Recommended Construction and Installation Instructions for the Composite Panel Reduction Device with a Square Mesh Panel

The Composite Panel Bycatch Reduction Device (BRD) with a Square Mesh Panel (SMP) is a highly effective BRD that has been shown to reduce total bycatch by at least 49.9 percent by weight with only one percent shrimp loss. This certified BRD requires two components – the Composite Panel BRD extension and the SMP in the codend (See Figures A and B).

The Composite Panel BRD is a funnel type apparatus that is fitted in the net immediately behind the Turtle Excluder Device (TED). The "funnel" consists of two composite panels installed in the lower part of the BRD extension. Each composite panel is constructed by combining two overlapping pieces of netting, which are a diamond mesh interior piece and a square mesh exterior piece. The square mesh exterior piece provides support to the funnel structure. The properly installed funnel creates areas of slow water flow within the trawl, allowing bycatch to swim out through two triangular escape openings that are cut into the BRD extension on each side of the trawl (four total openings). See Figure C on the following page for a photo of this Composite Panel BRD.

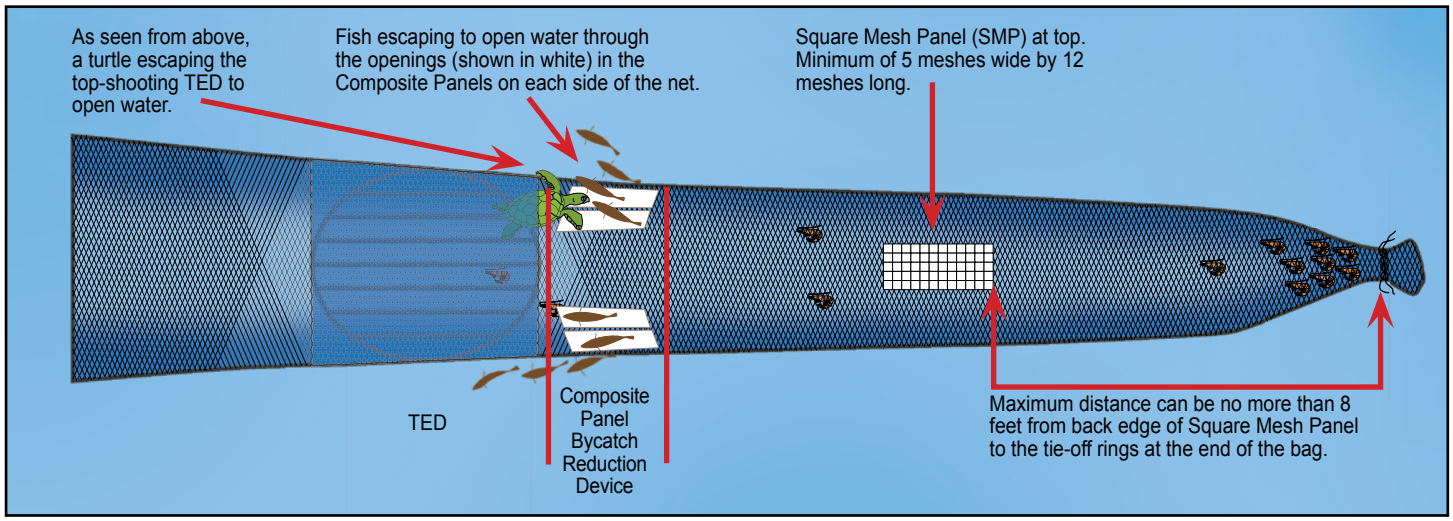

Figure A. As shown from above, a shrimp trawl illustrating a top-shooting TED, followed by the Composite Panel Bycatch Reduction Device (with openings on each side of the trawl), a Square Mesh Panel (SMP) at the top of the trawl and the codend.

