Department of Primary Industries
and Regional Development

Fact Sheet: Inshore & offshore prawn trawl – Authorised modifications to trawl gear

July 2024

Introduction

Department of Primary Industries and Regional Development (DPIRD) research demonstrates that minor modifications to trawl gears have the potential for substantial benefits including improving catches of target species, while reducing bycatch, drag (and therefore fuel use) and habitat impacts, culminating in fewer overall environmental impacts.

Opportunity is available to voluntarily use these and other modifications, some of which are already lawful, and others authorised by a section 37 order. A copy of the section 37 order may be found on the DPIRD website.

The opportunity to modify and trial new net configurations and Bycatch Reduction Devices (BRDs) is part of an ongoing collaborative approach between DPIRD and industry in anticipation of an upcoming process to review and modernise all trawl gear requirements in NSW.

In response to netting material shrinkage and availability issues, DPIRD has approved additional BRDs for use to relieve fishers the cost and inconvenience of urgently replacing the affected BRDs and to accommodate available materials.

Authorised modifications and potential benefits (all waters)

Note: The modifications authorised by the section 37 order are identified with "*".

Otter boards: Smaller or more hydrodynamic otter boards may be used to reduce drag/fuel use. Note that changes to otter-board size and design may affect catches of prawns.

SAFE (simple anterior fish excluder): A SAFE may be used. A SAFE is a narrow banner of PVC type material attached between the otter boards. Trials demonstrated that fitting a SAFE can reduce the bycatch of fish.

Sweeps: Shorter sweeps to reduce the bycatch of finfish may be used. Shorter sweeps can also increase wing-end spread.

Ground chain: Less or smaller-gauge chain may be used to reduce drag/fuel use.

***Soft-brush ground gear (dangler chains):** Multiple short lengths of chain, up to 10 links each, may be attached directly to the footrope, including by the centre link of the chain such that both ends of the chain hang free (called 'soft-brush ground gear'). If soft-brush ground gear is used, the net must not also be fitted with other chain.

***Gauge of chain:** In response to issues with the availability of chain, ground chain and soft-brush ground gear may be constructed of chain with links of material up to 13 mm in diameter (instead of 12 mm), noting that less or smaller-gauge chain will reduce drag/fuel use.

***Spreading mechanism (beam):** A beam or frame between two sleds may be used to spread one or more of the nets (or try net) if:

a. the sleds are no greater than 150 mm wide at the base (shoe); and

b. the head line and footrope are attached to the beam or frame no more than 1 m apart.

Net hanging ratio: Alternate hanging ratios may be used to change the lateral opening of the meshes in the net to enhance selectivity.

Quad rig: Four trawls of any head line length may be used at any one time subject to the total head line length of all trawls combined not exceeding the maximum head line length of 55 m. Trials show that triple- and quad-rigs had the greatest spread ratios, lowest drag and least fuel consumption. The triple rig could represent the most suitable configuration from an environmental perspective given smaller and fewer otter boards and reduced bottom contact, but a quad rig also has efficiency benefits.

***Larger-mesh (trawl body):** Mesh not exceeding 100mm may be used throughout the body of the net (including the belly, wings, and extension piece).

Wing heights: Reduced wing heights may be used to reduce drag and fuel use. Lower wing heights can also reduce the length of the trawl, which has also been shown to reduce bycatch.

***Square-shaped mesh to wings and side panels:** The mesh of the wings and side panels of a net may be constructed of mesh not less than 38 mm if the mesh is hung on the bar so that the meshes are square-shaped. Research shows that square-shaped mesh wings and side panels reduce the bycatch of small prawns.

Net taper: Steeper net tapers may be applied to reduce drag (fuel use) and bycatch.

***Larger-mesh (codends):** Codends may be constructed of larger mesh, up to 60 mm in the case of a diamond-mesh codend and up to 50 mm in the case of a square-mesh codend.

