

Installation Instructions

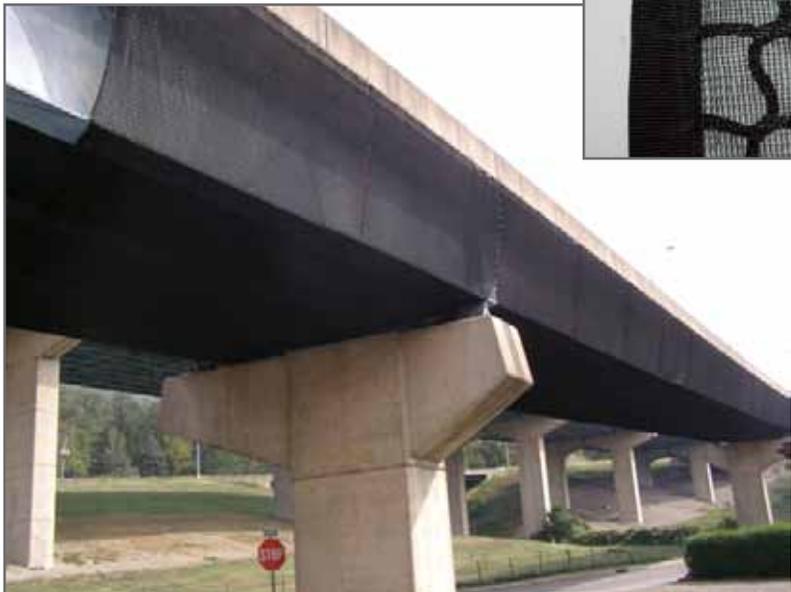
Strong Block Debris Containment System



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Debris
Containment System



INTRODUCTION

DEBRIS CONTAINMENT SYSTEM



The Strong Block Debris Containment System is designed with the highest degree of safety in mind, using the highest grade materials within the industry. The shock-absorbing containment netting is made of high tenacity synthetic mesh designed to meet the most rigorous construction demands.

Strong Block 5K and 10K net panels are fabricated using a two-ply construction method to join a 60 mm structural net underlay to a 9 mm or 3 mm debris net liner. The two net panels are sandwiched and joined together at the border with 75 mm woven High Tenacity Polypropylene webbing and then double-stitched with UV treated and lubricated #138 polyester sewing thread. Stainless steel #2 grommets are installed two foot on-center (one foot on-center as an option) along all sides of the finished panel.

Note: The Strong Block debris containment system is designed for debris only and is not intended for personnel fall protection.

Conditions Requiring Nets

The debris containment system is used on bridges and structures to capture and contain concrete spalling. While primarily designed to safely contain concrete and stone debris, it may also be used as a safety measure to prevent construction material and tools from falling to the surface below, thus preventing injury and property damage.

Each potential debris hazard shall be examined by a competent person¹ capable of determining the conditions for which debris containment is required.

In no event shall the public or employees be allowed beneath unprotected areas. *ANSI A10.37-1996*

Installation Considerations

The impact force from a falling object increases with distance to impact. For this reason a debris net should be installed as close to the debris area as possible to arrest and contain the greatest load.

The largest potential free-fall impact should be calculated when suspending the system at any distance below the working area.

The maximum calculated impact must not exceed the system ratings.

Inspection and Testing - See ANSI[®] A10.37-1996

Debris nets and hardware shall be inspected by a competent person¹ after each installation.

Additional inspections shall be made after alterations, repair, and impact loading. On-the-job impact testing of the nets shall be conducted immediately following initial installation, relocation or major repair.

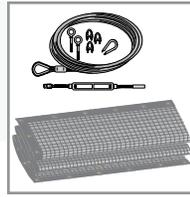
On-the-job system testing is done in accordance to *A10.37-1996*.

Where there is any possibility of personnel falling into debris nets, they shall be installed in accordance with *ANSI A10.11*.

When the user can demonstrate that a drop test is not feasible or practical, the system shall be certified by a competent person¹ to be in compliance with all provisions of the standard. *ANSI A10.37-1996, Section 9.5; ANSI A10.11-1989, Section 10.*

¹ "...capable of identifying existing and predictable hazards in the surroundings or working conditions which are hazardous or dangerous to employees and the public and who has authorization to take prompt corrective measures to eliminate or control them". ANSI[®] A10.37-1996

KIT PARTS LIST COMPONENT IDENTIFICATION



Unpack all support components, cabling, fittings and netting. Check all pieces against the packing slip for description, quantity, and lengths. Check the safety netting for any cuts or tears in the net or rope cording. Contact INCORD if anything is missing, not to length, or if any portion of the netting is damaged. Do not substitute any installation hardware or net material.

