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Descriptions of trawl-gear used for demersal species by the Canadian fleet in Subarea 5 and Statistical Area 6 during the period 1969 through 1972¹

by

P.J.G. Carrothers
Fisheries and Marine Service, Environment Canada
Biological Station, St. Andrews, N.B., Canada

Attached are drawings and specifications for particular, though typical, groundfish trawls as used in the Canadian Atlantic offshore fishery in recent years. Within the fleet there are some variations between vessels, particularly with respect to rigging and door size.

The drawings, or trawl plans, are drawn to scale according to the method of Dickson (1), subsequently adopted by the Food and Agriculture Organization of the United Nations (FAO) (2) and specified by the International Standards Organization (ISO) (3). Each netting panel is scaled so that the length or depth is extended measure and the width is as though the hanging ratio were 0.5 (hung-in $\frac{1}{2}$). The "steps" which result at the seams in the drawings do not exist in the finished trawls but they do indicate the amount of "distortion" in the netting near the circumferential joins.

Taper cuts are described according to the ISO convention (4). "B" following a digit designates the number of "bar" cuts (single twines along the mesh bar) in each cutting cycle, while "N" designates the number of "mesh" cuts (two twines along the row of knots) in the direction normal to the course of the twines. The "N-cuts" are variously referred to as "points" or "meshes" by different authors.

Twine sizes are identified according to the trade number of the supplier for the particular trawl being described. Equivalent twines from other manufacturers will have different trade numbers. However, in all cases, the resultant tex (SI unit) of the twines is given, as specified by ISO (5), to avoid confusion. The resultant tex is the mass in grams per kilometre of untreated twine.

Mounting lines (dashed lines) are drawn to scale to indicate the amount of distortion in the mounted netting. Double-headed arrows indicate which points in the net are drawn together during final assembly.

The "Yankee" trawls are the traditional nets in the fishery. The "36" is more commonly used inshore by vessels of about 300 horsepower, although it is sometimes taken offshore by "loan board" boats. The "41" and "41-5" trawls are common on 90 to 110-foot boats with 500 to 700 horsepower.

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The recent increase in size and power of trawlers fishing the continental shelf has permitted the use of larger trawls. The traditional Granton trawl from the United Kingdom was tried first and is still used to some extent on vessels of 1,000 horsepower or more. However, this is a heavy trawl, intended for rougher grounds than those experienced by the Canadian fleet, and its mouth opening is surprisingly small for such a large net. The Engel (German) high-opening bottom trawl gives a much larger mouth opening than the Granton, particularly when used with a kite, but it requires about 1,200 horsepower.

Declining groundfish stocks and echo-sounder traces of fish above the headline of traditional, two-seam trawls, led to the development of the Atlantic Western trawls by W. W. Johnson of the Canadian Fisheries and Marine Service. These are large, four-seam trawls, designed to provide additional headline height without sacrifice of wing spread. Of these, two are in common use. The IIA on smaller vessels, mostly inshore, and the III on larger vessels on the banks.

The success of German midwater trawling near the seabed for cod at Greenland plus widespread echo-sounder traces of red-fish, particularly in the Gulf of St. Lawrence, inspired the successful development of the Diamond mid-water trawls. These are huge trawls made of four identical panels of netting with seams on the sides and top-and-bottom. Extra wedges of netting are set into the top and bottom seams for added spread. In keeping with current European practice, the meshes in the fore parts of the net are very large, originally 22 inches, although mesh lengths of 0.8 m. (31.5 inches) and 1.2 m. (4 feet) have been mentioned recently. The Diamond IX is the most widely used of these trawls, requiring at least 1,200 horsepower in a stern trawler, and a larger Diamond X is on the way, if not already in use.

There is a trend in the Canadian fleet toward multi-trawl operation, in which each vessel carries both bottom and mid-water gear rigged for rapid changeover. Also, the advent of mid-water trawls requiring handling by the stern of the vessel is leading toward the use of net reels for holding these trawls. The net reels can be mounted on the boat deck of conventional side trawlers for conversion to mid-water gear, and as many as three net reels are planned for a stern trawler for rapid changeover between types of gear to take maximum advantage of various fishing conditions.

It will be noted that these descriptions indicate 4½-inch netting in the intermediates and cod-ends as has been common practice in the past.