***Strengthening ropes:** Strengthening ropes may be fixed to a net to help a BRD and the meshes of the BRD retain their shape, but only if the strengthening ropes are orientated vertically in the net and not around the net.

***Modified big-eye BRD:** The big-eye BRD may be fitted with rigid material or a frame to keep the escape gap open instead of fitting floats to the rear panel and chain to the front panel.

***Novel BRDs:** Any other novel fisher-designed BRD, such as a fish-eye BRD, may be used (to enhance bycatch reduction) if:

a. the device includes an opening or escape hole that is not less than 300 mm wide (with a single support, rigid or soft, for strength if needed); and

b. the posterior most part of the device is positioned not more than 1.5 m forward of the codend drawstring.

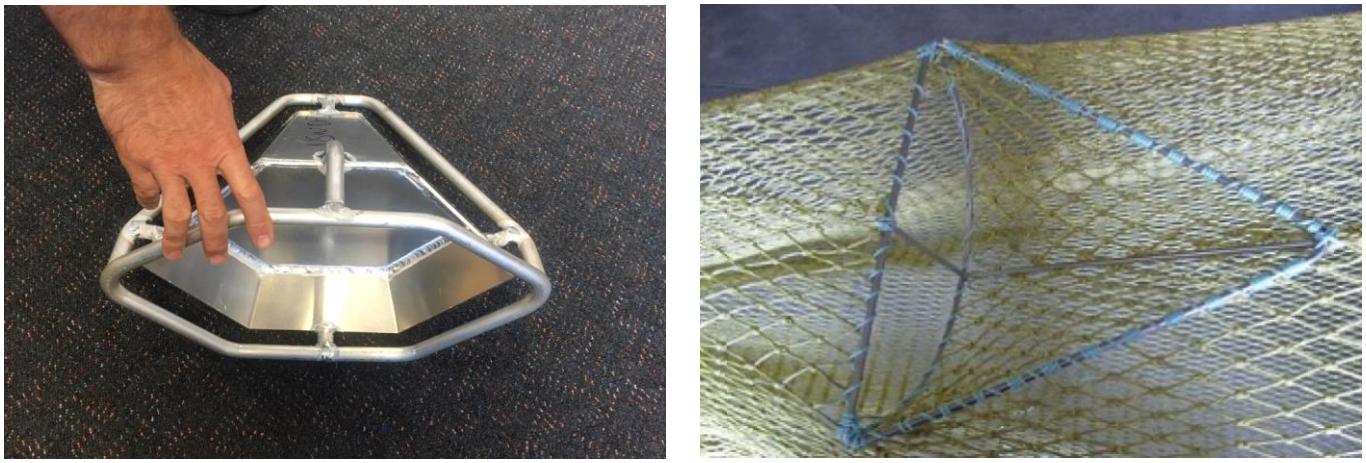


Figure 1: The fish-eye BRD is an example of a novel BRD that may be used, with a single rigid support if needed (right)

***Large-mesh panel BRD:** A panel of square-shaped mesh constructed of any type of material (hard or soft) may be used if:

a. the panel is not less than 350 mm wide and 500 mm in length;

b. the posterior most part of the panel being positioned not more than 1.5 m forward of the codend drawstring;

c. if the panel comprises soft netting material;

   i. the mesh must be not less than 85 mm;

   ii. the mesh must be hung on the bar so that it is square shaped;

   iii. the twine diameter of the netting must be not more than 5 mm; and

   iv. the panel must be sewn into the net using the bating rates (top and bottom only) for the mesh sizes set out in Table 1;

Bating rate	Mesh size
At least 4 points to each bar on the panel	85-125 mm
At least 6 points to each bar on the panel	>125 mm

Table 1: Bating rates.

d. if the panel comprises rigid mesh material:

   i. the mesh is not less than 50 mm in size (inside mesh measurement) from one bar to the opposite bar in both directions; and

   ii. the diameter of the bars of the rigid mesh panel most not be more than 5 mm; and

e. if a rigid frame is applied to the outside of the BRD the rigid frame must be not less than 350 mm wide and 500 mm high along the inside edge of the rigid frame.

