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REPORT OF THE  
**SECOND WORKSHOP ON STANDARD TRAWLS FOR BALTIC  
INTERNATIONAL FISH SURVEYS**

Gdynia, Poland  
23-24 February 1998

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## **1 INTRODUCTION**

### **1.1 Participants**

The following participated in the workshop:

Ulrik Jes Hansen, DIFTA, (Chairman)	Denmark
Holger Hovgaard, Danish Institute for Fisheries Research	Denmark
P.O. Larsson, Institute of Marine Research	Sweden
Valeri Feldman, AtlantNIRO	Russia
Šarunas Toliušis, Fisheries Research Laboratory	Lithuania
Ivo Šics, Latvian Fisheries Research Institute	Latvia
Jan Netzel, Sea Fisheries Institute	Poland
Włodzimierz Grygiel, Sea Fisheries Institute	Poland
Wiesław Blady, Sea Fisheries Institute	Poland
Waldemar Moderhak, Sea Fisheries Institute	Poland
Roman Szydłowski, Sea Fisheries Institute	Poland
Krzysztof Radtke, Sea Fisheries Institute	Poland

### **1.2 Terms of Reference**

At the ICES Annual Science Conference in 1997 the following resolution was adopted: (ICES C. Res. 1997/2:44):

A Workshop on Standard Trawls for Baltic International Fish Surveys (WKBIFS) under the chairmanship of Mr U. J. Hansen (Denmark) will be held in Gdynia, Poland from 20 - 21 January 1998 to:

- compile data on, and finalise the description of national survey trawls and research vessels;
- specify in detail the properties which are necessary for new standard trawls for small and large vessels and propose in detail standard trawl types and a manufacturer for these trawls;
- make recommendations on the type and specifications of standard bottom trawls for survey purposes.

With approval from the ICES General Secretary the dates for the meeting were later changed to 23 - 24 February 1998.

## **2 BACKGROUND INFORMATION**

### **2.1 Background**

The first Workshop on Standard Trawls for Baltic International Fish Surveys was held in Gdynia, Poland 8–10 January 1997. The Workshop found it not possible to select a single fishing gear that is optimal to cover all the species and size classes presently assessed in the Baltic Sea, considering also the two size classes of research vessels operating in the area and the much varying bottom topography to be covered. The Workshop presented in its report (Anon., 1997a) three options, giving details on ground-gear construction, netting material, mesh sizes, bridles, sweeps, trawl doors, and so on.

At its meeting in Rostock, Germany, 9–13 June, 1997 (Anon., 1997b), the Baltic International Fish Survey Working Group (WGBIFS) decided to recommend the TV3 trawl type, with the specifications given by WKBIFS, as a standard trawl for smaller research vessels. For the larger vessels, however, the WG recommended empirical tests to be carried out with a rock-hopper gear to optimise the dimensions and rigging of the ground rope arrangement. In general, the WG found the approach with two different ground gear arrangements preferable, to ensure a good area coverage, while at the same time allowing for a high catching efficiency for small cod in Subdivisions 24 to 26 where most of the cod stock is presently found.

The FTFB Working Group considered the WKBIFS report at its meeting in Hamburg, Germany, 14–17 April, 1997 (Anon., 1997c), and had a lengthy discussion on it. The WG concluded that one single trawl cannot be recommended that will match all vessel sizes, bottom types and geographical areas. It further suggested that a compromise of two sizes

of the same trawl with two sizes of groundgear, one for large vessels and one for small vessels would be the best option from an intercalibration perspective. The WG also noted that a new survey gear for the Baltic Sea will necessitate a long transitional period with optimization of the riggings for the selected trawl(s) and intercalibrations between the new standard trawl(s) and the old ones.

The Baltic Fish Committee, at its meeting during the ICES Annual Science Conference in Baltimore, USA, 25 September - 3 October, 1997 (Anon., 1998), reviewed the above mentioned reports and had a discussion on the subject. No final decision was taken during the meeting about what option should be chosen. A recommendation was passed on to the Consultative Committee and adopted there, that this present Workshop should be held. In subsequent contacts between the WKBIFS chairman and the chairman of the Baltic (FISH) Committee it was stated that the WK should work with the option of one intermediate groundgear for the larger vessels.

## **2.2 Suggested survey trawls**

Based on the work of the previous workshop and the results of the discussions during the present workshop the following suggestions can be drawn up.