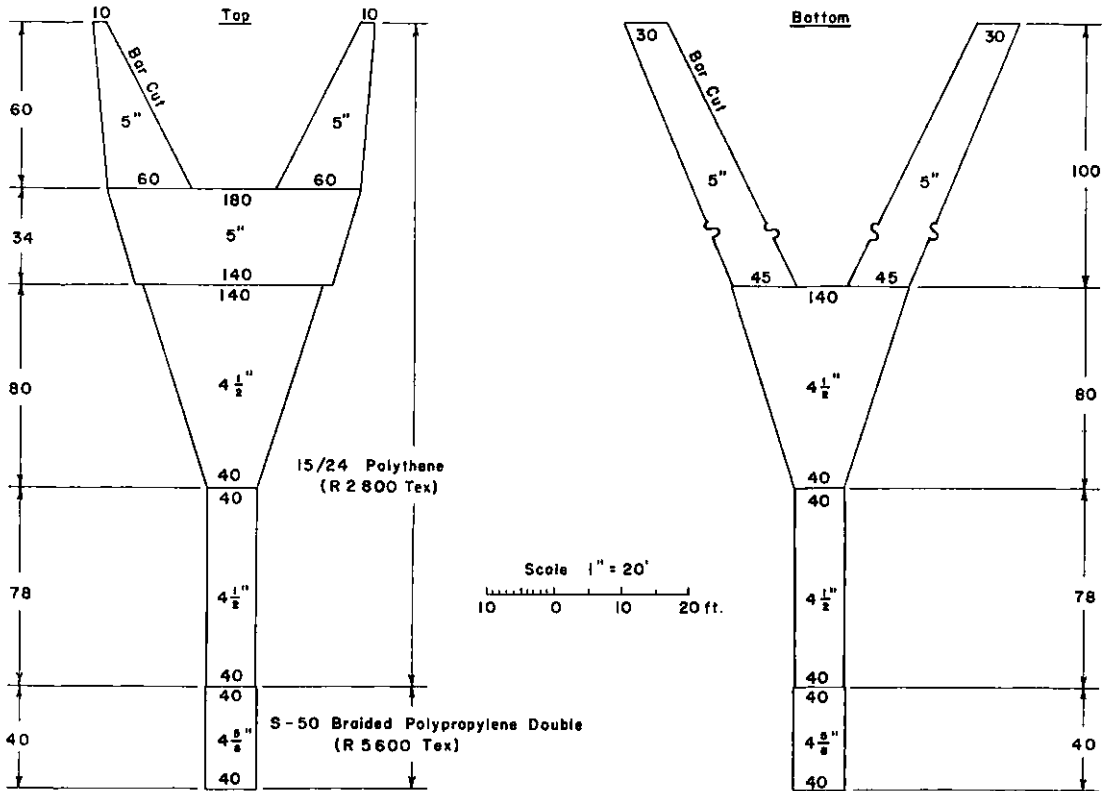
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FAO Catalogue of Fishing Gear Designs.
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the tex system.
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<u>Trawl Type</u>	<u>Vessel</u>		<u>Trawl Dimensions (ft)</u>				<u>Mouth opening (ft)</u>	
	<u>Length</u> (ft)	<u>Power</u> (h.p.)	<u>Headline</u>	<u>Footrope</u>	<u>Girth</u>	<u>Length</u>	<u>Height</u>	<u>Spread</u>
Yankee 36	60-80	300	60	80	65	115	8-11	34
Yankee 41	90-110	700	80	100	80	115	9-10	44
Yankee 41-5	90-110	700	80	100	80	115	8-11	44
Granton	100-140	1000	80	120	100	145	9-10	45
Engel	140-150	1200	96	145	130	135	16-22	50
A-W IIA	60-80	300	66	99	75	125	12-17	35
A-W III	140-150	1200	79	115	90	155	10-15	50
Diamond IX	140-150	1200	300	300	550	500		