The main difference between the large-mesh panel BRD and the approved ocean square-mesh panel BRD is that the large-mesh panel BRD must be constructed of larger-size mesh and the overall size of the panel may be slightly smaller.

Authorised modifications for targeting school prawns only

The following modifications are authorised for use only when targeting school prawn and only when operating in waters within 2 nautical miles of the natural coastline. Providing for their use aims to cater for those that target school prawns in the Estuary Prawn Trawl fishery and from time to time inshore ocean waters.

***Smaller mesh in the body and wings (diamond-shaped mesh):** The mesh of the body of the net (including belly, wings, and extension piece) may be constructed of 34 to 40 mm diamond-shaped mesh if steep side tapers are applied and wing depths are reduced as follows:

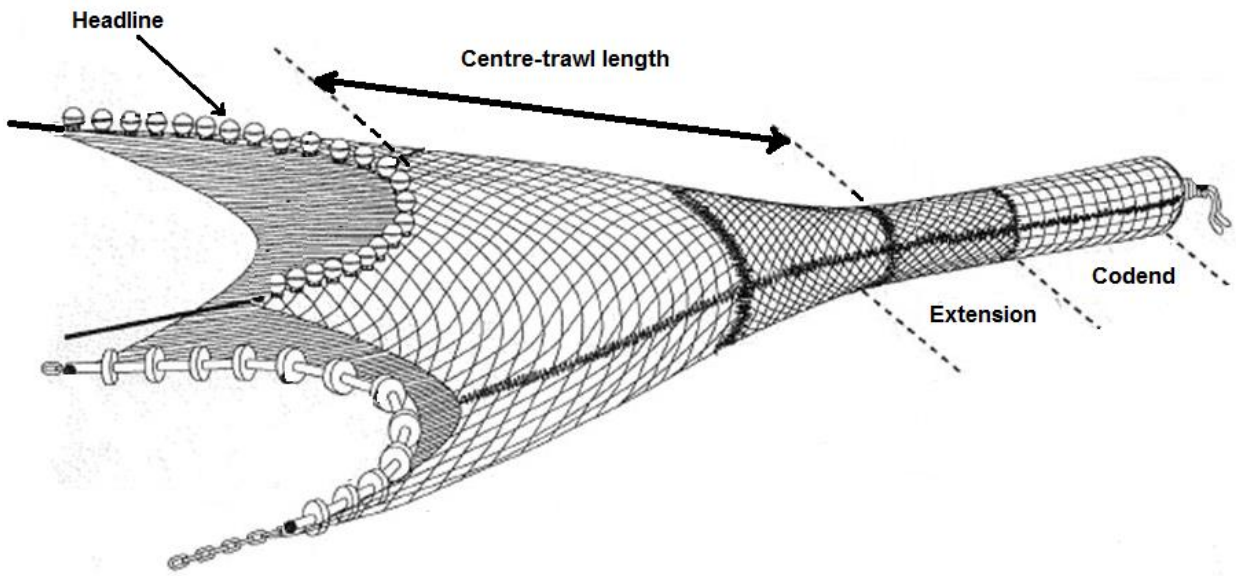
a. the depth of the wings must not exceed 3.0 m measured in a straight line from the inside edge of the top knot (along the top seam) to the inside edge of the bottom knot (at the bottom seam) along any single line (or row) of meshes when stretched; and

b. the ratio of centre-trawl length to head line length must not exceed the ratio specified in column 1 of Table 2 below when using the net configuration opposite in column 2.