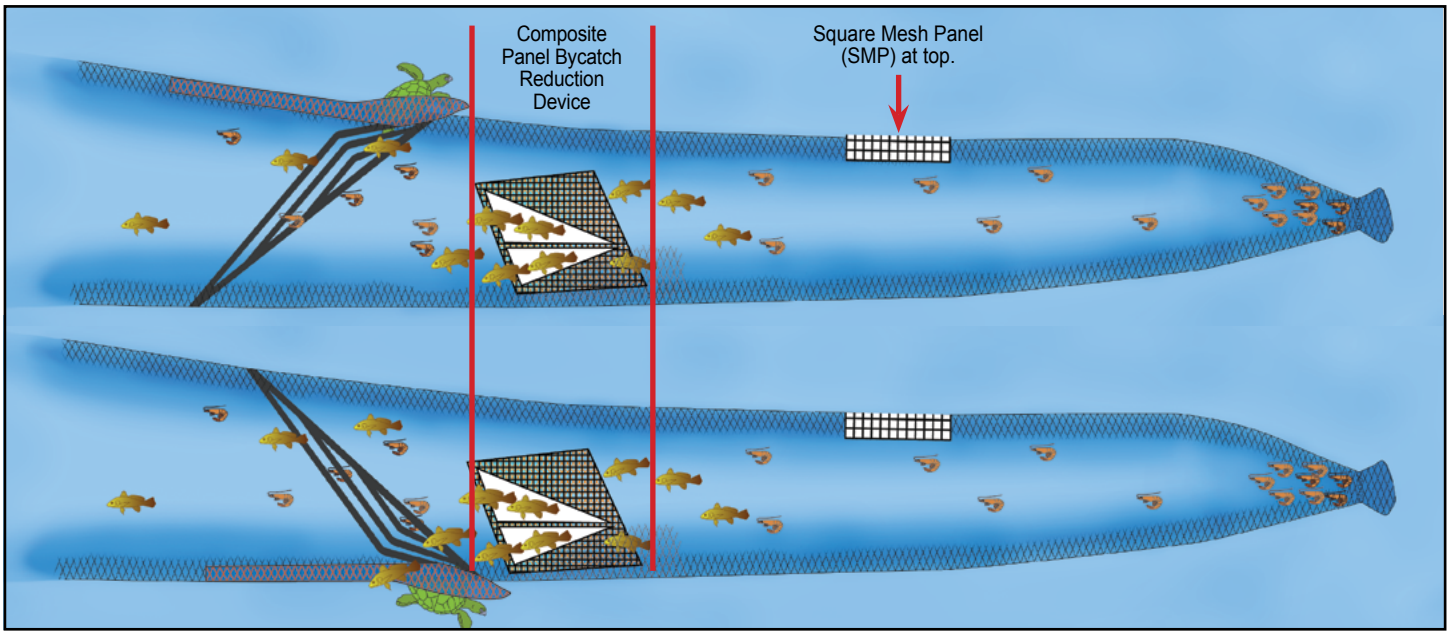

Figure B. Side illustration of a top shooting TED and a bottom shooting TED with properly installed Composite Panel Bycatch Reduction Devices fitting in the trawl behind the TED. Futher down the trawl is a Square Mesh Panel attached into the top of the trawl.

