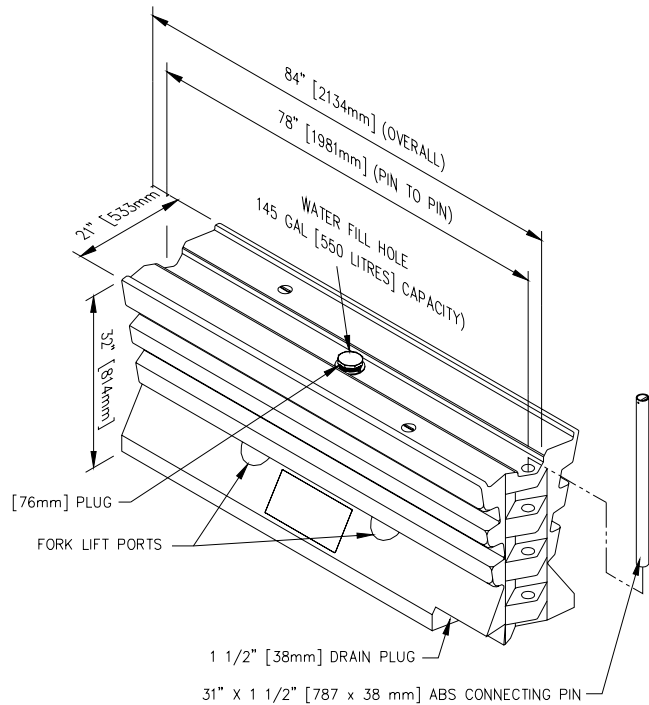
BARRACUDA sections are available in white, orange, yellow and light grey colors. Each section is constructed of a lightweight polyethylene plastic shell designed to accept water ballast. This durable, recyclable material resists cracking, breakage and corrosion under harsh environmental conditions.

The ends of each section are constructed with knuckles that interlock with those of other segments. The end knuckles are vertically aligned to accept an ABS plastic connecting pin. The sections can swivel 9.7 deg. at the pin for easy positioning around work areas. The sections can be positioned with an inside radius as small as 11.3 m [37'].

The BARRACUDA is constructed in a unique shape. The inwardly sloping ribbed side-walls interact with an impacting vehicle in a way that resists penetration, vaulting, and underriding. Sections are also stackable to reduce shipping and storage space.

Each BARRACUDA Barricade section is constructed with fork lift ports to allow for mechanical lifting if desired. One large fill opening and a drain plug are provided to allow quick filling and draining of the water ballast.

CONNECTABLE & INTERLOCKING STACKABLE (WHEN STORING AND TRANSPORTING) LARGE FILL OPENING



CAPACITY:
550L [145 GAL.]

WEIGHT:
610KG [1350 LBS] FULL
36 KG [80 LBS] EMPTY

Figure 1
BARRACUDA® Barricade Components

BARRACUDA®

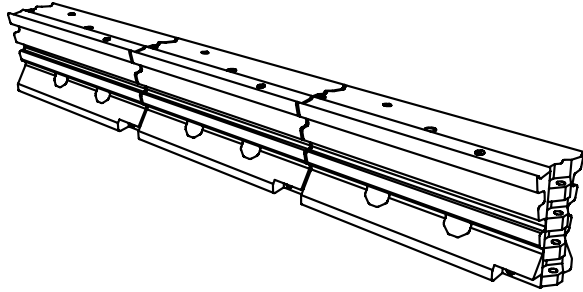


Figure 2
BARRACUDA® Barricade Assembly

PART NUMBER	DESCRIPTION	COLOR
SHBAR0000-WX	BARRACUDA SECTION	WHITE
SHBAR0000-OX	BARRACUDA SECTION	ORANGE
SHBAR0000-YX	BARRACUDA SECTION	YELLOW
SHBAR0000-MX	BARRACUDA SECTION	LIGHT GREY
2021200-0000	ABS CONNECTING PIN	
420504	1 1/2" DRAIN PLUG	
420505	3" PLUG	

Conformance

The BARRACUDA has been tested to NCHRP 350 TL-2 Longitudinal Channelizer Barricade and conforms with the current guidelines used by the Federal Highway Administration (FHWA) as recommended in:

H. E. Ross, D. L. Sicking, H. S. Perera, and J. D. Michie, "Recommended Procedures for the Safety Performance Evaluation of Highway Features", National Cooperative Highway Research Program Report 350, Transportation Research Board, Washington, D.C., 1993

Selection, and placement of BARRACUDA®, and design of installation should conform to applicable guidelines in:

FHWA, "Manual on Uniform Traffic Control Devices for Streets and Highways" Washington, D.C. 2003 Edition.

American Association of State Highway and Transportation Officials. "Roadside Design Guide" Washington, D.C.: AASHTO, 1996.

Federal, state, and local criteria governing BARRACUDA® conformance may vary. Consult the FHWA and local State Department of Transportation representatives.