Colum 1: Maximum ratio	Column 2: Net configuration
0.60	Single gear (1 net)
0.60	Double or dual gear (2 nets)
0.75	Triple gear (3 nets)
0.90	Quad gear (4 nets)

Table 2: ratio of centre-trawl length to head line length

Example for single gear (1 net) subject to a maximum ratio of 0.60: if the head line length is 10 m, the centre trawl length (from the head line to the end of the tapered part of the net) must not be greater than 6 m.



Note: An extension piece (if fitted) will be a straight section of netting (i.e., not tapered).

Research shows that 40-mm diamond-shaped mesh in the wings and body of a net is larger than appropriate for the sizes of school prawns targeted in some waters. Using an appropriate mesh size will facilitate adopting other modifications such as steeper side tapers and reduced wing heights that can improve efficiency and minimise environmental impacts.

*Square-shaped mesh to wings and side panels: The mesh of the wings and side panels of a net may be constructed of 34 to 40 mm mesh hung on the bar so that the meshes are square-shaped. If square-shaped mesh is applied to the wings or side panel of a net, the requirements above relating to wing depths do not apply. Research shows that square-shaped mesh wings and side panels reduce bycatch of small prawns.

Authorised BRDs in response to material shrinkage and availability issues

The following three variations of the approved ocean square-mesh panel BRD are now authorised for use by holders of an inshore prawn endorsement or an offshore prawn endorsement:[1]

Shrinkage affected ocean square-mesh panel BRD

The BRD in **Attachment A** has been approved in response to the high number of ocean square-mesh panel BRDs in use that have a surrounding panel known to be subject to extraordinary shrinkage and sediment induced increased twine diameters (Figure 2). It is approved on a temporary basis to relieve fishers the cost and inconvenience of urgently replacing these BRDs.

Fishers making new BRDs should not make them to the specifications in Attachment A – you are encouraged to use one of the other BRDs approved for use in the Ocean Trawl Fishery.