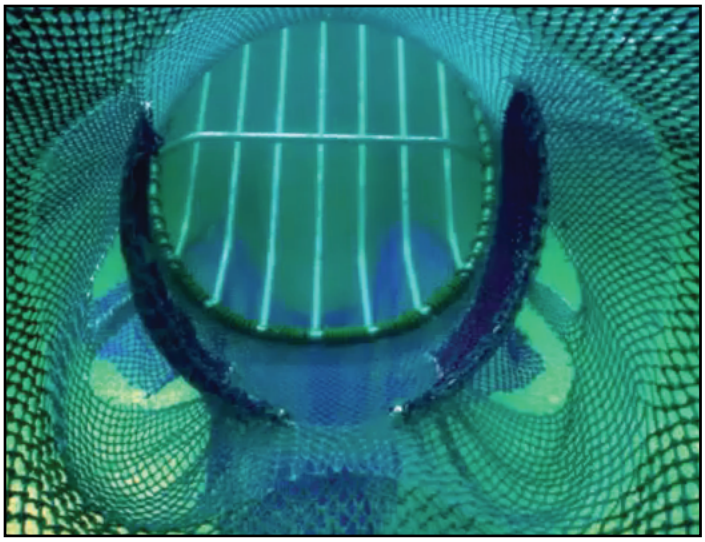

Figure C. Photo of a trawl under tow showing the TED with the Composite Panel Bycatch Reduction Device in operation. The composite panel is the darker netting in the middle and is composed of the overlapping square mesh and diamond mesh. This combination remains taunt when water flows through the netting. The triangluar holes of the escape openings can be seen on each side.

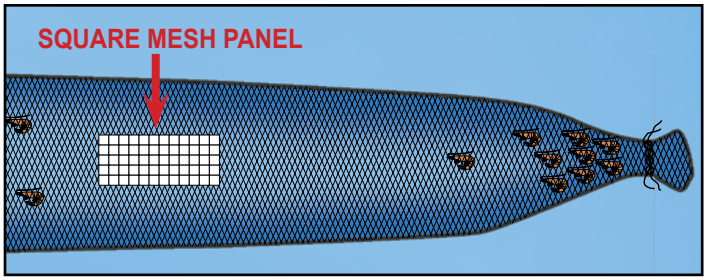

Figure D. The Square Mesh Panel (SMP) shown from above.

The Square Mesh Panel (SMP) (See Figure D) is a panel of large square mesh netting placed further down the trawl in the top of the codend. It provides additional bycatch escape openings. The SMP opening is a rectangular hole cut in the top center of the codend diamond mesh netting. It is designed to remain open under tow, whereas the diamond mesh of the codend does not.

When used together, these modifications make up one of the BRD configurations that are certified for use in the federal waters of the southeastern U.S. shrimp fishery.

Construction and Installation Instructions

Step 1: Construction of the BRD Extension:

To build the BRD extension, a single piece of 1-1/2" to 1-3/4" (3.8cm to 4.5cm) netting 24.5 meshes by 149.5 meshes is needed. Note: This will be joined at the short sides, forming a cylindrical BRD extension in the final steps. (See Figure E)

Step 2: Construction of the Escape Openings:

First, orient the BRD extension netting so that the left corner of the leading edge starts on a whole mesh. Then, count 39.5 meshes along the leading edge of the netting. Start the first escape opening of the set by making a 9-mesh cut on an even row of meshes 1.5 meshes inward of the leading edge of the BRD extension netting. Next, turn 90 degrees and cut 15 points on an even row toward the trailing edge of the BRD extension netting. At this point, turn and cut 18 bars forward and to the left. Finish the escape opening by cutting 6 points toward the original starting point.

The second opening of the set is a mirror image of the first opening with 5 meshes of space between the openings. From the top right corner of the second opening, count 25 whole meshes to the right parallel to the leading edge of the BRD extension netting and repeat the previous steps to create the second set of escape openings. Double selvedge to re-enforce opening.

