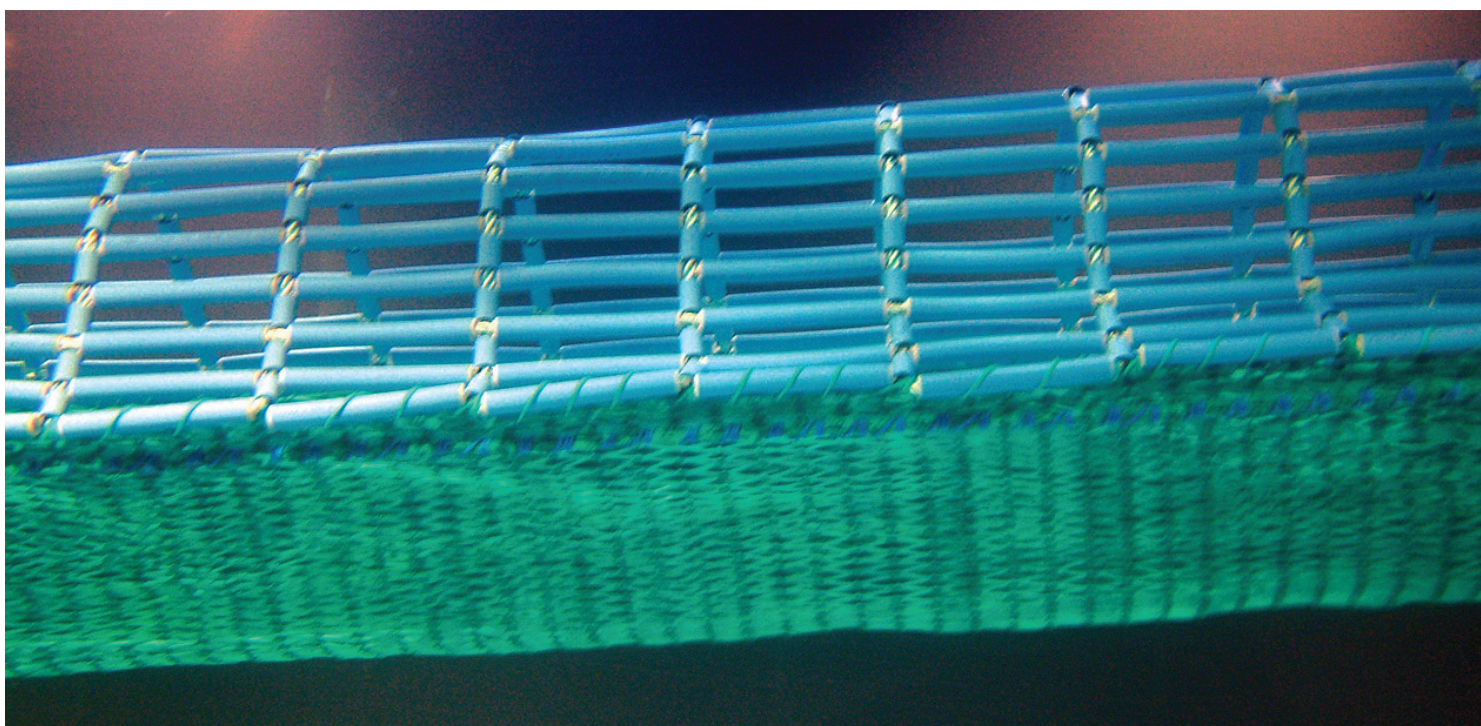


Making the most of grids to reduce discards

We all know there are big challenges ahead for the fishing industry in stepping up efforts to reduce discards. With the increasing importance of social, economic and political factors as a big part of the issue Seafish gear trial work over the last 15 years is increasingly relevant and is now being rolled out in commercial fisheries.