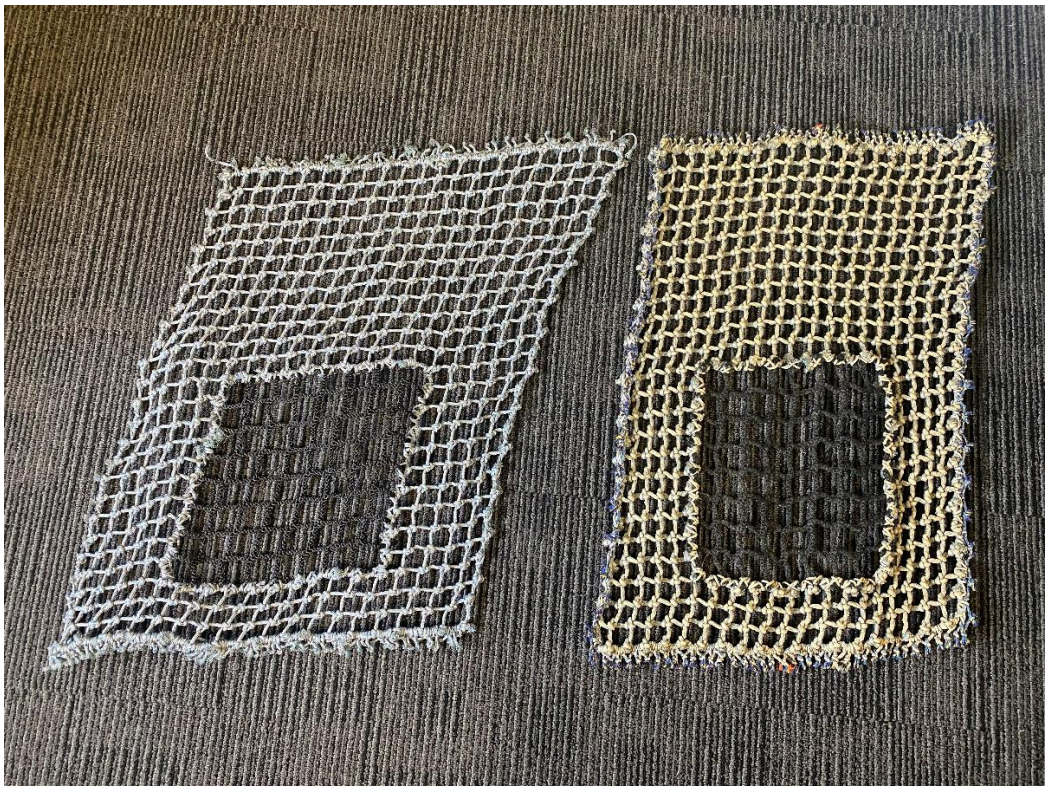


Figure 2: New Ocean square-mesh panel BRD (left) and another ~6 months old affected by extraordinary shrinkage (right).

Smaller-mesh ocean square-mesh panel BRD

The BRD in Attachment B has been approved for use in response to material availability issues. The main differences between this BRD and the approved ocean square-mesh panel BRD are:

a. smaller size mesh (minimum 42 mm instead of 45 mm) to the surrounding panel due to material availability issues, and

b. a centre panel that is greater in surface area (minimum 30 cm wide instead of 25 cm) to offset the smaller-size mesh to the surrounding panel.

[1] Holders of a deepwater prawn trawl endorsement are also authorised to use these BRDs.

Rigid-mesh ocean square-mesh panel BRD

The BRD in Attachment C has been approved for use in response to material availability issues and interest in rigid mesh, including stainless steel mesh, to avoid shrinkage issues.

The section 37 order specifies minimum bar lengths instead of mesh sizes and caters for available rigid materials including stainless steel mesh manufactured and advertised as 50 x 50 mm and 25 x 25 mm stainless mesh.

All minimum bar lengths specified in Attachment C are inside mesh measurements, from the inside of one plain bar to the inside of the opposite plain bar.

More information

Management and section 37 order

Commercial Fisheries Management hotline 1300 726 488

Research and gear construction

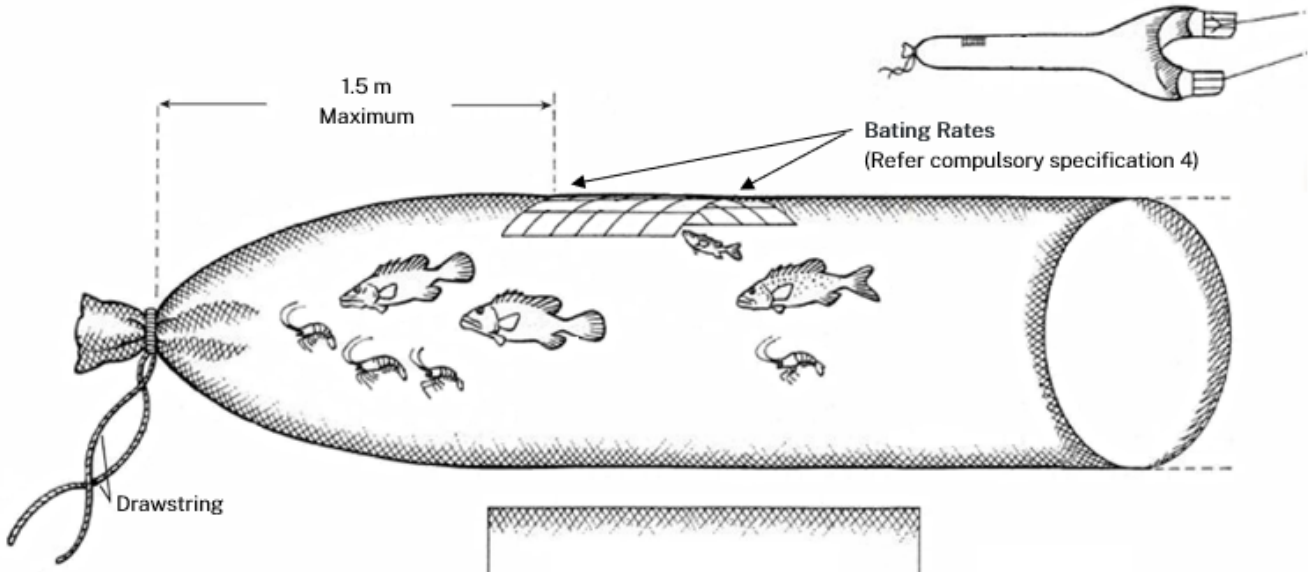
Matt Broadhurst, Senior Principal Research Scientist (02) 6656 8905 or 0408 110 448