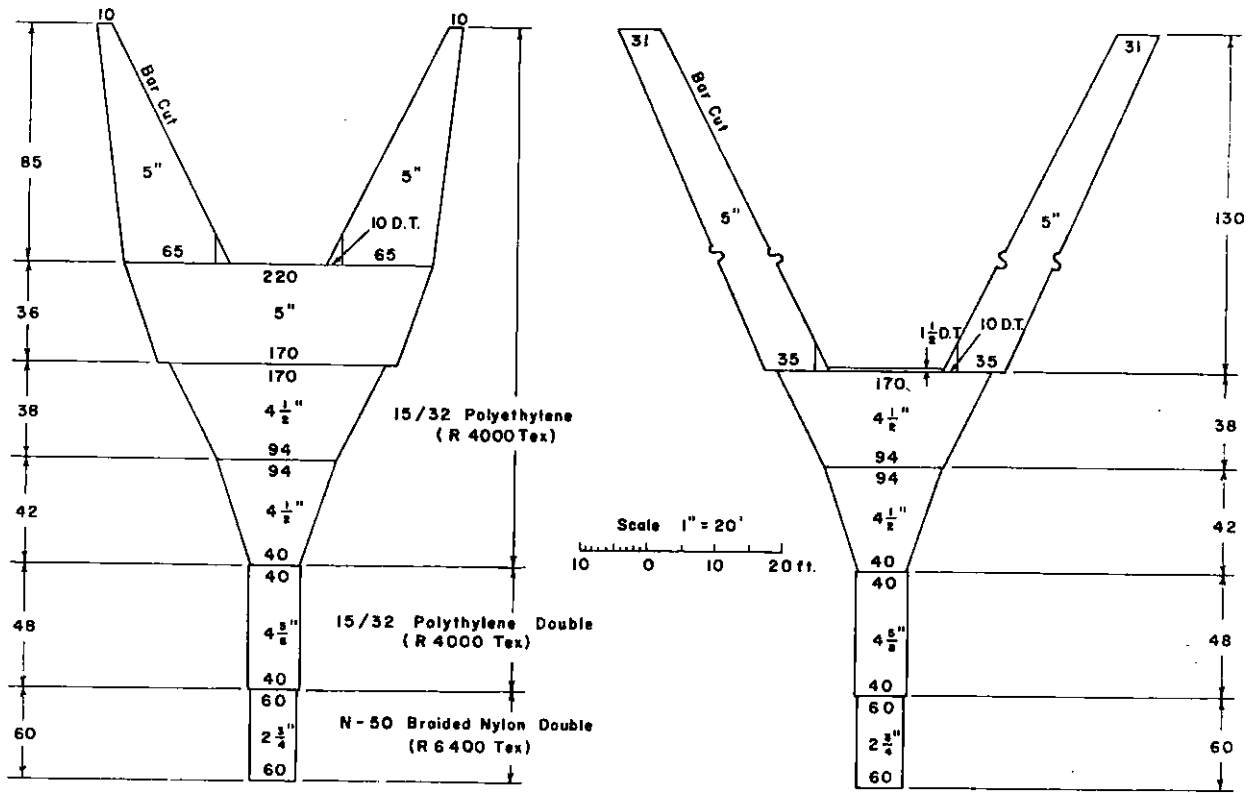
Yankee 36 Bottom Trawl



Yankee 36 Bottom Trawl

Line	Length x Diameter	Material	Attachments
Headline	60 ft	Combination	Floats:
Bosom	13 ft x 5/8 in.		Bosom: 10 x 8 in. diam. cast aluminum
Each wing	23.5 ft x 5/8 in.		Each wing: 10 x 8 in. diam. cast aluminum
Footrope	80 ft	Galv. wire	Bobbin gear:
Bosom	8 ft x 5/8 in.-6/19		Bosom: 4 rubber rollers, 16 in. diam. x 5 in. wide
Each wing	36 ft x 5/8 in. 5/19		5 in. diam. rubber disc spacers
Fishing line	82.5 ft	Combination	Each wing: 3 rubber rollers, 12 in. diam. x 4.5 in. wide
Bosom			4 in. diam. rubber disc
Each wing	37 ft x 5/8 in.		
Hanging line	82.5 ft x 5/8 in.	Combination	Each lower wing tip - steel banded wooden bobbin, 14 in. diam. x 5 in wide, mounted diametrically on bridle.
Wing lines	8.5 ft x 5/8 in.	Combination	
Belly & Rib	77 ft x 1/2 in.	Mono. Prop.	
Wing bridles		Galv. wire	
Upper	30 ft x 1/2 in.-6/24		
Lower	31 ft x 1/2 in.-6/24		
Ground warps	120 ft x 5/8 in.-6/19	Galv. wire	
Door legs		Galv. wire	Doors: Standard rectangular 4.1 ft x 7.5 ft x 2.5 in., 700 lb
Upper	6.6 ft x 1/2 in.-6/24		
Lower	6.9 ft x 1/2 in.-6/24		
Towing warps	5/8 in.-6/19	Galv. wire	

