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Recent developments on blue whiting trawls in Norway.

by

Isaksen, Bjørnar, Jensen, Hans & Olsen, Steinar  
Institute of Fishery Technology Research  
Box 1964, N-5011 Nordnes, Norway

ABSTRACT

Two new blue whiting trawls with very large meshes in the front part have been tested with regard to towing resistance, operational qualities and catching efficiency. The results confirm that the large mesh design is quite suitable for blue whiting fishing to reduce towing power and/or increase the trawl mouth opening. Large mesh trawls are already in commercial use by blue whiting trawlers in Norway.

1. EXPERIMENTS IN 1978

Subsequent to the French report at the Engineering W.G. meeting in Bergen last year about their successful developments of pelagic trawls with very big meshes in the front part, our Institute decided to modify a conventional blue whiting trawl by replacing the front part with a new one of max 10 metres mesh size (Fig.1)

Functional tests of this trawl were carried out in July -78 on the M/S "Havdrøn" in comparison with a more normal blue whiting trawl of the same dimensions (530m stretched circumference), and a max. mesh size of 2 metres.

The towing resistance of the new 10-m was considerably lower than that of the 2-m trawl, but during the cruise very scattered concentrations of blue whiting were found and no real test of the catching efficiency of the trawl could be made.

Thereafter both trawls were given on loan in August and early September to the Faroes Fishing Research Institute and used on

the motortrawler "Leivur Øssursson". The good towing and operational qualities of the 10-m trawl were confirmed and tentatively it also was concluded that the catching efficiency corresponded to the trawl opening. In other words, the very big meshes in the front part of the trawl at least did not cause a marked reduction in the catching efficiency.

The 10 m trawl was again used on "Havdrøn" during a cruise to the Norwegian Sea in October. Also this time only very scattered blue whiting concentrations were found and further observations of the catching efficiency could not be made.

## 2. RECENT DEVELOPMENTS

These results and the subsequent positive experience of the Faroese with a still larger big meshed trawl (16 m maximum meshsize) was the basis for the design of a new trawl frontpart. For reasons of easy construction and in order to build in some elasticity in the design this frontpart was made from elongated hexagonal meshes. The maximum meshsize is nearly 30 m., and the trawl has a stretched circumference of 830 metres and an estimated vertical opening of about 46 metres. (Fig. 2). Before the actual construction of this trawl a 1:20 scale model was made. This model was used to study the sensitivity of the trawl configuration and mesh shape to varying wing spread and vertical opening.

The H-trawl, as we call it, and the 10-metre trawl made last year were both used during a cruise to the Faroe blue whiting grounds in May with the new research vessel "Michael Sars". In addition to trying out these two trawls under actual fishing conditions, the program included tests of transferring the catch to another vessel, similar to the method tried by the Icelanders last year.

Prior fishing experiments on the Faroe fishing grounds dynamic measurements of both trawls were carried out in Bjørnefjorden near Bergen, during which the rigging of sweeps, weights and doors were finalized for the new H-trawl.

According to the measurements made in Bjørnefjorden (Table 1), the towing resistance of the large H-trawl is not greater than that of the 10-m trawl.

Considering the differences in rigging and dimensions of the trawls these are very encouraging results.

The fishing experiments were made during two separate trips, the 10-m trawl being used during the first trip. Fishing conditions were then relatively good, but problems caused by the netsonde cable being too short, adequate towing speed could not be used. Only 5 hauls were made with catches ranging from 250 to 800 hl (Table 2). The results achieved confirm that the 10-m trawl is easy to handle and functions well in sea. However, the catch opening seems to be less than required to fish effectively under these conditions.

Some few Norwegian vessels already this season were equipped with big meshed trawls, mostly of larger dimensions than this 10-m trawl. Their experiences were generally positive, none has reported reduced catches with the big meshed trawls in comparison with the conventional ones.