Match all components to their placement on the design blueprint. In some instances, custom lengths of netting and cabling must be matched to a specific work area.

Your components may differ in appearance from those pictured on this page. This is for reference and basic identification only.



Read all instructions carefully before installing the Debris Containment System. Keep in mind that safe practices must always be used during installation, testing, inspection, maintenance, and removal.

Kit Components:

1. 10k / 5k Debris Net
2. Snap Hook, quantity per installation
3. Wire Rope Cable with one end terminated
4. Turnbuckle, one or more per cable run
5. Cable Clamp, three per cable end
6. Thimble, one per cable end
7. Eye Bolt Anchors
8. Concrete Adhesive Anchoring Kit



Strong Block systems are custom kits assembled to requirements that have been predetermined by the application.

The support hardware type and quantity may be different than that which is shown here.

Always reference the design blueprint and bill of materials for the components that apply to your system.

Panels are not supplied with hardware unless sold as a kit.



DEBRIS CONTAINMENT SYSTEM INSTALLATION



Installation - General Information

The nets shall be installed below the work area and as close to the underside of the bridge as practical.

The net panels shall be hung with sufficient clearance to prevent contact with any surface below the safety net during full impact load, which is typically twice the shortest dimension of the net.

Mounting anchors for the suspension cables must be secured to a suitable working surface approved in conjunction with the installer and construction engineers and subject to inspection by the site engineer. Crosby or equal rated hardware is recommended.

No substitute of material is acceptable. Any damaged netting, anchors, cabling or fittings must be reported to the work site supervisor immediately.

Anchor Installation

Install cable anchors according to the layout sheets supplied for the job site. A typical system will use 1/2" x 6" Forged Eye Bolts, drilled and anchored into the concrete with epoxy adhesive.



Drilling Caution: Avoid contact with rebar and pre-stressed concrete cabling.

Anchor placement is typically at the four outer corners covering the work area with intermediate anchors placed every 20 feet along the sides of the bridge. A 20' x 20' grid is optimal but this spacing can vary depending on the bridge geometry.

Hanger-Cables should be used to support a suspended wire cable grid at all intersecting points and for cable runs of greater than 30 to 40 feet. An installed wire cable system should not sag more than two feet between two support points.

Cable Installation

Install turnbuckles at one end of each cable run. Longer runs may require two turnbuckles chained together eye to jaw end.

Install the 3/8" wire rope suspension cable through the anchors of each cable run. Pull hand taught, and then secure each cable end with a thimble and three wire rope clips. Trim excess cable.

Install hanger-cables at intersections and run the carrier cable through the thimble. This helps support the weight of the cable while being tensioned.

Tension the cables by adjusting the turnbuckles for minimal sag in the cable. (Two foot maximum deflection with nets attached). Do not over-tighten as the strength of the cable will be reduced.

Netting Installation

Install the net panels according to the site engineers design plan. Be sure that the net panels are oriented with the debris liner facing the impact side.

A "Long Side" tag will be attached to the side with the longest dimension for easier installation.

The net panel is attached to the suspension cable at one foot intervals (each grommet) using 80 mm snap hooks. Attach the 4 corners of each net first then go back and fill in the remaining hooks.



Note: The debris liner must be installed face up toward the bridge/hazard with the large mesh support net on the outside.



Cable Anchor

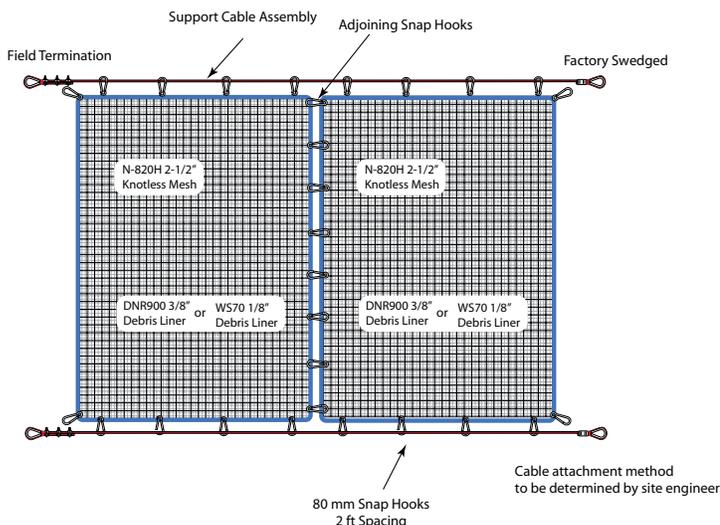
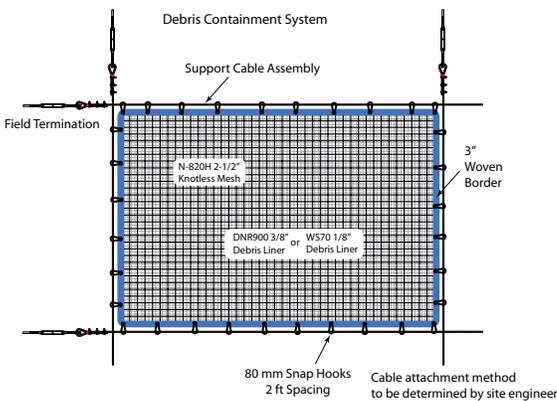
DEBRIS CONTAINMENT SYSTEM INSTALLATION