Special Site Considerations

A traffic control plan, in detail appropriate to the complexity of the work project, should be prepared and understood by all parties before the BARRACUDA® is deployed. Some special site considerations are:

Optional water capacity chart for purposes of planning for a water truck

LENGTH OF INSTALLATION	WATER REQUIRED
30m [100 ft]	8235 liters [2175 gal]
40m [130 ft]	10 980 liters [2900 gal]
50m [165 ft]	13 725 liters [3625 gal]
60m [195 ft]	16 470 liters [4350 gal]
70m [230 ft]	19 210 liters [5075 gal]
80m [260 ft]	21 955 liters [5800 gal]
90m [295 ft]	24 700 liters [6525 gal]
100m [330 ft]	27 445 liters [7250 gal]
150m [490 ft]	41 170 liters [10,875 gal]
200m [655 ft]	54 890 liters [14,500 gal]

1. What foundation will the barrier be deployed on and what is its slope? BARRACUDA may be deployed on various surfaces. Foundations other than clean asphalt may result in more or less lateral deflection for full design capacity impacts. The existence of cross slopes greater than 5% or curbs may create a vaulting effect on the impacting vehicle.
2. Can the water ballast be drained at the site? If not, provisions must be made to either siphon out the water ballast or use forklift to move full sections to a location where they can be drained.
3. Will the barrier be used in a climate where the water ballast may freeze? If freezing conditions are expected, it is best to use the BARRACUDA empty (free of water ballast). However if it is desired to ballast the sections with water, then the use of an antifreeze is recommended. See available antifreezes under the section titled "Other Considerations" in this manual.

Preparation

Begin preparing for the installation by reviewing the specified barrier location, design, layout, and orientation. Determine the number of sections needed. When connected each section is approximately 2 m [78"] long.

Conduct a parts inventory check to make sure all the necessary components are available before proceeding to the site. Visually check the sections for damage to ensure that they will hold water.

Required Tools

For a typical installation the recommended tools and equipment are:

1. BARRACUDA® Installation & Maintenance manual
2. Application and/or traffic control plan (as required)
3. Traffic control equipment (as required)
4. BARRACUDA components
5. Transport truck
6. Water truck w/pump* (if water ballast is required)
7. 3-3/4" open-end, box-end or socket wrench
8. Generator (power for optional accessories)
9. Forklift (optional)

* A pump with 950-1135 liter/min. [250-300 GPM] output and a 75 mm [3"] dia. x 15-30 m [50-100'] long hose with a shut-off control has been shown to be efficient. Time to fill one barrier is approximately 30 seconds.

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Deployment and Retrieval

1. A flat bed truck with a low bed is ideal for transporting BARRACUDA® sections. Load the sections onto the transport truck and stack and position them for the greatest shipping density. Secure the load before transport.

Note:

Empty sections may be stacked up to three high.

CAUTION: Do not stack sections filled with water.

WARNING!

Do not use stacked sections in any type of traffic application. Stacking the sections is advisable only for storage and transportation.

2. Begin deployment at the upstream traffic end of the site and work downstream. Work from the non-traffic side of the installation whenever possible. Unload the sections taking care not to damage them. Unloading proceeds much faster if one person remains on the truck and two people work on the ground. If site conditions permit, a fourth person can drive the truck so that sections can be unloaded continuously as the installation is progressing.
3. Align the sections according to the specified configuration and layout in the traffic control plan.

CAUTION: The existence of any cross slopes in excess of 5% (3 deg.) or curbs may create a vaulting effect on the impacting vehicle.

BARRACUDA Barricade sections are not symmetrical. Pay attention to the location of the drain plug. Usually the drain plug should be oriented on the side opposite traffic.

Bring the sections together and insert an ABS plastic connecting pin into the overlapping end knuckles at each joint.

Insert the ABS pin so that the metal cross pin is on top. The metal cross pin acts as a grip so that the ABS pin can be removed easily.

WARNING!

Each joint must be connected with the supplied ABS plastic pin or improper impact performance will result.

Reflectors or reflective sheeting may be attached to the sections as called for in the traffic control plan.

4. Water Ballast (optional)
In some applications, it may be desirable to fill the BARRACUDA units with water. BARRACUDA does not require water ballast to meet FHWA Performance Criteria.
- 4A. If ballast is desired, fill each section with water for the amount of ballast desired.

It is desirable in colder climates that the water not freeze, and in consideration of local restrictions or regulations, add antifreeze as necessary.

Since filling the sections typically takes longer than deployment, it is convenient to have a water truck available as soon as deployment begins. The water truck can follow immediately behind the deployment crew to minimize time in the work zone. Filling proceeds more quickly if one worker drives the water truck and another moves the fill hose from section to section.
- 4B. Screw the caps into fill holes. Use a wrench if necessary but do not overtighten the caps.
- 4C. Check the installation to ensure that all sections are properly aligned and connected with a pin.

Retrieval

1. Begin retrieval at the down stream traffic end of the site and proceed upstream. Begin the retrieval procedure by removing the water ballast. If site conditions permit, the drain plug may be unscrewed to allow the water to drain.