When the vessel reached the Faroe grounds again on 24th of May, concentrations of blue whiting were markedly reduced. The catches of the fleet varied much from one day to another, and after 5 days commercial fishing practically ceased. This trip the H-trawl was used. Best catches were made in the morning, the biggest haul being 1300 hl (Table 2). The catches taken with the H-trawl (400 tons in 4 days) were quite comparable to those of the commercial vessels fishing in the same area.

The transfer of codends to the transport vessel was very successful. The method is straight forward and is not limited by weather conditions to any greater extent than taking on board own catches.

For future experiments the big meshed area of the trawl will be extended further aft by replacing the 2 and 1 metre meshes with big hexagonal ropemeshes.

Other changes planned are to remove the foremost big meshes so that the wingtips will be shaped like those of the 10-m trawl. The heavy selvages in the front part should be replaced by reinforcements in the rope meshes.

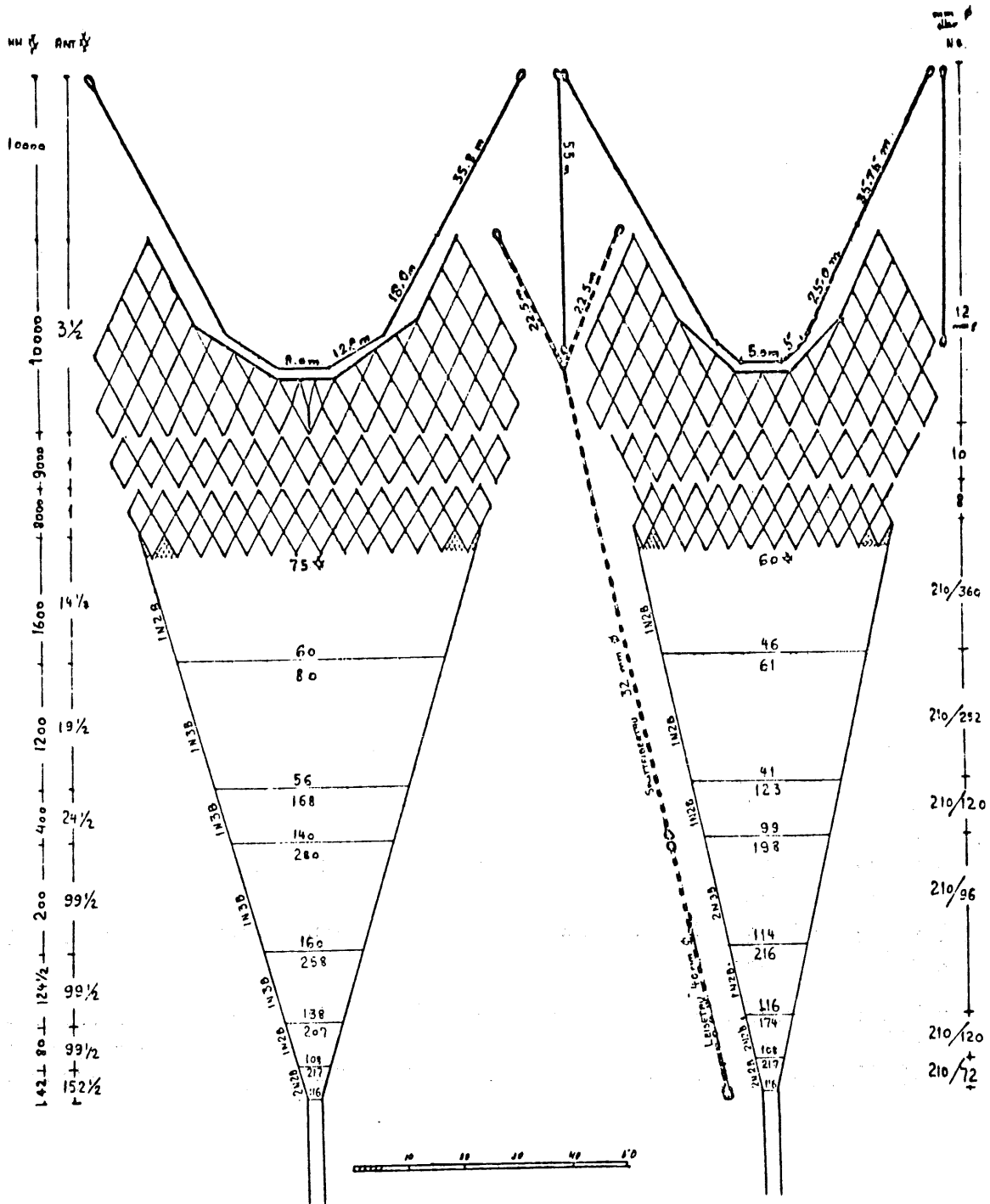
Table 1. Measurements carried out in Bjørnefjorden near Bergen.