A **suspended containment system** is comprised of a network of flexible mesh net panels suspended below the work area from a system of cables and anchors. Wire rope suspension cables are run from side-to-side and periodically along the length of the bridge forming a checkerboard type grid.

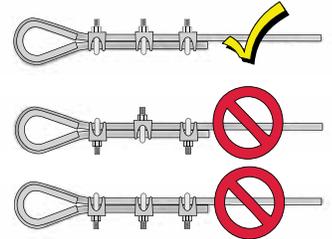
Cables are attached at each side and ends in a variety of ways specific to local conditions and are tensioned using turnbuckles. "Hanger-cables" attached to the bridge and then to the intersection of the cable grid are often used to help support the wire grid to limit the sag of the containment system. Snap hooks are used to attach the net panels to the cables.

A **taut containment system** is essentially a wrap of the work area like a skin, tight to the surface. A system of this type would only use two cable runs, one on each side of the net, typically anchored in four places.

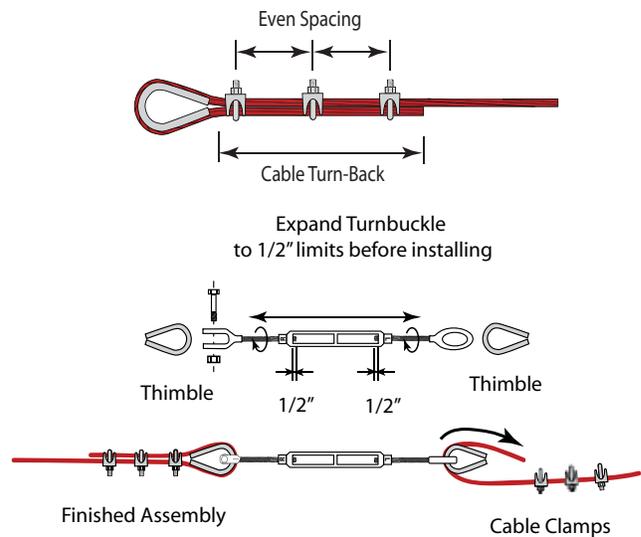


Cable End Preparation

Note: A properly prepared cable end with thimble uses three cable clamps evenly spaced with the first clamp securing the thimble. Install clamps as shown in the illustration.



Cable Clamp Assembly and Torque Specifications			
Clamp Size (in)	Clamps	Cable Turn-Back (in)	Torque (ft-lb)
3/8	3	6-1/2	30



Side suspended debris system

DEBRIS CONTAINMENT SYSTEM INSPECTION



Inspection

Debris nets and hardware must be inspected by a competent person¹ after installation and not less than once each month thereafter. Additional inspections must be made after alterations, repair or following any significant impact loading. Inspection must include all netting, cables, carabiners and anchors. Debris should be removed as it is found.

If any welding or cutting operations occur above the safety net, weld protection must be provided for that area, and more frequent inspections should be conducted in proportion to the level of dangers involved.

Nets or hardware that show deterioration from mildew, wear, tears or stress, that may affect their strength, must be immediately removed from service for further inspection, repair or disposal.

It is recommended that an up-to-date, on the job record be maintained for each debris net system. The record should include inspection dates and notes for each system installation, removal, repairs and component replacements.

Inspection Check List

√ Inspection must include all netting, panel connecting hardware, anchor hardware and suspension cabling.

√ Nets or hardware that show deterioration from mildew, wear, or stress that may affect their strength, must be immediately removed from service for further inspection, repair or disposal.

√ Nets must be checked for debris on a scheduled basis, and all debris must be removed.

It is recommended that an up-to-date, on the job record be maintained for each debris net system. The record should include the following:

- | | |
|---------------------|--------------------------|
| (1) Net ID number | (4) Repairs |
| (2) Date installed | (5) Date removed |
| (3) Dates inspected | (6) Disposition & reason |

Debris Removal

During system inspections or as debris is found, it should be removed to reduce loading on the system. Gaining access inside the net is to unhook only the sides necessary for removal of the debris.