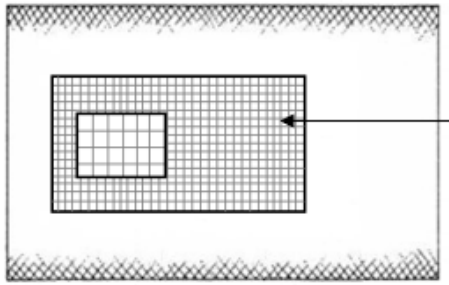
Attachment A

NSW Ocean Trawl Fishery

Shrinkage affected Ocean Square-Mesh Panel Bycatch Reduction Device (BRD)

(for use in NSW Ocean Waters)





Compulsory specifications:

1) Maximum distance from drawstring 1.5m (stretched when not in use)

2) **Panel A (surrounding panel):**
   a. Minimum 30 mm mesh hung on the bar (i.e., hung square)
   b. Minimum 45 cm wide and 70 cm long
   c. Maximum diameter twine of 6 mm

3) **Panel B (centre panel):**
   a. Minimum 55 mm mesh hung on the bar (i.e., hung square)
   b. Minimum 25 cm wide and 30 cm long
   c. Maximum diameter twine of 5 mm
   d. Maximum 1.6m forward of codend drawstring and inserted into Panel A

4) **Bating Rates** (top and bottom of Panel A only)
   a. If square-mesh panel 30-60 mm mesh - at least 2 points to each bar on the panel
   b. If >60-75 mm mesh - at least 3 points to each bar on the panel
   c. If >75 mm - at least 4 points to each bar on the panel

Purpose of approval (for information only):

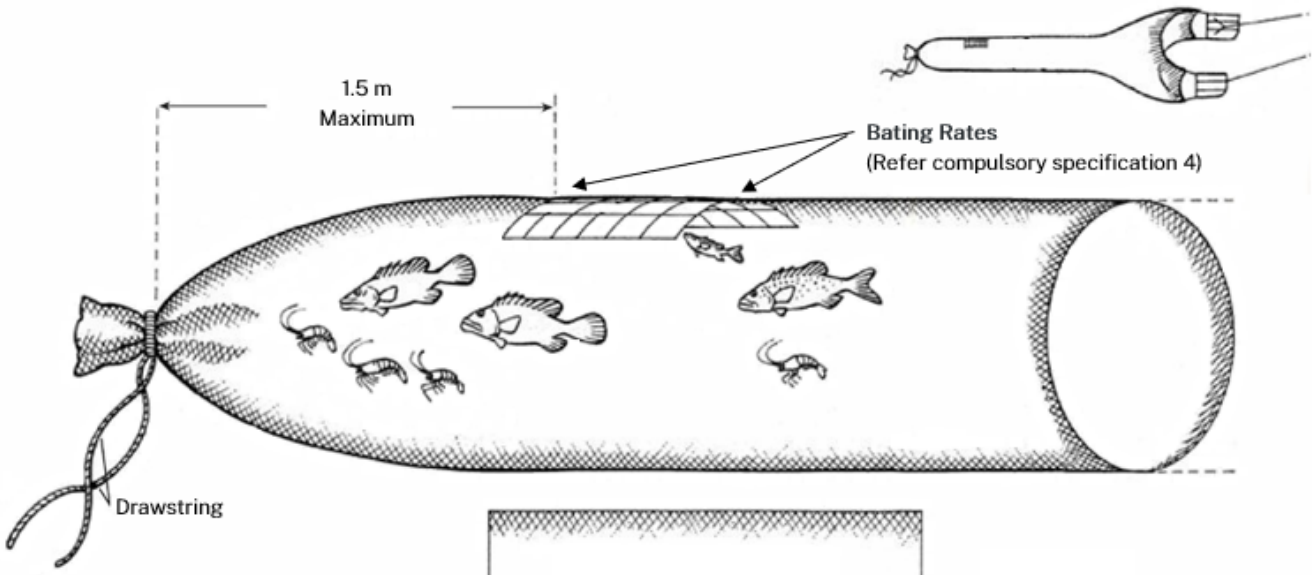
This BRD is now approved for use. The purpose of this approval is to authorise the high number of BRDs in use in the NSW Ocean Trawl Fishery with a surrounding panel (Panel A) known to be subject to extraordinary shrinkage and sediment induced increased twine diameters. Refer compulsory specifications underlined for the variations made in response to these issues. **If making a new BRD, do not build it to these specifications.**