Note: The time it takes to drain a barrier section is approximately 4-1/2 minutes.

CAUTION: Water on the traveled roadway may create a slippery surface for vehicles. Proper traffic control should be deployed.

If the water may not be drained at the site, then the water may either be siphoned out or the section can be unpinned and moved by forklift to another work area or a site where it may be drained or stored.

2. Once the water is removed, the pins may be removed and the sections separated.
3. Reinstall the drain plugs.
4. Remove the empty sections onto the transport truck in the reverse order as they were deployed. Secure the load before transporting.

Storing

Store the BARRACUDA® sections completely empty of water with the drain plug and fill cap installed.

Note:

Empty sections may be stacked up to three high.

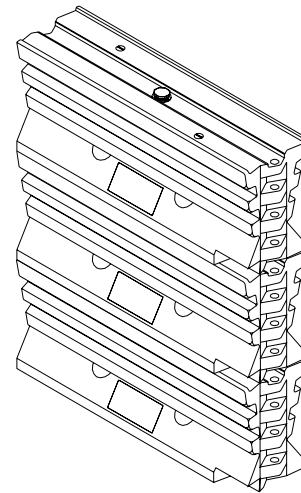


Figure 2b

Stacked BARRACUDAS for Storing and Transporting

Other Considerations

Certain conditions may affect the performance of the BARRACUDA Barricade. Since every job site is unique the designer needs to consider the following:

Curves

The ends of each section are constructed with knuckles that interlock with those of other segments. The end knuckles are vertically aligned to accept ABS plastic connecting pin. The sections can swivel at the pin for easy positioning. The sections can be positioned with an inside radius as small as 11.3 m [37'] (Figure 3).

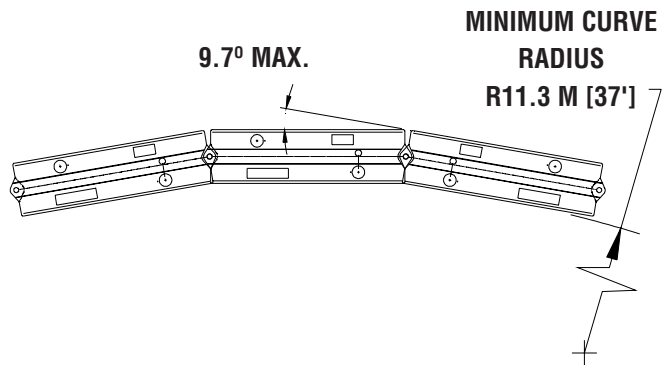


Figure 3

Slopes

Cross slopes

The BARRACUDA Barricade may be placed on cross slopes up to 5% (3 deg.) (Figure 4).

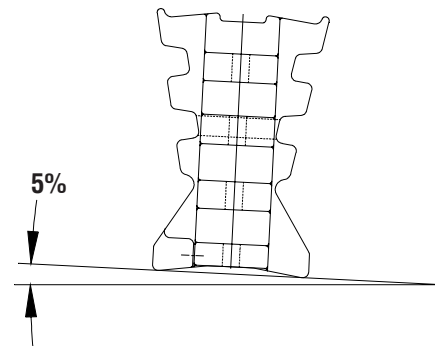


Figure 4

Longitudinal slopes

The BARRACUDA Barricade may be placed on longitudinal slopes up to 5% (3 deg.) (Figure 5).

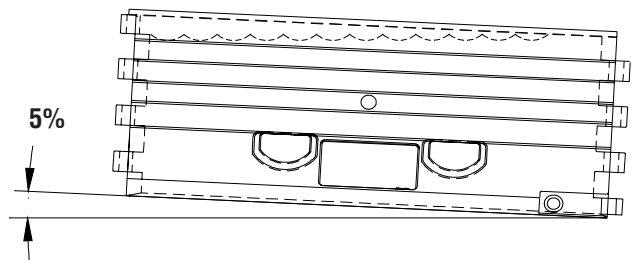


Figure 5

Hills

The BARRACUDA Barricade has the ability to conform to a hill up to 20:1. Please note the maximum longitudinal slope in Figure 5.

Ditch

The BARRACUDA Barricade has the ability to conform to a ditch up to 20:1. Please note the maximum longitudinal slope in Figure 5.

Curbs

BARRACUDA Barricade should **NOT** be placed directly against curbs that can prevent its lateral movement.