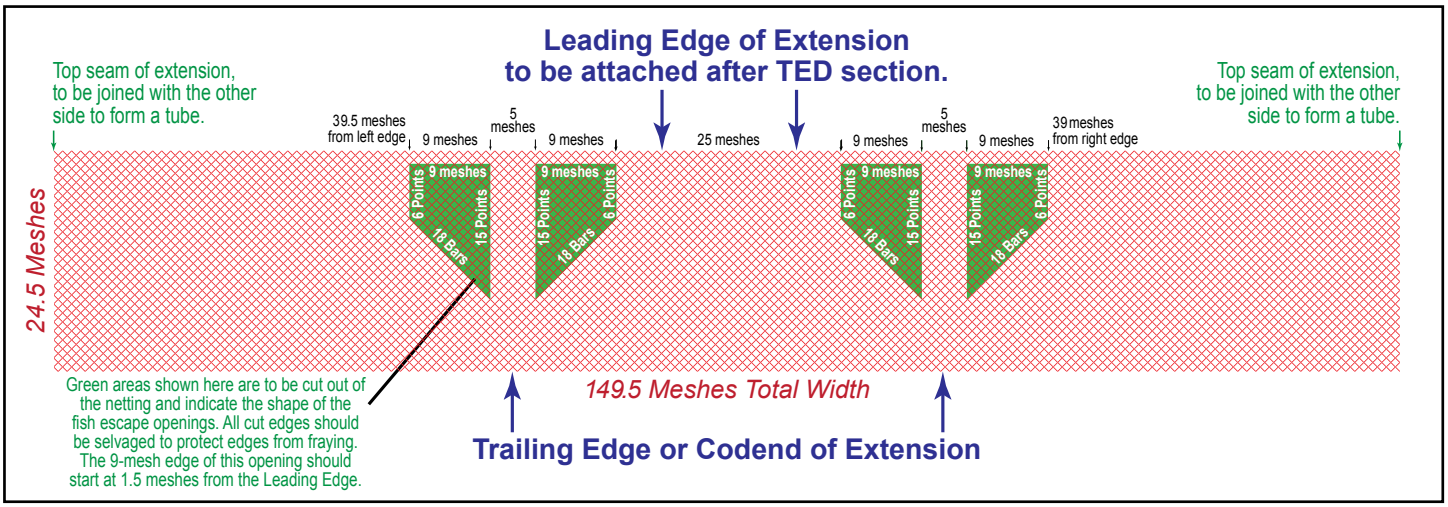

Figure E. Measurements for constuction of the BRD Extension.

Step 3: Construction of the Composite Panels:

The interior layer is constructed from a rectangular piece of 1-5/8-inch (41 mm) heat-set and depth-stretched polyethylene Diamond Mesh (DM) netting 36 meshes on the leading edge by 20 meshes deep. (See detailed illustration in Figure F) The second supportive structural layer is a piece of 2-inch (51 mm) square mesh (SM) netting (1 inch bar) 18 squares on the leading edge and 32 squares down each side. The requirements for the square mesh piece do not specify a particular netting material, but knotless is recommended to prevent slippage. If using knotless, burn the cut ends.

Attach the 18 square mesh side along the 36-mesh diamond with two diamond meshes per square. This will be the leading edge. Next, attach the 32-square mesh evenly along the first row of meshes on the 20-mesh diamond netting. Place the panel flat and check that the trailing edges align. If too long, cut the square mesh (usual suspect) on the trailing edge and burn the cut ends. Attach the trailing edge with the same procedure as the leading edge and attach other 32/20 side so the panel is completely sewn. Construct a second panel using the same method.