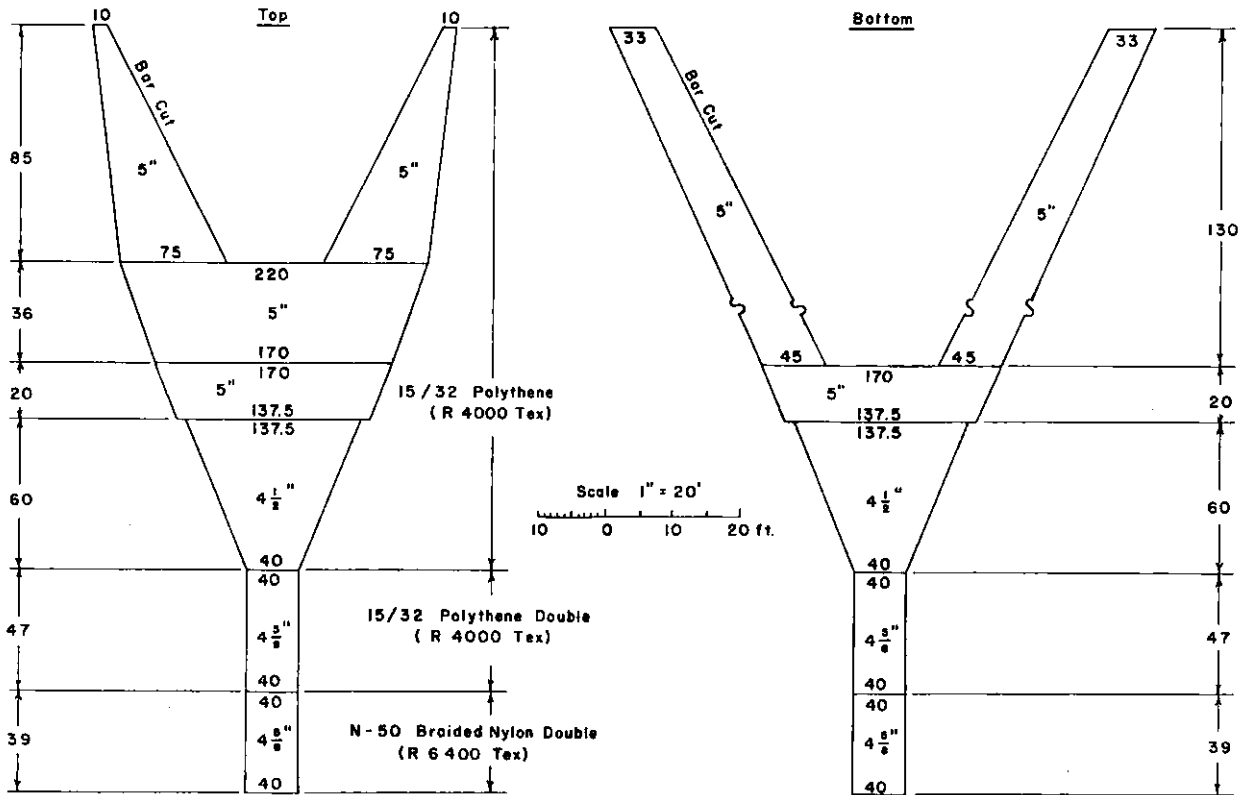
Yankee 41 Bottom Trawl



Yankee 41 Bottom Trawl

Line	Length x Diameter	Material	Attachments
Headline	79 ft	Combination	Floats: Bosom: 15 x 8-in. diam. cast aluminum
Bosom	14 ft x 3/4 in.		
Each wing	32.5 ft x 3/4 in.		Each wing: 14 x 8-in. diam. cast aluminum
Footrope	100 ft	Galv. wire	Bobbin gear: Bosom: 5 rubber rollers, 18-in. diam. x 5-in. wide, and 7-in. diam. rubber discs
Bosom	14 ft x 7/8 in.-6/19		
Each wing	3 x 14 ft x 7/8 in.-6/19		Each wing: 5 rubber rollers, 14-in. diam. x 4.5-in. wide, and 7-in. diam. discs
Fishing line	101.5 ft	Polythene	Lower wing tips: None
Bosom	14.5 ft x 1 in.		
Each wing	43.5 ft x 1 in.		
Hanging line	104.5 ft x 3/4 in.	Polythene	
Wing lines	8.7 ft x 3/4 in.	Nylon	
Belly & Rib	61.3 ft x 7/8 in.	Mono. Prop.	
Wing bridles		Galv. wire	
Upper	31 ft x 1/2 in.-6/24		
Lower	30 ft x 5/8 in.-6/24		
Ground warps	180 ft x 7/8 in.-6/19	Galv. wire	
Door legs		Galv. wire	Doors: Standard rectangular 9.5 ft x 4.5 ft x 3.5 in., 1600 lb
Upper	10 ft x 3/4 in.		
Lower	10.5 ft x 3/4 in.		For oval doors and back straps, see Table 8.
Towing warps	7/8 in. diam.-6/19	Galv. wire	

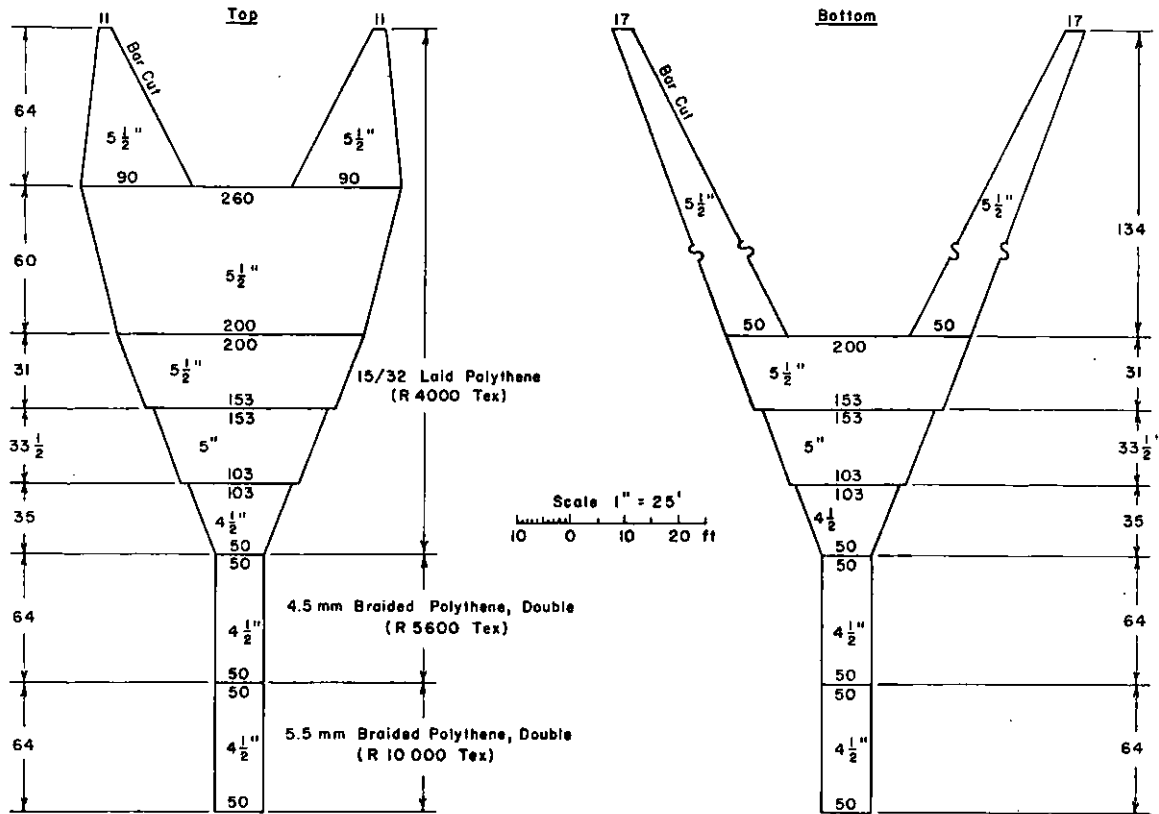
Yankee 41-5 Bottom Trawl



Yankee 41-5 Bottom Trawl

Line	Length x Diameter	Material	Attachments
Headline	79 ft	Combination	Floats:
Bosom	26 ft x 7/8 in.		Bosom: 20 x 8 in. diam. cast aluminum
Each wing	26 ft x 7/8 in.		Each wing: 13 x 8 in. diam. cast aluminum
Footrope	100 ft	Galv. wire	Bobbin gear:
Bosom	14 ft x 7/8 in.-6/19		7-in. diam. rubber discs full length of footrope
Each wing	3 x 14 ft x 3/4 in.-6/24		OR (see Table 1 for tows)
Fishing line	105 ft	Combination	Bosom: 6 rubber rollers, 18-in. diam. x 5-in. wide with 7-in. diam. disc spacers
Bosom	15 ft x 7/8 in.		Each wing: 5 rubber rollers, 15-in. diam. x 5 in. with 7-in. diam. disc spacers
Each wing			
Hanging line	116 ft x 5/8 in.	Mono. Prop.	
Wing lines	8 ft x 1 in.	" "	
Belly & Rib	61 ft x 1 in.	" "	
Wing bridles		Galv. wire	
Upper	31 ft x 1/2 in.-6/24		
Lower	30 ft x 5/8 in.-6/24		
Ground warps	180 ft x 7/8 in.-6/19	" "	
Door legs		" "	Doors: Standard rectangular
Upper	9 ft x 3/4 in.-6/24		4.5 ft x 10 ft x 3.5 in.,
Lower	9 ft x 3/4 in.-6/24		1600 lb
Towing warps	7/8 in.-6/19	" "	

