Seafish Research and Development

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Trial to evaluate the area of impact of a single trawl and trawl doors on the mud habitat of an MCZ in Torbay, Devon.

Summary:

In response to a request from Sarah Clark of Devon & Severn Inshore Fisheries and Conservation Authority (D&S IFCA), Seafish Gear technologists carried out a two day sea trial in Torbay, Devon. The trial involved evaluating the footprint of single demersal trawls using Scanmar underwater acoustic technology and an underwater camera to assess the dynamics of the trawl when deployed on the mud habitat of the MCZ in Torbay. The work was carried out on board an <10m commercial fishing, the L’Aventurier SU438. During the trial Seafish gear technologists worked with the vessels skipper, Julian Kimble, to attach Scanmar acoustic sensors to the doors and wing ends of two single demersal trawls to measure the footprint of the trawl on the seabed. An underwater camera was also used to film the visual impact of the trawl on the seabed.

During the two day trial carried out in October 2017, six assessed tows were carried out in Torbay in an area adjacent to the MCZ. The area chosen had a similar mud habitat to that seen inside the MCZ. On each tow the distance between the trawl doors was measured along with the spread of the net measured at the wing ends of the trawl. Two types of trawl were used during the trial, a 9 fathom wing trawl and a heavier 7 fathom box trawl. Wing end and door spread distances were recorded at intervals during the tow duration. An underwater camera was also attached to the headline of the trawl to collect footage of the impact of each of the trawls on the seabed. The effect on the spread of the trawl with the use of a tickler chain was also assessed.

Design and construction and results from the 2 trawls are detailed in the report below.

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1. Introduction

In response to a request from Sarah Clark of Devon & Severn Inshore Fisheries and Conservation Authority (D&S IFCA), Seafish Gear technologists carried out a two day sea trial in Torbay, Devon. The trial involved evaluating the footprint of single demersal trawls using Scanmar underwater acoustic technology and an underwater camera to assess the dynamics of the trawl when deployed on the mud habitat of the MCZ in Torbay. The vessel chartered to carry out the work was an under 10m demersal trawler L'Aventurier SU 438.

Working in partnership with the skipper, Julian Kimble, Seafish gear technologists carried out two days of sea trials in Torbay. Using Scanmar acoustic sensors it was possible to assess both the door spread and the wing end spread of the trawl to give an analysis of the footprint of the trawl during commercial towing conditions. The trial was carried out over the course of two days , 5th -6th October 2017. Weather conditions were good and the sea state was calm.

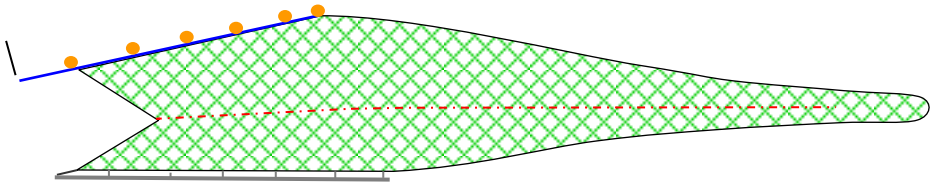
Due to the limited size of the area being assessed tow times were kept to between 30-45 minutes with an approximate towing distance of 2.5-3.5 Km. Towing speeds were between 2.7 & 2.9 knots.

L'Aventurier SU 438

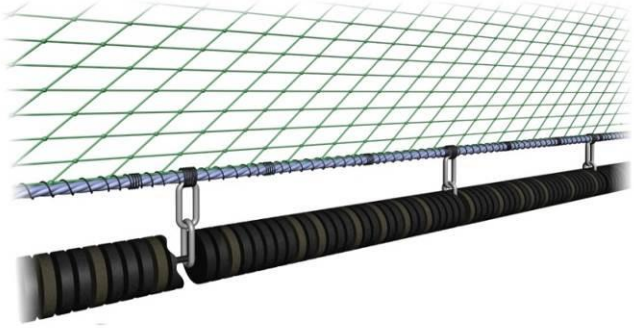
2. Trawl Construction

2.1 9 Fathom Wing Trawl

The 9 fathom (16.45 m) wing trawl is a simple two panel design net. The trawl is measured on the footrope which is 9 fathom (16.45m) in length. This is the lighter of the two nets worked by the L'aventurier.