	10 m - TRAWL				H - TRAWL			
Date	19. May				21. May			
Otterboard	WACO 6 m <sup>2</sup>				WACO 7.5 m <sup>2</sup>			
Weights	370 kg				640 kg			
Warp length	600 m				600 m			
Sweeps	100 m upper		107 m lower		120 m upper		130 m lower	
r.p.m.	675	750	825	825	750	825	825	750
pitch	60/100	60/100	60/100	60/100	60/100	60/100	60/100	60/100
Towing force (tor.)	4.04	5.17	6.47	5.56	4.94	5.80	6.46	5.16
Star-board	3.87	4.98	5.94	5.86	3.80	5.84	5.93	4.14
Port.	7.91	10.15	12.41	11.42	8.74	11.64	12.39	9.30
Total								
Speed (knots)	2.9	3.35	3.7	3.9	3.45	3.6	3.7	3.4
Headline depth (m)	262	200	161	175	360	285	268	330
Vertical opening (m)	38	32	28	28	49	37	38	50
Towing direction	E	E	E	W	E	E	W	W

Table 2. Catch journal from the blue whiting cruise with R/V "Michael Sars" on the Faroe fishing grounds in May 1979.

Date	Trawl st.	Position	Duration of the haul.	Towing dist. (n.m.)	Sweeps (m)	Weights (kg)	Catch (hl)	Remarks
11.5	1	N 60°32' W 6°51' N 60°36' W 6°57'	07.30-08.50	4	100	370	300	
11.5	2	N 60°33' W 6°57' N 60°42' W 7°08'	15.30-18.40	10	100	370	300	
12.5	3	N 60°25' W 6°39' N 60°37' W 6°59'	06.30-11.50	16.5	100	370	800	
12.5	4	N 60°27' W 6°46' N 60°42' W 7°07'	16.15-21.10	17	100	370	300	
13.5	5	N 60°28' W 6°57' N 60°31' W 6°59'	09.20-10.30	4	100	370	250	Bad weather. Haul interrupted.
24.5	6	N 60°25' W 6°57' N 60°37' W 6°59'	07.00-13.30	23.0	130	640	350	
24.5	7	N 60°23' W 6°31' N 60°34' W 6°51'	16.55-22.05	19.0	140	820	400	
25.5	8	N 60°35' W 6°57' N 60°42' W 7°13'	07.55-11.40	11.5	180	820	350	
25.5	9	N 60°27' W 6°45' N 60°42' W 7°06'	15.30-20.55	17.0	180	640	150	Weights too small.
26.5	10	N 60°26' W 6°39' N 60°39' W 7°00'	07.40-13.20	18.0	180	640	700	
26.5	11	N 60°27' W 6°45' N 60°40' W 6°59'	16.20-20.30	13.0	180	780	200	
27.5	12	N 60°25' W 6°31' N 60°39' W 6°56'	07.00-12.10	16.5	180	780	1300	
27.5	13	N 60°34' W 6°50' N 60°39' W 7°04'	15.25-17.50	13.3	180	780	100	Difficult current conditions.
28.5	14	N 60°27' W 6°39' N 60°37' W 6°57'	06.44-10.35	11.2	180	780	400	
28.5	15	N 60°30' W 6°44' N 60°35' W 6°52'	13.40-15.30	5.1	180	780	-	Nearly no fish recordings.

Fig. 1. 10 - m TRAWL. CIRCUMFERENCE 520 m.