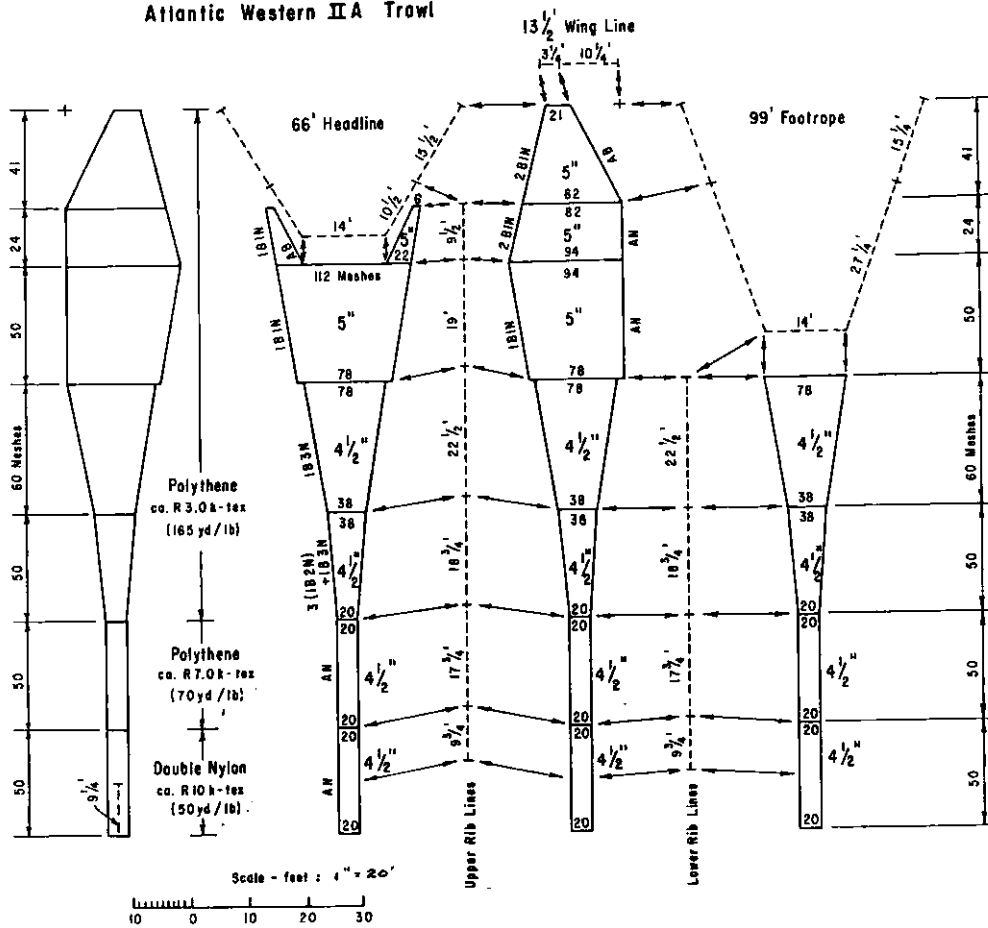
Granton Bottom Trawl



Granton Bottom Trawl

Line	Length x Diameter	Material	Attachments
Headline	79 ft	Combination	Floats:
Bosom	21 ft x 7/8 in.		Bosom: 20 x 8-in. diam. cast aluminum
Each wing	29 ft x 7/8 in.		18 x 8-in. diam. cast aluminum
Footrope	120 ft	Galv. wire	Bobbin gear:
Bosom	20 ft x 7/8 in.-6/19		Bosom: 6 rubber rollers, 21-in. diam. x 5.3-in. wide, and steel spacers
Each wing	20+15+15 ft x 7/8 in.		Each wing: 7 rubber rollers, 16-in. diam. x 5-in. wide, and 7-in. diam. rubber discs
Fishing line	21 ft	Combination	Each lower wing tip: 14-in. rubber wing bobbin
Bosom	21 ft x 7/8 in.		
Each wing	None		
Hanging line	127.5 ft x 1 1/8 in.	Mono. Prop.	
Wing lines	4 ft x 1 1/8 in.	Mono. Prop.	
Belly & Rib	85 ft x 1 1/8 in.	Mono. Prop.	
Wing bridles		Galv. wire	
Upper	31 ft x 5/8 in.-6/19		
Lower	30 ft x 7/8 in.-6/19		
Ground warps	120 ft x 7/8 in.-6/24	Galv. wire	
Door legs		Galv. wire	Doors: Standard rectangular
Upper	9.6 ft x 7/8 in.-6/19		10.5 ft x 4.5 ft x 3.5 in.,
Lower	9.5 ft x 7/8 in.-6/19		1700 lb
Towing warps	29/32 in. diam.-6/19		