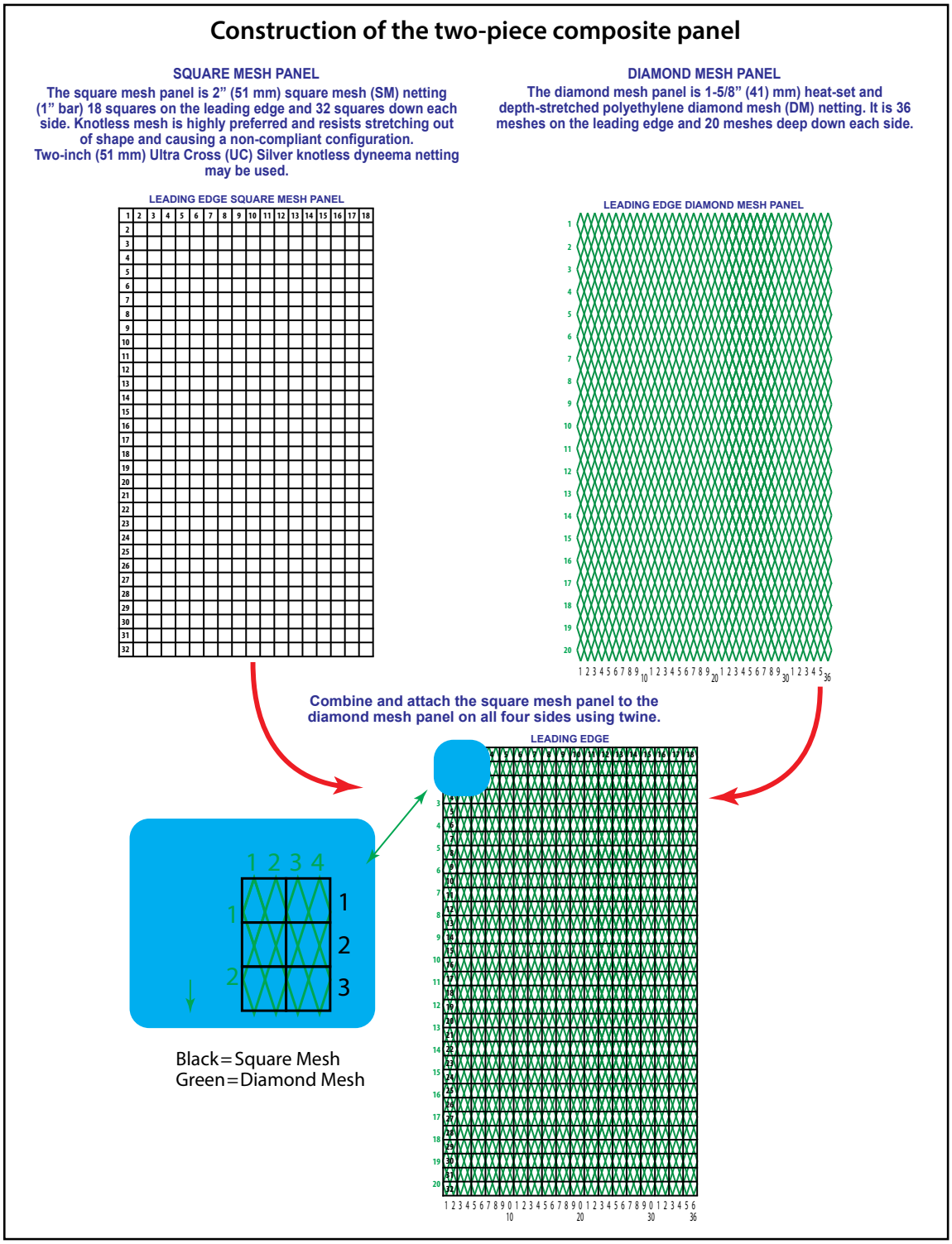

Figure F. Detailed illustration for constuction of the two-piece Composite Panel

Step 4: Attaching Composite Panels into the BRD Extension:

The two composite panels are attached inside the BRD extension. (See Figure G) One composite panel covers each set of BRD extension openings. The composite panel will be oriented so that the square mesh layer is facing the BRD extension netting and escape openings. For each set of escape openings, the 36-mesh leading edge of the composite panel diamond mesh is sewn evenly across the leading edge of the escape openings and netting brace (24 meshes). Alternately, sew 2 meshes of the panel DM to 1 mesh of the BRD extension netting, then 1 mesh of the panel DM to 1 mesh of the BRD extension netting.

From the inside corners of the escape openings, the 20 mesh sides of the panel DMs are attached to the BRD extension netting on a 2 bar, 1 point angling toward the back center of the BRD extension forming a V-shape in the center of the BRD extension netting. The interior trailing corners will have 5 meshes between them once both panels are installed. The opposite 20 mesh side of the panel DMs are then attached to the BRD extension on the bars angling back and away from the escape openings. Note: BRD Extension will be slightly bunched once the panels are fully attached.