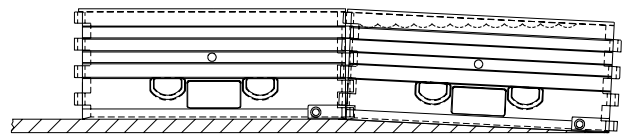


Figure 6

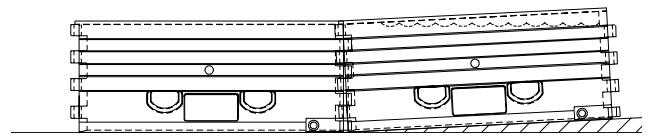


Figure 7

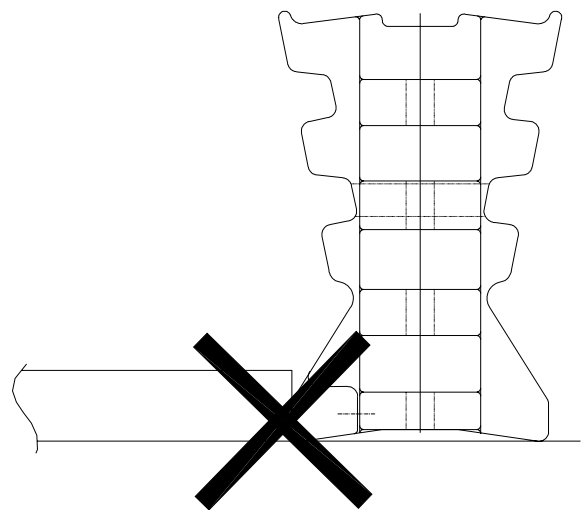


Figure 8

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Other Considerations (cont'd.)

Environmental Considerations

STORING EMPTY BARRACUDA BARRICADE SECTIONS WHEN FREEZING IS EXPECTED

To maintain BARRACUDA Barricade's portability, it is best not to let water enter the system and freeze. Possible solutions are to cover the sections with a waterproof tarp, leave the drain plugs partially open to allow drainage, store the sections upside down, or secure the fill cap on the sections.

USING BARRACUDA BARRICADE WHEN FREEZING IS EXPECTED

If the BARRACUDA is to be used in freezing conditions, it is best to keep the sections empty. However, if it is desired to ballast the sections with water, then the use of anti-freeze is recommended.

Available Antifreezes

* SALT (Sodium Chloride) - 20% solution by weight protects to 0 deg. F. Low cost. Corrosive. Needs to be pre-mixed and large spills may be harmful to vegetation.

* CALCIUM CHLORIDE - 35% solution by weight protects to -20 deg F. Medium cost. Corrosive to zinc. Large spills may be harmful to vegetation and spills may be slick. A significant amount of heat is generated during mixing which may require mixing before placing in the barrier.

* ETHYLENE GLYCOL - 50% solution by volume protects to -20 deg. F. Medium to high cost. Large spills should be considered dangerous due to potential for environmental harm. Spills may also be slick.

* PROPYLENE GLYCOL - 50% solution by volume protects to -20 deg. F. High cost. Large spills may be harmful to vegetation and spills may be slick.

* LIQUID CMA (calcium magnesium acetate) - 25% solution by volume protects to 0 deg. F. Very high cost. Considered environmentally safe and nontoxic.

* LIQUID POTASSIUM ACETATE - 60% solution by volume protects to -20 deg. F. Extremely high cost. Considered environmentally safe and nontoxic.

Notes:

1. The water/antifreeze mixture should be returned to the water truck and recycled for environmental reasons and cost of antifreeze.

2. For those mixtures that may be slick, the solution should be washed away with large amounts of water and the area should be sanded to prevent skidding if large spill would occur.

3. Regardless of which antifreeze is chosen, the user should check with local ordinances relative to environmental issues.