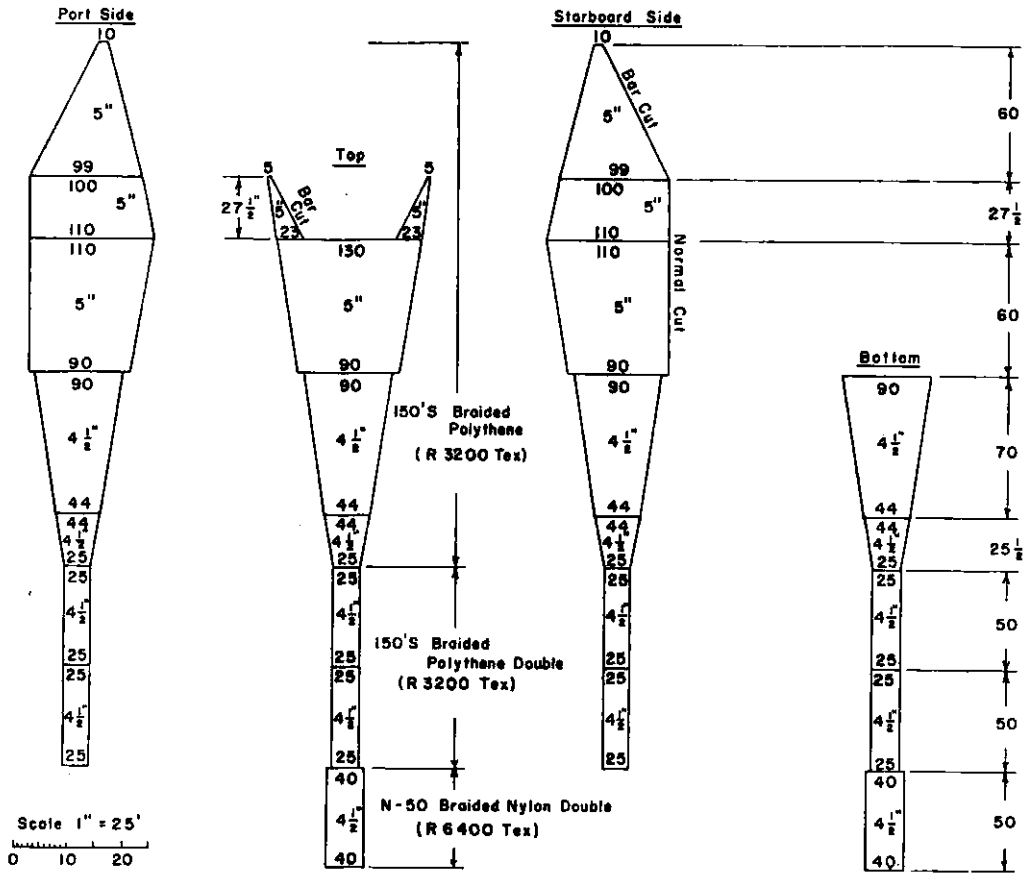
Atlantic Western IIA Trawl



ATLANTIC WESTERN IIA BOTTOM TRAWL

<u>Line</u>	<u>Length & Diameter</u>	<u>Material</u>	<u>Attachments</u>
Headline	66-ft. x 0.50-in.	Spun Nylon on steel	Floats: 50 x 8-in. diam. aluminum
Bosom	14-ft.		
Each bunt	10.5-ft.		
Each wing	15.5-ft.		
Footrope	99-ft. x 0.625-in.	Galv. steel	Rubber rollers (4.5-in. diam. spacers)
Bosom	14-ft.		8 x 14-in. diam. x 5-in. wide
Each bunt	27.25-ft.		3 x 12-in. diam. x 4-in. wide
Each wing	15.25-ft.		7.0-in. diam. discs
Fishing line	14.5-ft. x 0.875-in.	Combination nylon & steel	
Bosom only			
Hanging line	72-ft. x 0.875-in.	Polyprop.	
Bosom	15.0-ft.		
Each bunt	19.25-ft.		
Each wing	9.25-ft.		
Wing lines	13.5-ft. x 1.0-in.	Nylon	
Upper	3.25-ft.		
Lower	10.25-ft.		
Rib lines		Polyprop.	
Upper	96.83-ft. x 0.75-in.		
Lower	66.33-ft. x 0.75-in.		
Wing bridles		Galv. wire	
Upper	91.0-ft. x 0.44-in.		
Lower	90.0-ft. x 0.625-in.		