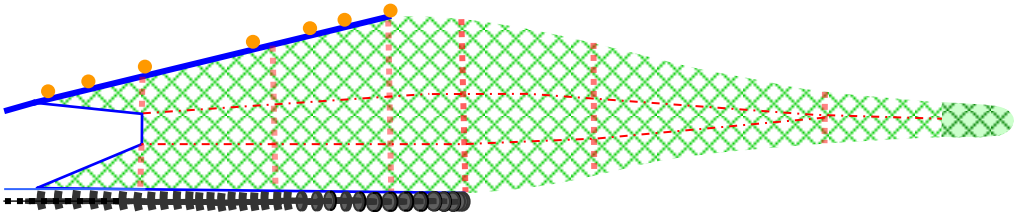


The ground gear of the trawl is made up of 8 x 4" (10cm) rubbers every 1.5ft (45cm). The rubbers are 1-1.5" (2.5 - 4cm) thick. The ground gear has 11mm long link chain danglers at the centre and wing ends of the trawl. The headline length of the trawl is 44ft (13.3m), 10ft (3m) shorter than the ground gear which provides a cover of netting above and ahead of the ground gear.

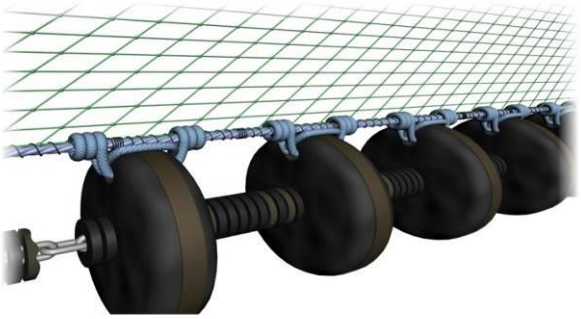


2.2 7 Fathom Box Trawl

The 7 fathom (12.8m) Box trawl has a side panel of netting fitted between the top and lower panels of netting, as with the wing trawl the trawl is measured on the footrope which is 42ft (12.8 m) in length. The netting panel gives the trawl more headline height and allows the centre section of the footrope to have better ground contact to help reduce fish escaping below the ground gear.



The construction of the ground gear of this trawl has 6" (15cm) mini hoppers all the way along the length of the ground gear as well as chain danglers for the entire length of the footrope. The headline length of the trawl is 36ft (11m) allowing the top panel of netting to come ahead of the ground gear.



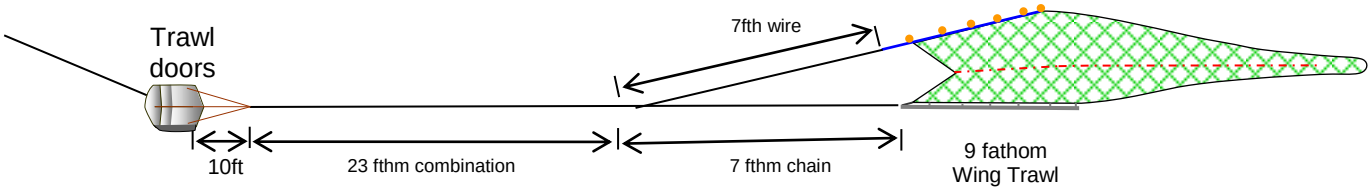
3. Trawl Rigging

Both trawls were rigged as they would be when fishing for cuttlefish in the test area. The average depth being fished was 6 fathoms (12 metres) and the amount of wire shot from the vessel to the door was 40 fathom (73m) equating to a warp to depth ratio of 6:1. This warp to depth ratio is common when fishing in shallow waters. The same set of trawls doors were used with both nets.

L'Aventurier Trawl Door

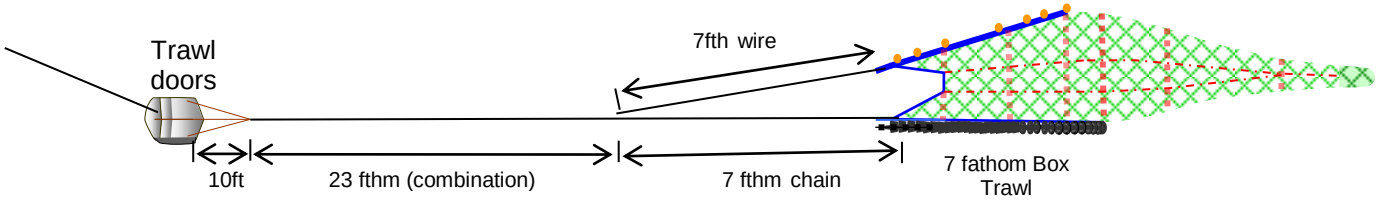
Rigging of the trawls remained the same for both nets with 23 fathom (42m) of combination rope behind each door then a further 7 fathom (12.8m) of bridle. The bridle was made of 7 (12.8m) fathom of long link chain on the bottom leg.