In the last in a series of articles, **Mike Montgomerie**, Gear Technologist at Seafish, gives his perspective on the issue and the work Seafish, along with industry, has been doing to help develop new selective technologies and net-based fishing activities to reduce discards. In this article he discusses the use of flexible and rigid grids.

A variety of different flexible



Flexi grid in the top of a cod end extension to act in a similar manner to a square mesh panel

is limited due to the large amount of fish being caught. If the fish are scattered and the net is in effect ‘filtering’ the water, the fish will probably get easy access to the grid. However, it is more usual in pelagic trawling to target shoals of fish, where a large volume of fish will be passing beneath the grid at one time and only the ones at the top of the net will get exposure to the grid, thereby the opportunity to escape.

Flexible grids with several gap widths from 15mm to 25mm have also been trialled in the Nephrops industry as a size selection device for Nephrops. These grids were fitted in the lower panel of the extension of the trawl, the intention being to ‘riddle’ out the small Nephrops. It was found that very few Nephrops were released, even when a grid with larger gaps was used. This was probably due to the shape and overall size of the Nephrops as they tumble down the trawl with legs and claws sticking out, combined with them not showing any escape mechanism at this point in the capture process. As would be the case with many species, they would need to be ‘forced’ out of the gaps by water flow, or by some design feature in the trawl. French fishermen have been working on a grid for selecting out the smaller Nephrops. This grid is inclined at 45 degrees and dropped into the bottom panel of the trawl. This allows all the Nephrops exposure to it, releasing the small ones and deflecting the larger ones upwards and into the codend.