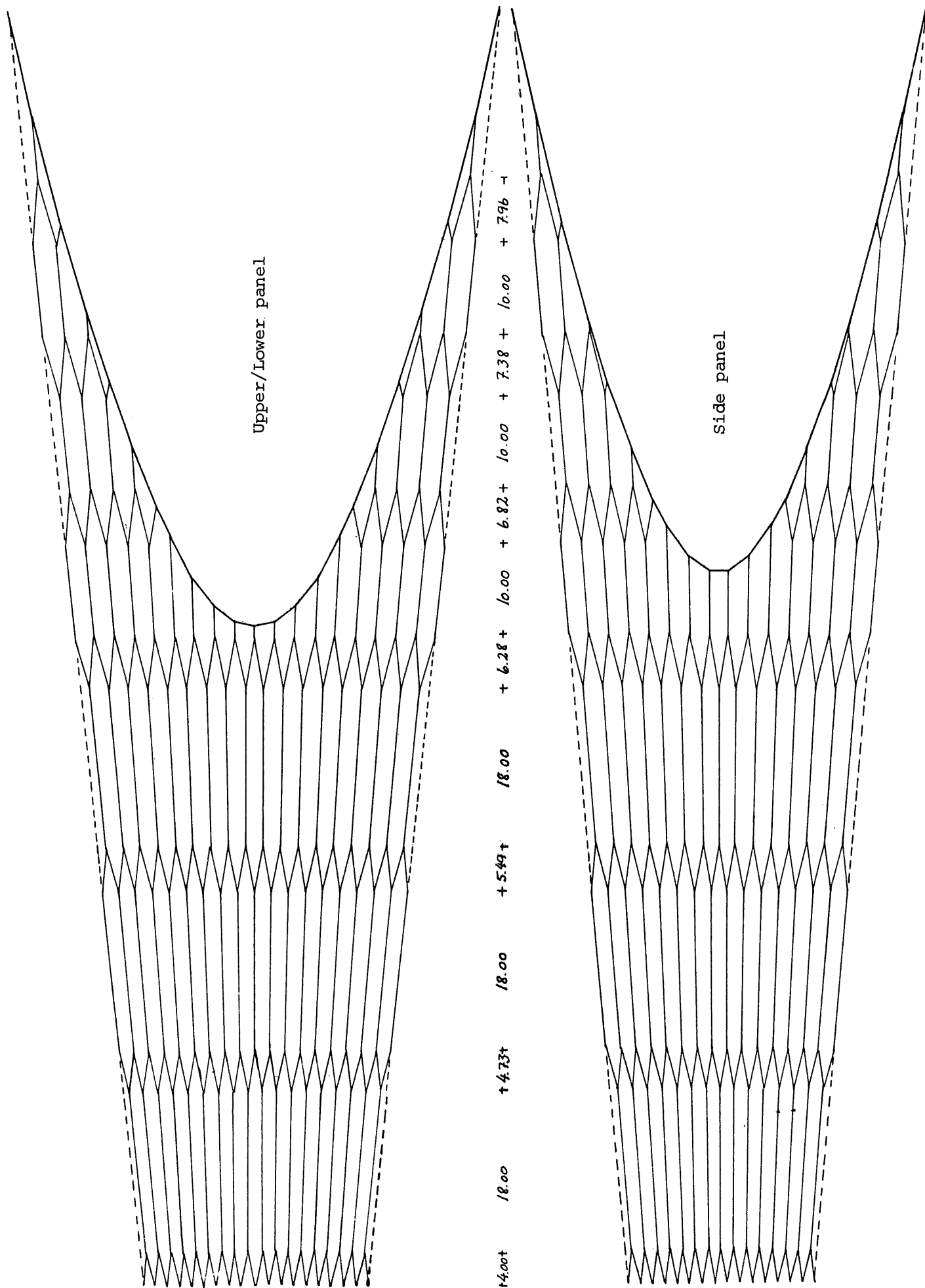


Fig. 2. HEXAGONAL TRAWL. CIRCUMFERENCE 830 m.