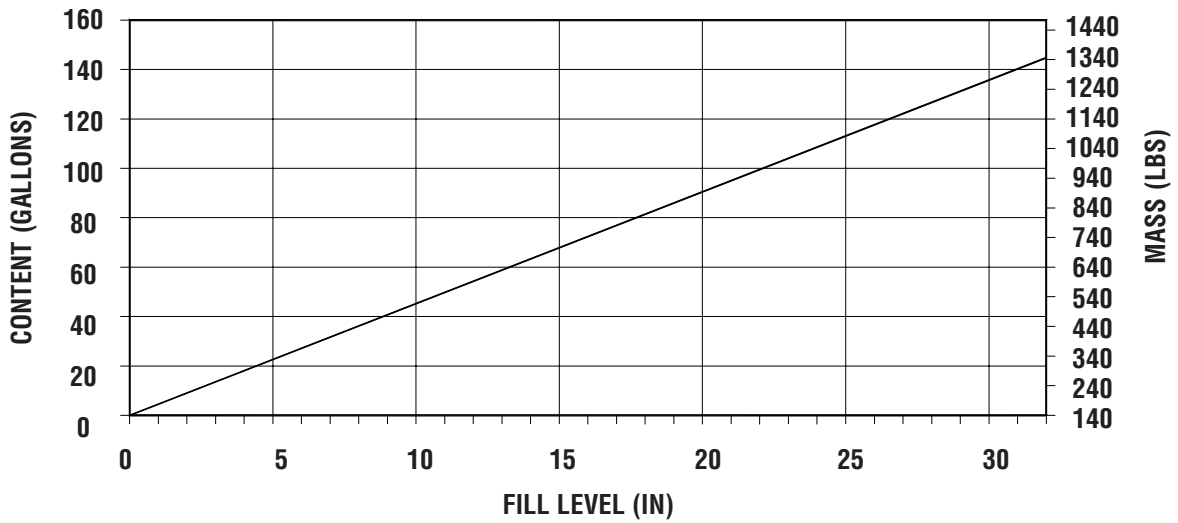
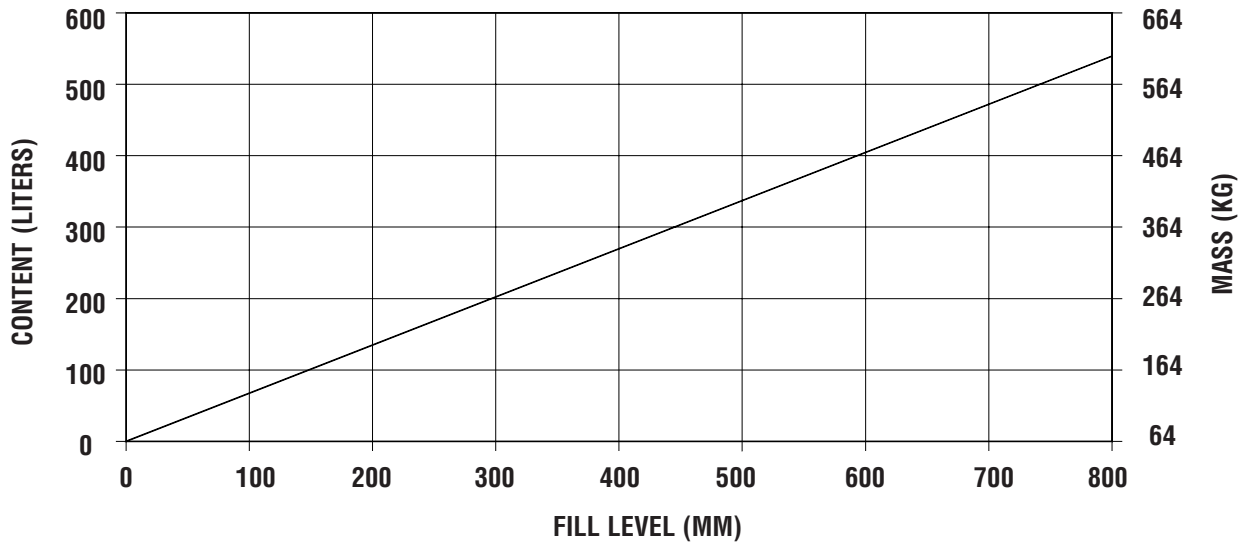


Figure 11
BARRACUDA® fill capacity chart

Note:
 Chart is shown for purpose of moving partially filled barrier sections.

BARRACUDA®

Performance Characteristics

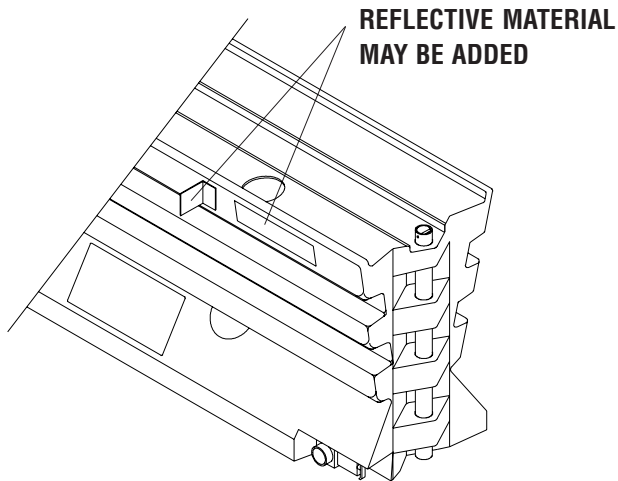


Figure 12
Reflective Material Placement

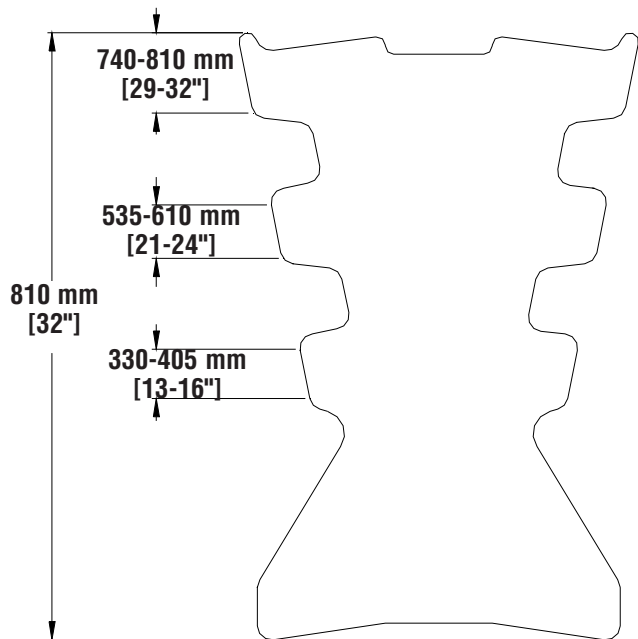


Figure 13
BARRACUDA BARRICADE RIB HEIGHT ABOVE GRADE

Conformance

BARRACUDA Barricade has been tested to and conforms with the current guidelines used by the Federal Highway Administration (FHWA) as recommended in:

National Cooperative Highway Research Program Report 350 (NCHRP 350), Recommended Procedures for the Safety Performance Evaluation of Highway Features" U.S. Department of Transportation. National Academy of Sciences, 1993.