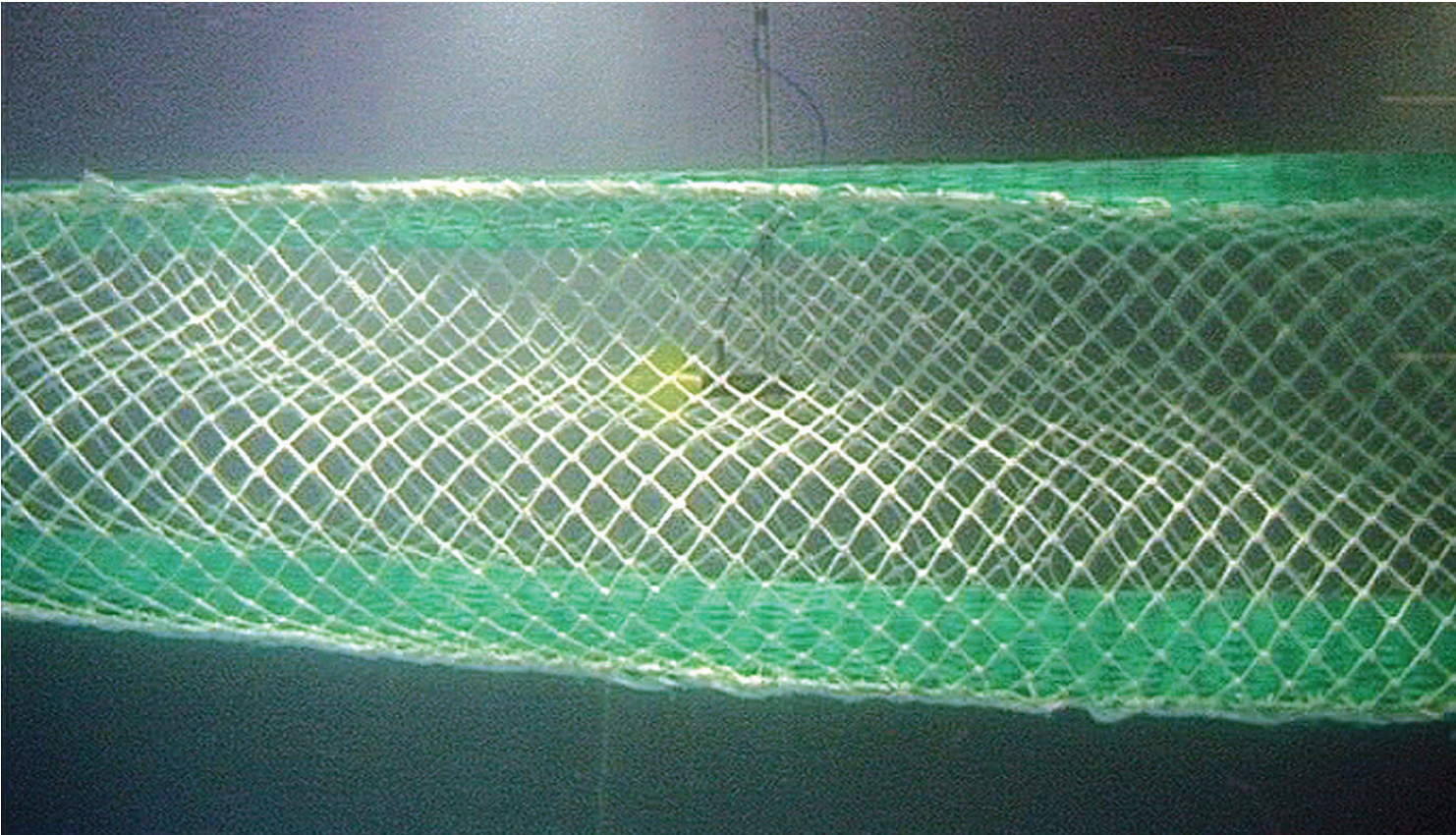
RIGID GRIDS

Rigid grids are used in many fisheries throughout the world and have proved to be a very efficient tool for the separation of species in trawls. Because they are a rigid structure it is fairly easy for legislators to regulate the grids overall dimensions, bar spacing and method of fitting. This helps to ensure consistency in its selectivity.

The rigid grid is fitted in the trawl ahead of the codend, inclined at an angle of approximately 45 degrees, with the bar spacing designed to allow the target species to pass through between the bars and into the codend. The larger bycatch is directed up and out of the net through an escape hole in the top panel of the trawl.

Rigid grids are most efficient when there is a big difference between size of the target species and the size of the fish or shellfish that are to be excluded from the trawl, as in the turtle excluder device and sea lion grids. Inclined grids are also used in many shrimp fisheries to separate and release the fish while retaining the shrimps.

Many rigid are made from metal and can be cumbersome to handle, particularly on the smaller classes of vessels which use net drums and power blocks to handle the gear. Some types of rigid grids are made using several hinged



Stiffened netting panels fitted in the sides of a codend extension to allow the release of small fish



Plastic grid with vertical bars and gaps at the bottom



Plastic grid with horizontal bars and gaps at the bottom

vicinity of the grid and liable to allow the escape of target species. This would also ruin the streamlined shape of the net.

To be its most effective a rigid grid really needs to be fitted further up the trawl, where there is sufficient mesh in the circumference to allow the grid to be at sensible proportions. A larger grid gives the catch longer exposure to the grid, and therefore should improve its efficiency in separating the catch.

If a square or rectangular grid is fitted into a standard two panel net there will be distortion of the meshes around the corners - it is like fitting a square peg in a round hole! This distortion will allow target species to escape and, in the longer term, will cause stretching and abrasion of the netting.

Ideally an oval-shaped grid should be used in a two panel net. For a rectangular grid, it is better to fit a four panel (or boxed) section into the trawl to accommodate the grid without distortion of the meshes. A rectangular grid will fit the cross-sectional shape taken up by a four panel (or boxed) section of netting. To get maximum benefit from a rectangular grid it may be better to re-cut the aft end of a two panel trawl into four panels to fit the grid into.

Most grids are designed to release by-catch that is larger than the target species, but in some fisheries a portion of the by-catch may be of similar size to the target species and will pass through the grid. It may be necessary to combine the use of a grid with some other discard reduction device to allow the escape of the smaller fish. This could be as simple as larger mesh codends, or a larger mesh size in the square mesh panel. It is important to assess that a grid is going to be the most efficient and practical discard reduction device before using it in a specific fishery.