Step 5: Sew Sides Together to make Cylinder:

The 24.5-point sides of the BRD extension are joined to form a tube of extension netting. The seam will be located at the top of the BRD extension. If nylon is used in the construction of the BRD, a net treatment (dip) should be applied before use.

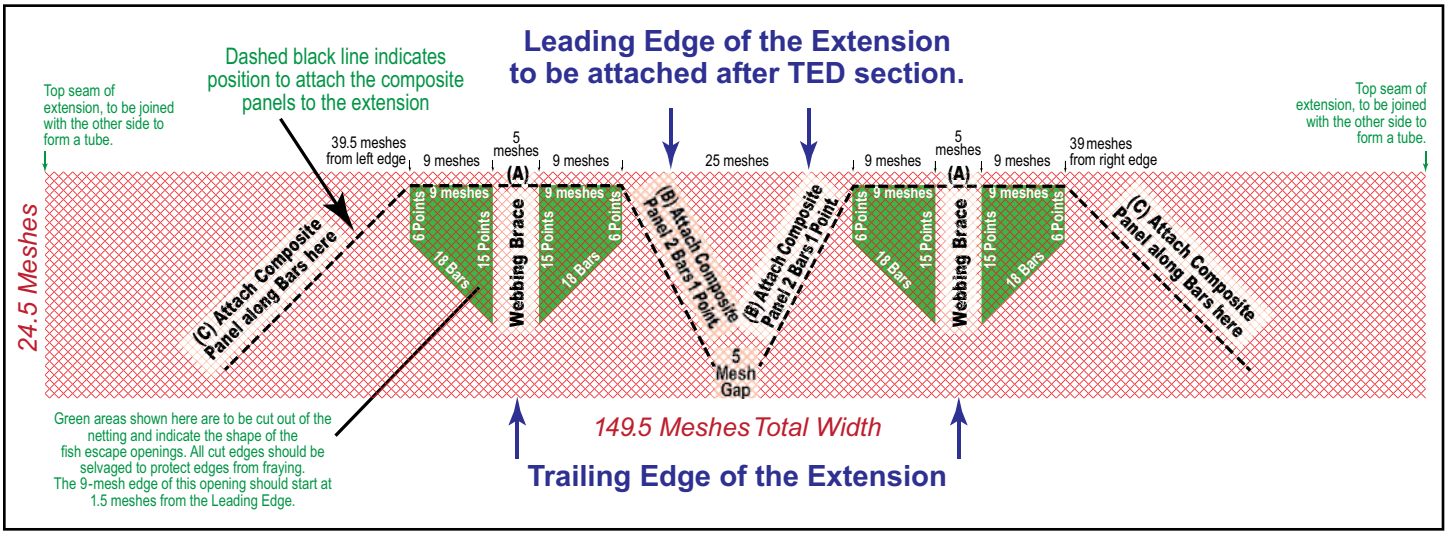

Figure G. Where to attach Composite Panel to the BRD Extension

Step 6: Connect to TED Extension:

The BRD extension connects to the TED extension no more than four meshes from the posterior edge of the TED grid (bottom or top shooting). If TED extension is longer than four meshes, the excess netting should be removed on an even row of meshes. The seam of the BRD extension is oriented to the top of the trawl so the composite panels always rest on the bottom of the net (See Figure B for correct placement).

Construction and Installation Instructions for the Square Mesh Panel

(See Figure H) The SMP is a single piece of square mesh with a minimum dimension of 5 squares width and 12 squares length with minimum 3-inch (76-mm) stretched mesh (1.5-inch bar). The SMP is installed in the top of the codend no more than 8 feet from the tie-off rings. Maximum twine diameter is #96 twine (4mm). Selvedge the panel edge before attaching.