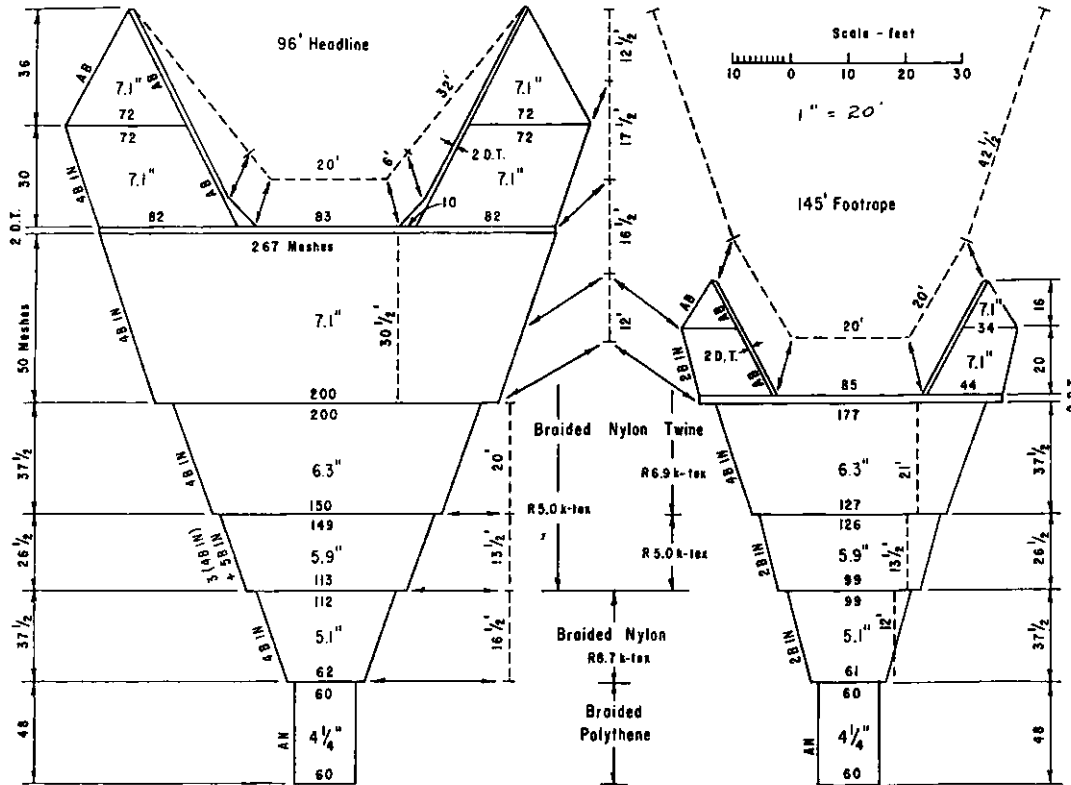
Atlantic Western III Bottom Trawl



Atlantic Western III Bottom Trawl

Line	Length x Diameter	Material	Attachments
Headline	79 ft	Galv. wire	Floats: Bosom: 23 x 8-in. diam. cast aluminum
Bosom	17.5 ft x 5/8 in.-6/19	- braided	
Each wing	10.5+20.3 ft x 5/8 in.	Nylon cover	Each wing: 10+17 x 8-in. diam. cast aluminum
Footrope	115 ft	Galv. wire	Bobbin gear: Bosom: 8 rubber rollers, 21-in. diam. x 5.3-in. wide, and 7-in. diam. rubber spacers
Bosom	16 ft x 7/8 in.-6/19		
Each wing	20.5+9.5+19.5 ft x 7/8 in.		Each wing: 5 rubber wing bobbins, 18-in. diam., and 7-in. diam. rubber spacers
Fishing line	16 ft	Combination	Each lower wing tip: 1 rubber wing bobbin, 18-in. diam., between bridle and wing
Bosom	16 ft x 7/8 in.		
Each wing	None		
Hanging line	76 ft x 1 in.	Mono. Prop.	
Wing lines	23 ft x 7/8 in.	Combination	
Belly & Rib	111.5 ft x 1 in.	Mono. Prop.	
Wing bridles		Galv. wire	
Upper	91 ft x 5/8 in.		
Lower	90 ft x 1 in.		
Ground warps	180 ft x 7/8 in.-6/19	Galv. wire	
Door legs		Galv. wire	Doors: Standard rectangular 10 ft x 4.5 ft x 3.5 in., 1600 lb
Upper	9 ft x 3/4 in.-6/24		
Lower	9 ft x 3/4 in.-6/24		
Towing warps	7/8-in diam.-6/19	Galv. wire	

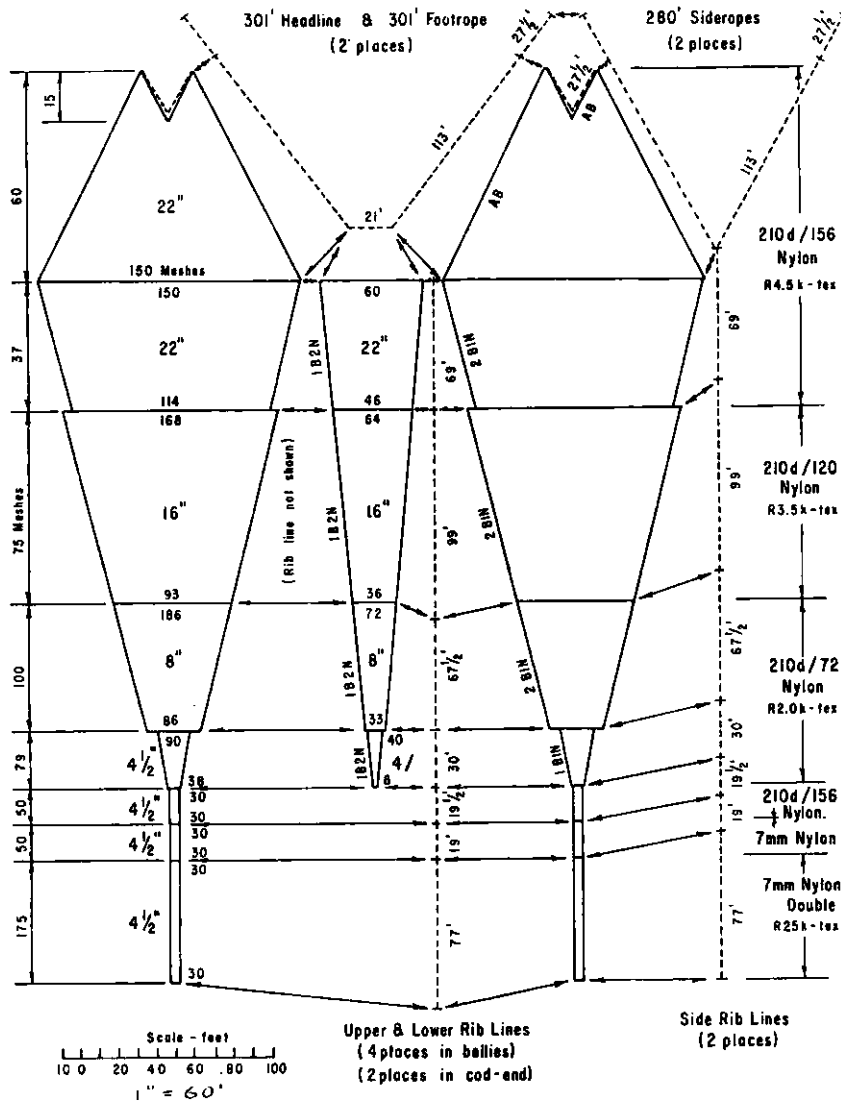
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Engel High - Opening Bottom Trawl