THIS is the final article in a series of six which have covered the reasons why fish are discarded and behavioural trends, and then looked at a number of selective technologies and net-based fishing activities than can be used to reduce discards including square mesh panels, separator panels and grids.

Further advice on fitting and operating these devices is available from Seafish either on the website <http://www.seafish.org/fishermen> or <http://www.seafish.org/fishermen/responsible-sourcing/protecting-fish-stocks/discards> or by phoning Mike Montgomerie on 01472 252327.

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Selectivity measures and how they could reduce discards

Discard Reduction Device	Released pre-capture or post capture	Species	How effective	Size of fish it is effective for	Areas used in UK
Square mesh panels					
Regulatory square mesh panels	Post	Haddock,	Very good	Smaller fish, size dependant on mesh size	All around UK
		Whiting	Very good	Smaller fish, size dependant on mesh size	All around UK
		Cod	Poor	Smaller fish, size dependant on mesh size	All around UK
		Flats	Minimal effect		All around UK
Extra square mesh panels	Post	Similar to above			West coast and NE <i>Nephrops</i> fishery
Larger mesh square mesh panels	Post	Similar to above			West coast and NE <i>Nephrops</i> fishery
Large diamond mesh panels	Post	Similar to above			West coast and NE <i>Nephrops</i> fishery
Separator panels					
Separation device - used with second release device for max benefit	Post	Whiting, haddock etc	Good	More effective for larger fish above 175 mm	Not in common use commercially
Separator panels	Post	Cod, flats, <i>Nephrops</i> etc	Little effect	All sizes	Not in common use commercially
Inclined separator panels	Post	Similar to above			Not much commercial use. Some use in the Irish Sea to release cod

Coverless trawls					
Coverless trawls	Pre capture	Whiting, haddock, higher swimming	Very good	More effective for larger fish above 175 mm	Used by many in the smaller class of <i>Nephrops</i> trawlers around the UK. Been trialled recently in the NE <i>Nephrops</i> fishery
Coverless trawls	Pre capture	Cod, flats etc	Little effect	All sizes	
Grids					
Flexible grids fitted in top panel	Post	Haddock, whiting	Works in similar manner to square mesh panels		Not used commercially
Flexible grids fitted in bottom panel	Not very effective for release of fish or size selection of <i>Nephrops</i>				Not used commercially
Inclined grid in lower panel (French grid)	Post	<i>Nephrops</i>	Good	Release small <i>Nephrops</i> depending on gap spacing	Used by trawlers in Brittany
Grid in side of extension stiffened nylon netting	Post	Hadd, cod, whiting etc	Good	Smaller fish, size dependent on mesh size	Used in some Baltic fisheries. Not used in UK.
Right inclined grids (steel)	Post	Cetaceans, turtles etc	Very good	Effective for larger species	USA, Australia, Far East <i>Nephrops</i> /nd shrimp fisheries
Right inclined grids (steel)	Post	Haddock, whiting etc	Very good	Effective for larger species	
Semi flexible plastic grids	Post	Cod, hadd, whiting etc	Very good	Effective for larger species	Trialled by Scottish/Danish <i>Nephrops</i> vessels.
Other methods					
Reduction of sweep/bridle length to reduce capture of unwanted bycatch	Pre capture	Most round fish and some flats	Good	Effective for all sizes	Inshore <i>Nephrops</i> fisheries, sole fisheries
Reduction in headline height to reduce capture of higher swimming fish	Pre capture	Haddock, whiting	Good	More effective for larger fish	<i>Nephrops</i> fisheries, flatfish fisheries
Large mesh sizes in wings and body of the trawl	Post	All species	Good	Effective for small fish	All areas
Large mesh sizes in codend and extension	Post	All species	Good	Effective for small fish	All areas

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