Replace or repair any damaged net panels following debris removal.

System Removal

Remove the net panels from all suspension cables, and then release cables. If anchors are removed, fill all holes with suitable sealant. Do not reuse cables or anchors.

Factors Affecting Net Life

Sun. Ropes of synthetic fibers can lose significant amount of strength after prolonged exposure to direct sunlight. All nets not in use should be protected from direct and indirect sunlight.

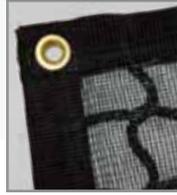
Abrasion. The adverse effects of abrasion should be kept in mind. Nets should not be dragged or allowed to chafe over the ground or other rough surfaces.

Sand. Embedded sand cuts into fibers, reducing the strength of the net. Care should be taken to keep nets as clean and free of sand as possible.

Rust. Prolonged contact with rusting iron or steel can cause abrasive degradation and loss of strength.

Airborne Contaminants. Many chemicals and airborne contaminants can adversely affect the strength of nets. Where such hazards to nets exist, the chemicals should be identified and the concentrations measured. The effect on the net materials should be determined by test, if not already known.

DEBRIS CONTAINMENT SYSTEM COMPONENT SPECIFICATIONS



Kit Hardware as supplied by InCord

1/2" x 6" Eye Bolt Anchor

Construction Drop Forge Hot Galvanized Steel
 Working Load 2200 lb (1000 kg)
 Net Weight..... 63.0 lb/100 pieces (28.6 kg/100 pieces)
 Specifications ASME B30.26



3/8" Wire Rope Suspension Cable

Construction 7x19 Galvanized Steel Wire
 Working Load 7000 lb (3180 kg)
 Net Weight..... 24.3 lb/100 ft (36.2 kg/100 m)
 Specification Federal Specification RR-W-410E



1/2" Turnbuckle, Jaw/Eye

Construction Forged Carbon Steel, Hot Galvanized Finish
 Working Load 2200 lb (1000 kg)
 Net Weight..... 1.68 lb (0.76 kg)
 Specification FF-T791b, Type 1, Form 1 - Class 8, and ASTM F-1145



3/8" Malleable Wire Rope Clip (3 per assembly)

Construction Malleable Iron Saddle, Steel U-Bolt, Zinc Plate
 Net Weight..... 21.0 lb/100 pieces (9.5 kg/100 pieces)
 Specification..... FF-C-450 TYPE 1 CLASS 1



3/8" Wire Rope Thimble

Construction Zinc Plated Rolled Steel
 Net Weight..... 6.2 lb/100 pieces (2.8 kg/100 pieces)



Snap Hook, 80 mm

Construction Zinc Plated Steel
 Working Load 500 lb (230 kg)
 Net Weight..... 3.18 lb/100 pieces (7.0 kg/100 pieces)

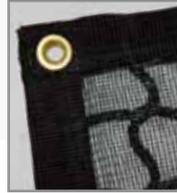


Concrete Adhesive Anchoing Kit

Type..... Two component epoxy
 Strength..... ASTM D695: 10,300 psi minimum



DEBRIS CONTAINMENT SYSTEM INSTALLATION INSTRUCTIONS



Debris
Containment System

Netting as supplied by Strong Man

N-820H Raschel Knotless Netting – Strong Block Structural

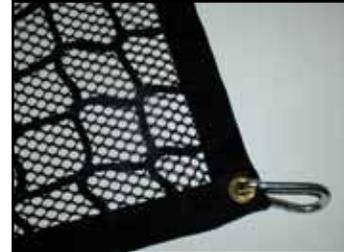
Underlay	
Fiber	High Tenacity Polypropylene (HTPP)
Cord Diameter	3/16 inch (5 mm)
Mesh Size	2-1/2 inch (60 mm) square opening
Mesh Break	719 lbf (3.2 kN)
10K Design Load.....	10,000 lb (44.5 kN)
5K Design Load.....	5,000 lb (22.2 kN)
Weight	12 oz/yd ² (408 g/m ²)
Melting Point.....	320°F (160°C)
UV.....	300 kLy, UV Stabilizers added
Color	Black, Gray, Sand

DNR900 Debris Netting – Liner

Fiber	Knit Polyester
Mesh Size.....	3/8 inch (9 mm) square opening
Burst Strength.....	170 psi (ASTM 5120)
Color	Black, Gray, Sand

WS70 Debris Netting – Liner

Fiber	Polyethylene
Mesh Size.....	1/8 inch (3 mm) square opening
Air Permeability.....	Exceeds 1470 CFM / sq ft ²
Burst Strength.....	197.76 lbf (ASTM D 3787-01)
Color	Black



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