3.1 - 9 Fathom Wing Trawl



Wing Trawl

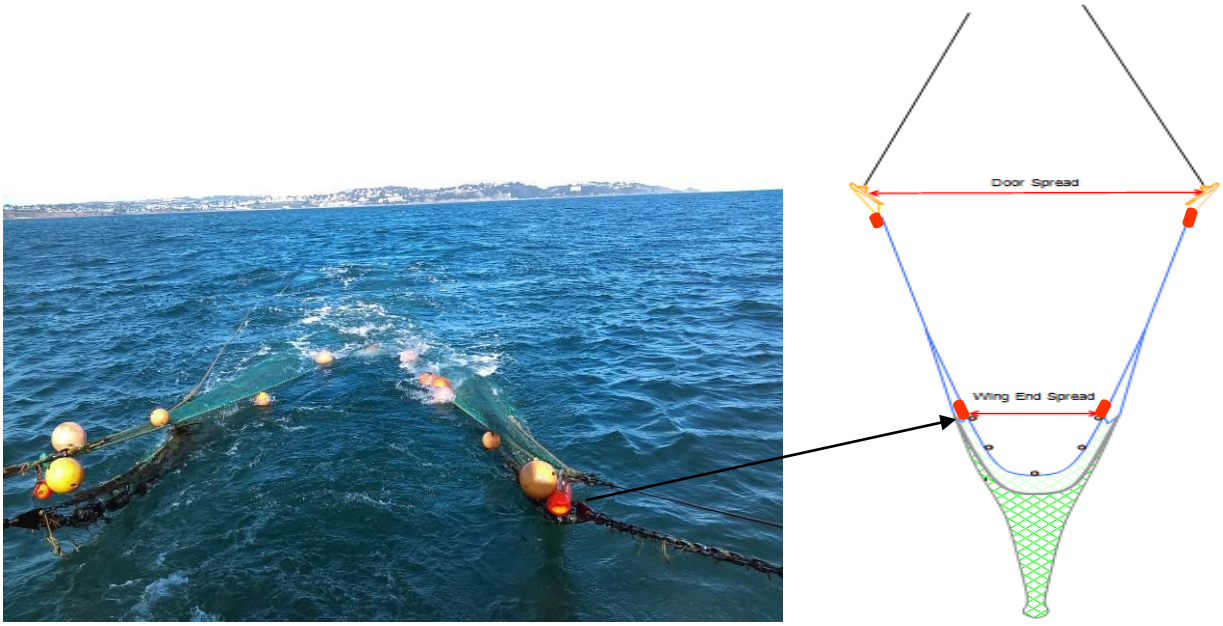
3.2 - 7 Fathom Box Trawl



Box Trawl

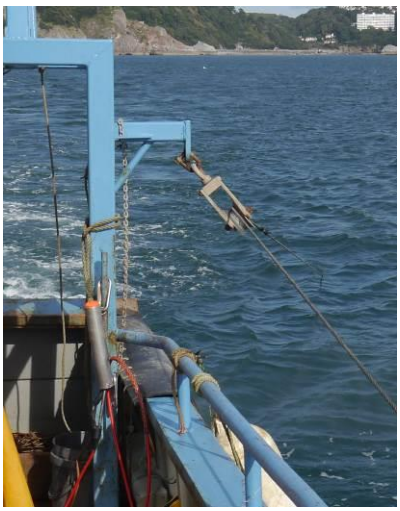
4. Results

Scanmar sensors were attached to both the wing ends of the trawl and the trawl doors to accurately measure the distances for wing end and door spread, giving the footprint of the trawl on the seabed during fishing operations.



Orange Scanmar sensors attached to the wing ends of the trawl

The wing end and door spread distances recorded for the two different nets are detailed in the tables below. The tables show the spread of the gear when towing from the blocks and from the towing point.



Towing from the blocks

Towing from the towing point

Both nets show similar spreading distances for both the doors and the wing ends. This would be expected as the rigging of the trawls remained the same for both nets and the same doors were used. The slight difference between the spreads of the wing trawl and the box trawl can be attributed to the fact that the wing trawl is 9 fathom on the foot rope compared with the 7 fathom Box trawl. The wing end opening distances as a percentage of the head line length are similar for both the wing trawl and the box trawl, being 52% & 48% respectively. These percentage openings are slightly in excess of what would be normal for these type of nets but would be expected when working in shallow water and shortening up on the sweep length.

Wing Trawl	**05/10/2017**		
Door Spread distance ft/(m)		Wing end Spread (distance ft)	
Towing point	Blocks	Towing point	Blocks
108ft (32.9m)	110ft (33.5m)	23.0ft (7m)	23.8ft (7.25m)

Box Trawl	**06/10/2017**		
Door Spread (distance ft)		Wing end Spread (distance ft)	
Towing point	Blocks	Towing point	Blocks
102ft (31.1m)	106ft (32.3m)	17.2ft (5.24m)	18.3ft (5.58m)

5. Modifications

The skipper made a modification to the to the rig of the gear , prior to carrying out the trials, to replicate what he would commonly use in the area, by shortening the length of the sweep to 23 fathom (42m). The shortening of sweep lengths is common practice when working in very shallow water or areas of limited manoeuvrability.

Contact Details

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