Design, selection, and placement of BARRACUDA Barricade and optional accessories should conform to applicable guidelines in:

U.S. Department of Transportation. Federal Highway Administration. "Manual on Uniform Traffic Control Devices" Washington, D.C.: U.S. Government Printing Office, 1988.

American Association of State Highway and Transportation Officials. "Roadside Design Guide" Washington, D.C.: AASHTO, 1996.

Federal, state, and local criteria governing BARRACUDA Barricade conformance may vary. Consult local FHWA and State Department of Transportation representatives.

Maintenance and Repair

To Remove Pin

1. Simply grasp the metal cross pin with your finger(s) and lift the pin out of the hole.

Proper maintenance of BARRACUDA is essential to assure maximum performance. Take the time to review the product limitations, installation cautions, and maintenance instructions before performing the necessary work. Do not attempt to install any sections without the proper plans for the installation.

The time interval between maintenance inspections depends a great deal upon particular site conditions. Frequent inspections are recommended until a longer inspection interval becomes justified.

Visual Drive-By Inspection

A slow drive-by visual inspection of BARRACUDA is often all that is required. Some special inspection considerations are:

1. Are the sections ballasted (optional)? If water ballast is desired in a particular installation, then perform an inspection to check that the desired amount of water is in each section. Check for leaks. Fill or drain each section as desired.
2. Are the sections properly aligned? The installation must be aligned according to the plans for the site. Misaligned sections in the middle of an installation may be an indication that the barrier has been hit and potentially damaged. If any sections are misaligned, carry out a walk-up inspection.
3. Are the BARRACUDA sections installed in an area that does not require positive protection? The Barracuda is NOT designed to stop or redirect a vehicle. Never use the Barracuda in a situation where people or equipment must be protected.

Walk-up Inspection

If the drive-by visual inspection indicates maintenance is required, then a walk-up inspection is necessary. Some of the most common maintenance concerns and corresponding repair techniques are:

Damaged Sections

Generally, sections are usable if they are properly connected to other sections. Occasionally, sections may become damaged from impact or puncture and must be replaced. Sections with minor damage or leaks may often be repaired using sealants or plastic welding methods. (See BARRACUDA Patching.) Empty the water from the sections immediately surrounding the damaged section(s). Remove the pins holding the damaged section(s) and slide the section(s) sideways until enough gap opens up in the installation for removal. New sections are replaced by reversing this process. Take care to work in a direction away from traffic and to properly line up the installation when replacement is complete (see Misaligned Sections).

Misaligned Sections

Sections may occasionally become misaligned due to impact or nuisance hits. Generally 600-900 mm [2 to 3'] of lateral misalignment is easily corrected by simply pushing the sections back into alignment. If the sections are empty, they can usually be pushed manually; if they are full, they can be nudged into position with a vehicle, pry bar, or forklift, being sure to use the forklift ports. Care must be taken to avoid damaging the sections with the forklift forks.

BARRACUDA® Patching Preparation:

The area to be patched must be completely dry and free of dirt and grease. Additionally, a film coats the barrier and should be removed by either lightly sanding the pieces or burning it off with a small butane torch. Do not damage the plastic by overheating. A few quick passes are sufficient.

BARRACUDA®

Maintenance and Repair (cont'd.)

Options:

Plastic Welding

The most reliable means of patching can be accomplished with plastic welding and can range from "stick" welding to automatic preparation and feed. The temperature, as measured 6 mm [1/4"] away from the welding torch should be at 290 deg. C [550 deg. F.] for the BARRACUDA material. Welding speed for ideal, straight line welds can range from 100 mm - 150 mm [4" to 6"] per minute with stick welding to 600 mm [24"] per minute with an automatic gun. A plastic welding equipment supplier can offer additional information.

Spin Weld Plugs

Spin Weld plugs give excellent results for patching small holes and leaks in the BARRACUDA. Individuals who will be performing the repairs should read the instructions and practice a few times before attempting to perform a repair. Practicing the Spin Weld process is important as this gives the individual a feel for the techniques required to perform a proper weld.