ENGEL HIGH-OPENING BOTTOM TRAWL

<u>Line</u>	<u>Length X Diameter</u>	<u>Material</u>	<u>Attachments</u>
Headline	96-ft.	Combination	Floats: 8-in. diam. aluminum
Bosom	20-ft. x 0.71-in.		20
Each bunt	6-ft. x 0.71-in.		5
Each wing	32-ft. x 0.71-in.		20
Footrope	145-ft.		Rubber rollers (7-in. diam. spacers)
Bosom	20-ft. x 0.95-in.	Galv. wire	6 x 16-in. diam. x 5-in. wide
Each wing	20-ft. x 0.95-in.	" "	3 x 16-in. diam. wing bobbins (half-eggs)
Unmounted	42.5-ft. x 0.95-in.	Combination	
Fishing line	61.75-ft.	Combination	
Bosom	20.75-ft. x 1-in.		
Each wing	20.5-ft. x 1-in.		
Hanging line	63.5-ft.	Polypropylene	
Bosom	21.5-ft. x 1-in.		
Each bunt	21.0-ft. x 1-in.		
Wing lines	29.25-ft. + 34-ft. selvage		
Upper	20-ft. x 0.75-in.	Combination	
Lower	9.25-ft. x 1.0-in.	Polypropylene	
Rib lines	108.5-ft.		
Unmounted	12.5-ft. x 0.71-in.	Galv. wire	
Upper wing	17.5-ft. x 0.75-in.	Combination	
Fore square	16.5-ft. x 0.75-in.	"	
Lower wing	12.0-ft. x 0.75-in.	"	
Bellies	(20.0+13.5+16.5)-ft. x 0.63-in.	Nylon (Doubled)	
Belly lines	(on the mesh from the quarters)		
Upper	30.5-ft. x 0.63-in.	Nylon	
Lower	(21.0+13.5+12.0)-ft. x 0.63-in.	Nylon	
Wing bridles			Doors: BMV #5 oval (30 June 72 - 01 July 72)
Upper (Head & Rib)	2 x 131-ft. x 0.5-in. + 32.75-ft. x 0.63-in.	Galv. wire	10.25-ft. x 5.84-ft. x 3-in. (47 ft ² 2200-lb.)
Lower	164-ft. x 0.88-in.	" "	Rectangular (02 Jul 72 - 03 Jul 72)
Ground warps	120-ft. x 0.88-in.	" "	10.5-ft. x 4.5-ft. x 3-in. (47 ft ² 1800-lb.)
Door legs	Each 10-ft. x 0.63-in.		Kite: Wooden (1200/01 Jul 72-1200/02 Jul 72)
Towing warps	0.93-in. diam.		47.5-in. long x 31.5-in. wide x 1.5-in. thick

Diamond IX Midwater Trawl



DIAMOND IX MIDWATER TRAWL

Line	Length X Diameter	Material	Attachments
Headline	301-ft. x 0.625-in.	Galv. steel with braided nylon cover	100 x 8-in. diam. aluminum
Bosom	21-ft.		
Each wing	113-ft.		
Extension	27.5-ft.		
Footrope	(same as headline)		300-lbs. lead
Wing lines	55-ft. x 0.875-in.	Nylon (4 places)	
Rib lines			
Bellies	265.5-ft. x 0.50-in.	Double nylon (6 places)	
Cod-end	115.5-ft. x 0.875-in.	" " (4 ")	
Wing bridges			
Upper	390-ft. x 0.625-in.	Galv. wire	1200-lb. weight each side
Lower	390-ft. x 0.625-in.	" "	30-ft. from wing extensions
Ground warps	None		Doors: 5 sq-m. Suberkrub

Equivalent Trawl Terms in English Speaking Countries

Canada	USA-NOAA-Knake	UK-Garner	FAO
Headline	Headrope	Headline	Headline
Wing Lines	Door Ends	Wing Line	Wing End Lines
Bolsh or Hanging Line	Hanging or Bolch	Bolch Line	Hanging (Bolsh) Line
Fishing Line	Fish Line	Fishingline	Fishing Line
Footrope	Footrope	Bobbin Wire or Footrope	Footrope (Groundrope)
Wing Bridles	Wing Bridle (Legs)	Headline & Tow (Toe) Legs	Spreading Wires (Legs)
Ground Warps	Ground Wire	Cables or Bridles	Sweep Lines
Door Legs	Trawl Door Back Strap	Back Strop	Backstrops
Pennants	Pennant (Idler)	Independent Piece or Wire	Pennant
Quarter Ropes	Quarter Rope	Quarter Rope	Quarter Ropes
Q-R Stops	Q-R Straps		
Q-R Beckets	Q-R Beckets	Headline Becket	Becket
Q-R Back Straps	Q-R Chains	Q-R Strop	Backstrop
Belly Lines	Belly Lines	Belly Line Legs	Lastridge Lines
Rib Lines		Belly Lines	
Splitting Strap	Splitting Strap	Double Bag Becket	Splitting (Halving) Strop
Lazy Deckie	Haul Up Line	Hauling Leg Pork or Poke Line	Haulup Line
Cod Line	Cod End Rope	Cod Line	Cod Line or Draw Rope
Doors	Trawl Door	Otter Door	Trawl Board
Floats	Floats	Floats	Floats
	Towing Warps	Bobbins (Towing) Warp	Bobbins Trawl Warps or Cables