The width of the escape opening cut must be 4 codend meshes per square of the SMP, so 20 cut meshes for a 5-mesh wide SMP (minimum). The stretched mesh length of the opening must equal the total length of the SMP so that it will stay open during a tow. Attach the SMP to the cut opening evenly around the perimeter using heavy twine.

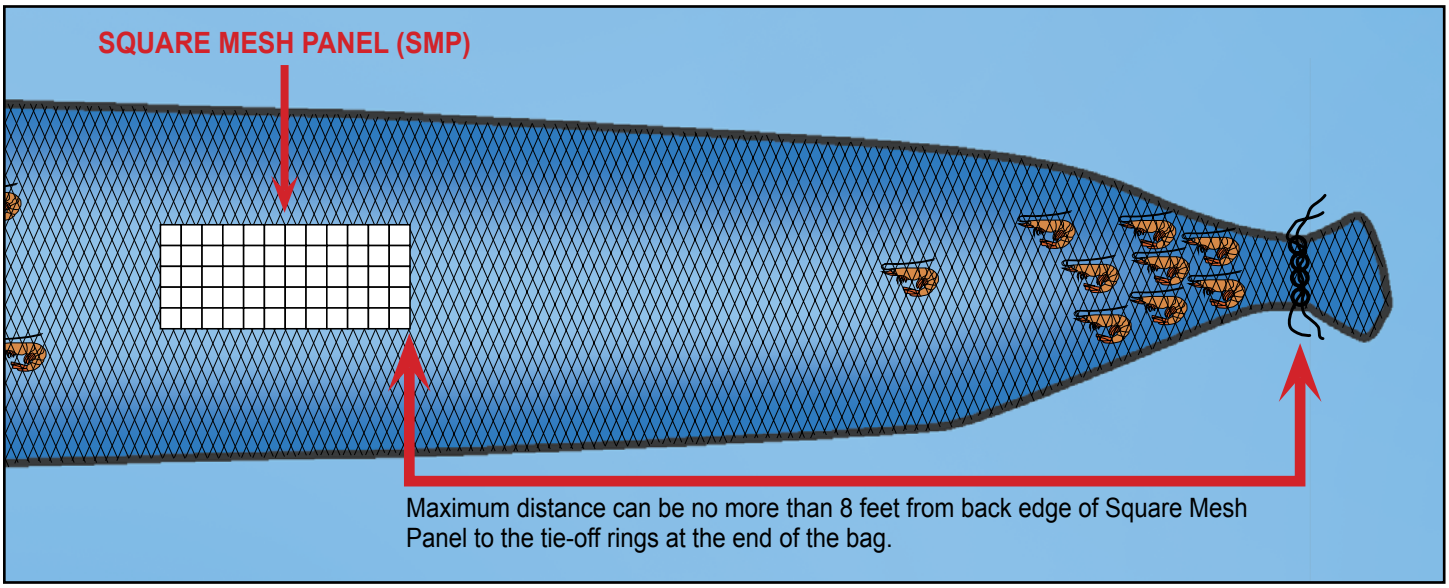

Figure H. The Square Mesh Panel is installed in the top of the trawl no more than eight feet from the tie-off rings.

Terms

Mesh = Squares along the run of twine. (Each "square" of the net or netting is called a mesh.)
Bars = One of four sides of a mesh. (Each side of the "square" in the net, all are usually the same length.)
Point = One of four corners of a mesh
Trailing Edge = The side of a netting panel that faces aft toward the codend or trawl bag.
Leading Edge = The side of the netting panel that will be facing forward, toward the mouth of the trawl.
Selvage = Finished edge that is prevented from fraying or unraveling.
TED Extension = The part of the net that contains the Turtle Excluder Device.
BRD Extension = The part of the net that contains the Bycatch Reduction Device.
DM = Diamond Mesh
SMP = Square Mesh Panel

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