Items necessary for repair:

- Drill Motor with 7 mm drill bit
 - 25,000 rpm Router
 - Spin Weld tool
 - Spin Weld plugs
 - Rasp
1. Drill 7 mm hole at point of leak.
 2. Secure the Spin Weld tool into Router.
 3. Place a Spin Weld plug onto the Spin Weld tool.
 4. Place plug and router squarely over the hole to be plugged.
 5. Turn on the router, holding it firmly with light downward pressure. Watch for indications of melting plastic flowing around the plug. Turn off the router, holding it steady until the plastic solidifies.
 6. Inspect plug to insure that it has bonded to the barrier.
 7. Rasp plugged area smooth to finish repair.

Hot Glue Gun

Relatively good success in patching the BARRACUDA® can be accomplished with a standard hot glue gun using general purpose adhesive. This type of patching will deteriorate over an extended period of exposure to the sun, etc. The best results will be obtained by using patience and large amounts of glue.

Field Patching

Initial preparation as outlined above should be accomplished whenever feasible. No materials are available that adhere properly when applied to a wet barrier. Butyl caulking (gray, sticky pads or rolls) works fairly well to fill gaps for temporary patching.

Both fiberglass resin or epoxy can be used to fill and plug leaks. Epoxy's liquid consistency makes it more difficult to keep in any hole during its cure, but is effective if this shortfall can be overcome. Fiberglass resin and sheeting/cloth can be used on larger areas. The exterior of the mat must be completely covered with resin. Otherwise, any exposed fibers will quickly act like wicks and the patch will fail. The resin or epoxy will require a curing time before the barrier may be refilled with water.

Any repaired barriers should be marked for easy identification. It is recommended to periodically check the repairs for leaks.

Glossary

Appurtenance-Apparatus or equipment related to vehicular transportation. (E)

Barricade-A device that provides a visual indicator of a hazardous location or the desired path a motorist should take. It is not intended to contain or redirect an errant vehicle. (A)

Barrier-A device that provides a physical limitation through which a vehicle would not normally pass. It is intended to contain or redirect an errant vehicle. (A)

Bidirectional-A traffic direction in relation to the hazard which is one direction on one side of the hazard and the opposite direction on the other side. (E)

Capacity-The ability of an appurtenance to absorb the kinetic energy of an impacting vehicle in a safe and controlled manner. (E)

Channelizing Device-A device used to warn and alert drivers of hazards created by work activities in or near the traveled way and to guide and direct drivers safely past the hazards. It is not intended to contain or redirect an errant vehicle. (T)

Clearance-Lateral distance from edge of traveled way to a roadside object or feature. (A)

Clear Zone-The total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a nonrecoverable slope, and/or a clear run-out area. The desired width is dependent upon the traffic volumes and speeds, and on the roadside geometry. (A/N)

Construction Zone-A highway area under construction or refurbishment with traffic concerns. (E)

Crash Tests-Vehicular impact tests by which the structural and safety performance of roadside barriers and other appurtenances may be determined. Three evaluation criteria are considered, namely (1) structural adequacy, (2) occupant risk, and (3) vehicle trajectory. (A)

Crashworthy-A feature that has been proven acceptable for use under specified conditions either through crash testing or in-service performance. (A)

Critical Impact Point (CIP) - That point along a device with the greatest potential for snagging or pocketing an impacting vehicle. (E)

Design Speed-The speed selected and used for correlation of the physical features of a highway that influence vehicle operation. It is the maximum safe speed that can be maintained over a specified section of highway when conditions are so favorable that the design features of the highway govern. (A)

End Treatment-The designed modification of a roadside or median barrier at the end. (A)

Flare-The variable offset distance of a barrier to move it further from the traveled way. (A)

Gating Device (Feature) - A device designed to allow controlled penetration of a vehicle when impacted upstream of the beginning of the length of need (LON). Note that some distance is present between the end of a gating device and the beginning of the LON of the device. (N)

Gawk Screen-A device used to shield selected roadside areas from a driver's vision. (E)

Glare Screen-A device used to shield a driver's eye from the headlights of an oncoming vehicle. (A)

Hazard-Something dangerous and obstructive in the median, roadway, or roadside. (E)

Impact Angle-For a longitudinal barrier, it is the angle between a tangent to the face of the barrier and a tangent to the vehicle's path at impact. (A)

Lateral Deflection-The distance an appurtenance is deflected sideways from its original position. (E)

Length of Need (LON) - Total length of a longitudinal barrier needed to shield an area of concern. (A)

Longitudinal Barrier-A barrier whose primary function is to prevent penetration and to safely redirect an errant vehicle away from a roadside or median hazard. (A)

Median-The portion of a divided highway separating the traveled ways for traffic in opposite directions. (A)

Glossary (cont'd.)