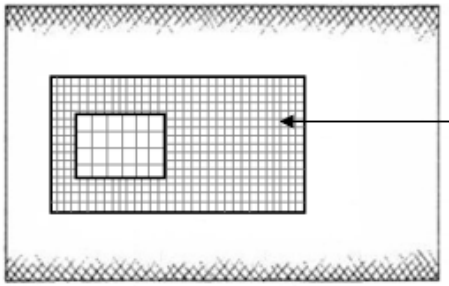
Diagram provided by QLD Department of Primary Industries & Fisheries

NSW Ocean Trawl Fishery

Smaller-mesh Ocean Square-Mesh Panel Bycatch Reduction Device (BRD)

(for use in NSW Ocean Waters)





Compulsory specifications:

1) Maximum distance from drawstring 1.5m (stretched when not in use)
2) **Panel A (surrounding panel):**
   a. Minimum 38 mm mesh hung on the bar (i.e., hung square)
   b. Minimum 50 cm wide and 65 cm long
   c. Maximum diameter twine of 5 mm
3) **Panel B (centre panel):**
   a. Minimum 55 mm mesh hung on the bar (i.e., hung square)
   b. Minimum 30 cm wide and 30 cm long
   c. Maximum diameter twine of 5 mm
   d. Maximum 1.6m forward of codend drawstring and inserted into Panel A
4) **Bating Rates** (top and bottom of Panel A only)
   a. If square-mesh panel 38-60 mm mesh - at least 3 points to every two consecutive bars on the panel
   b. If >60-75 mm mesh - at least 3 points to each bar on the panel
   c. If >75 mm - at least 4 points to each bar on the panel

Purpose of approval (for information only):