Median Barrier - A longitudinal barrier used to prevent an errant vehicle from crossing the highway median. (A)

Non-Gating Device - A device with re-directional capabilities along its entire length. Note that the end of a non-gating device is the beginning of the length of need for the device. (N)

Offset - The distance between the traveled way and a roadside barrier or other obstacle. (A)

Penetration - Action of a vehicle passing into or through an appurtenance by overcoming its re-directive resistance. (E)

Performance Level - The degree to which a longitudinal barrier is designed for containment and redirection of different types of vehicles and speeds. (A)

Re-directive - A characteristic of an appurtenance that indicates that the device smoothly controls a vehicle angle impact without pocketing or penetration. (E)

Roadside - That area between the outside shoulder edge and the right-of-way limits. (A)

Roadside Barrier - A longitudinal barrier used to shield roadside obstacles or non-traversable terrain features. It may occasionally be used to protect pedestrians or "bystanders" from vehicle traffic. (A)

Roadway - The portion of a highway, including shoulders, for vehicular use. (A)

Secondary Impact-Vehicle impact(s) subsequent to vehicle loss of contact with an appurtenance. (E)

Shielding-The introduction of a barrier or crash cushion, between the vehicle and an obstacle or area of concern to reduce the severity of impacts of errant vehicles. (A)

Slope-The relative steepness of the terrain expressed as a ratio or percentage. Slopes may be positive (backslopes) or negative (foreslopes), and as parallel or cross slopes in relation to the direction of traffic. (A)

Temporary Barrier-A device used to prevent vehicular access into construction or maintenance work zones and to redirect an impacting vehicle so as to minimize damage to the vehicle and injury to the occupants, while providing worker protection. (A)

Test Level-A set of impact conditions, defined in terms of vehicular type, mass, speed, and angle, that quantifies the performance level of a traffic barrier. (N)

Traffic Barrier-A device used to prevent a vehicle from striking a more severe obstacle or feature located on the roadside or in the median, to prevent crossover median accidents, or to provide worker protection. (A)

Transition-That part of a longitudinal barrier between and connecting sections of differing lateral stiffness. (N)

Traveled Way-That portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes. (A)

Underriding-Abrupt movement of an impacting vehicle down and underneath an appurtenance. (E)

Vaulting-Abrupt movement of an impacting vehicle up and over an appurtenance. (E)

Vehicle-As used herein an automobile used in transporting passengers ranging in weight and styles from 820 to 2000 kg [1800 to 4415 lb.]. (E)

Warrants-The criteria by which the need for a safety treatment or improvement can be determined. (A)

References:

- (A) American Association of State Highway and Transportation Officials. "1989 Roadside Design Guide" Washington D.C.).
- (E) Energy Absorption Systems, Inc., "Safety Needs Analysis Program (SNAP)" Chicago, IL: Energy 1992.
- (N) National Cooperative Highway Research Program Report 350 (NCHRP 350).
- (T) Lewis, R. M., "Work Zone Traffic Control Concepts and Terminology," *Transportation Research Record*, No. 1230, Transportation Research Board, 1989, pp. 1-11.

Limitations and Warnings

The BARRACUDA® has been successfully tested and evaluated per the NCHRP 350 guidelines (NCHRP 350) for Test Level 2 (TL-2) Longitudinal Channelizer Barricade. The selected test matrix impact conditions recommended in this guideline are intended to encompass the majority, but not all, of the possible in-service collisions.

Properly deployed, BARRACUDA® (see Deployment and Retrieval section of this manual) is a crashworthy system designed to slow an impacting vehicle and allow it to gate through the barricade line.

Tests were conducted on an eighteen (18) water-filled section system under the following conditions:

Vehicle Mass:

820 kg [1808 lbs]

Speed:

TL-2 70 km/h [45 mph]

Angle:

20 deg.

Surface Conditions:

Clean, dry asphalt with less than 5% cross slope.

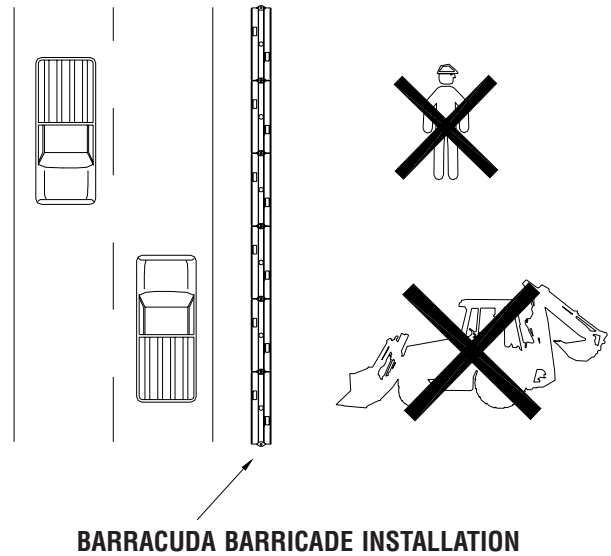


Figure 14

WARNING!

The BARRACUDA does not provide intrusion protection. A vehicle could pass through the device and enter the delineated zone. The BARRACUDA is only intended to provide visual direction, delineation and channelization. DO NOT use the BARRACUDA in applications where people or equipment must be protected, such as highway work zones. Contact Energy Absorption Systems, Inc. or your local dealer for information on protective barrier products.

Notes

Notes

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