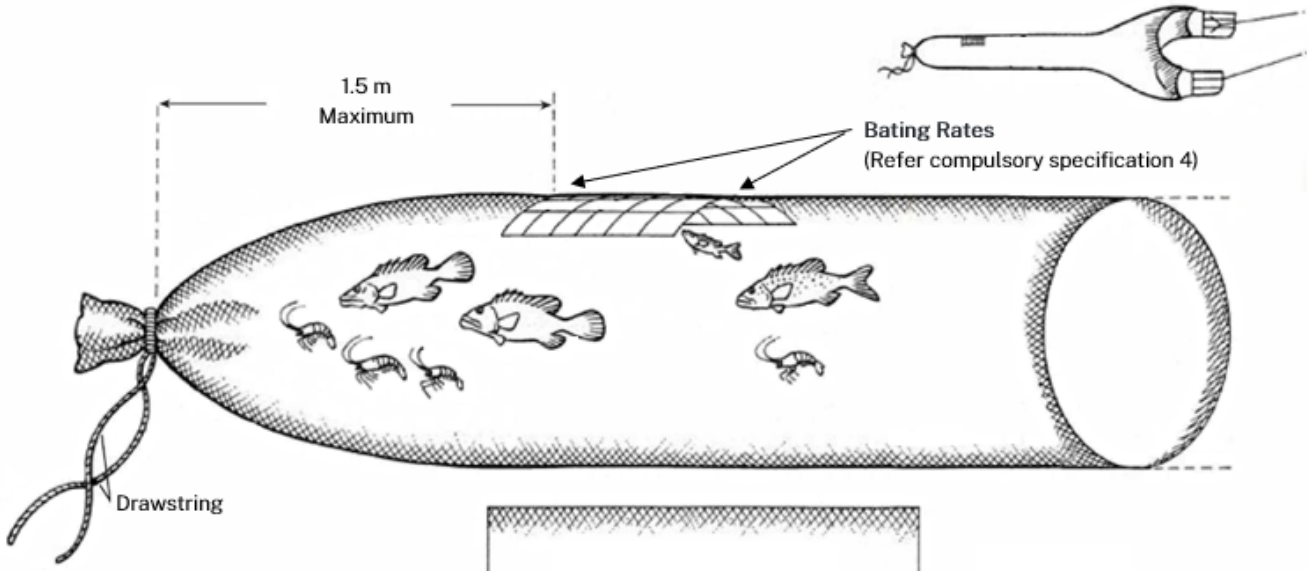
This BRD is now approved for use. The purpose of this approval is to authorise the use of a modified version of the ocean square-mesh panel BRD consisting of smaller mesh to the surrounding panel (Panel A) due to material availability issues, subject to the centre panel (Panel B) being larger in overall surface area. Refer compulsory specifications underlined for the variations made in response to this issue.

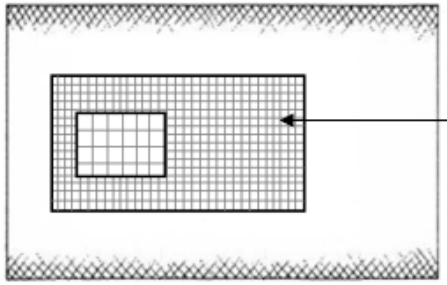
Diagram provided by QLD Department of Primary Industries & Fisheries

NSW Ocean Trawl Fishery

Rigid-mesh Ocean Square-Mesh Panel Bycatch Reduction Device (BRD)

(for use in NSW Ocean Waters)





Compulsory specifications:

1) Maximum distance from drawstring 1.5m (stretched when not in use)

2) **Panel A (surrounding panel):**
   a. Minimum 20 mm bar length (i.e., inside bars)
   b. Minimum 55 cm wide and 70 cm long
   c. Maximum diameter bars of 5 mm

3) **Panel B (centre panel):**
   a. Minimum 28 mm bar length (i.e., inside bars)
   b. Minimum 25 cm wide and 30 cm long
   c. Maximum diameter bars of 5 mm
   d. Maximum 1.6m forward of codend drawstring and inserted into Panel A

4) **Bating Rates** (top and bottom of Panel A only)
   a. If square-mesh panel 20-30 mm bar length - at least 2 points to each bar on the panel
   b. If >30-38 mm bar length - at least 3 points to each bar on the panel
   c. If >38 mm bar length - at least 4 points to each bar on the panel

Purpose of approval (for information only):

This BRD is now approved for use. The purpose of this approval is to authorise the use of a modified version of the ocean square-mesh panel BRD consisting of rigid mesh material (e.g., stainless steel) in lieu of soft-mesh netting material due to material availability issues. Refer compulsory specifications underlined for the variations made in response to this issue.

Diagram provided by QLD Department of Primary Industries & Fisheries