### **Survey vessels up to 400 HP**

Trawl design:

- TV3 trawl, 520 meshes in 80 mm full mesh circumference. The detailed specification is given in Appendix 1a. The design is the property of Ray's Vodbinderi, Hirtshals, Denmark, but the design and full documentation has been provided and are at the disposal of the research laboratories.

Ground-gear construction:

- A groundgear with rubber discs. The size of the discs are to be 100 mm and they are spaced 10 cm in the centre of the bosom, increasing to 50 cm under the arms and wings. The spacing are achieved by 50 mm rubber tube or 50 mm rubber discs. A detailed specification is given in Appendix 1b.

Netting material:

- Polyethylene with a polyamide codend.

Mesh size:

- 12 - 16 mm in the codend. To be precisely determined by BIFS WG in June 1998.

Bridles, sweeps and trawl doors:

- The rigging of the net with bridles, sweeps and trawl doors, as well as the materials and dimensions of these are given in appendix 1c. It is recommended that the suggested rigging is optimized by flume tank experiments.

It can be accepted to use other trawl doors than the specified as long as such doors are capable of giving the same horizontal spread. The required spread will be given by the manual which are to be prepared for the survey trawl.

### **Vessels with more than 400 HP**

Trawl design

- TV3 trawl, 930 meshes in 80 mm full mesh circumference. The detailed specification is given in Appendix 2a. The design is the property of Ray's Vodbinderi, Hirtshals, Denmark, but the design and full documentation has been provided and are at the disposal of the research laboratories.

#### Ground-gear construction:

- A rockhopper ground-gear. The size of the discs are to be 200 mm spaced 10 cm in the centre of the bosom. The diameter are decreasing to 150 mm and the spacing increasing to 50 cm under the arms and wings. A detailed specification is given in Appendix 2b.

#### Netting material

- Polyethylene with a polyamide codend.

#### Mesh size:

- 12 - 16 mm in the codend. To be precisely determined by BIFS WG in June 1998.

#### Bridles, sweeps and trawl doors:

- The rigging of the net with bridles, sweeps and trawl doors, as well as the materials and dimensions of these are given in appendix 2c. It is recommended that the suggested rigging is optimized by flume tank experiments.

It can be accepted to use other trawl doors than the specified as long as such doors are capable of giving the same horizontal spread. The required spread will be given by the manual which are to be prepared for the survey trawl.

### 2.3 Notes to the suggested trawls

The present workshop has not altered the views on the properties necessary for new survey gears for the Baltic from the views of the previous workshop. Consequently the recommendation for the small vessels is the same. For the large vessels a similar TV3 trawl is recommended with an intermediate ground-gear. This is in accordance with the wishes of the Baltic Committee.

It should be mentioned however, that the discussion of the workshop as well as in the BIFS working group and Baltic Committee have focused on the following problem:

- Specifying one intermediate groundgear for the large vessels implies that considerable areas in the northern part of the cod distribution in the Baltic Sea (ICES Sub-divisions 26-28) cannot be covered by international surveys. The benefit, - on the other hand - is that the stock assessment work only have to deal with two data sets: one from the small vessels and one from the large vessels.

The present workshop have considered this problem and have taken into account that the discussion may rise at a later stage or that some laboratories might want to carry out national surveys in these areas. If work is carried out on hard ground, the large TV3 trawl can be equipped with a heavy rockhopper gear. The Swedish and Russian laboratories are at the moment using such large groundgear but in different configurations, see Appendices 3a and 3b. It would be reasonable if the two laboratories tried to adapt the two gears to one single, and that other laboratories needing a heavy groundgear used the same.

The division between vessel sizes is here given tentatively by the horse power of the main engine. The actual selection of a trawl for a specified vessel must depend of the actual pull of the vessel, as well as of practical considerations concerning shooting, hauling or storing on board. Basically it is recommended that the smallest trawl are used *only* if the vessel cannot handle the large trawl or obtain the required towing speed during surveys with it.

### 2.4 Implementation

The specifications regarding the gear rigging must be available within 1998, if the first international Baltic trawl survey are to be conducted in the spring of 1999. It is advised that the gear rigging should be evaluated and optimized through flume tank model testing. Flume tank technology is not available by national research institutes within ICES. This implies that funding must be made available to enable such work to be carried out at commercial fisheries development institutes.

Introducing new standard survey gears requires that funding is provided by the countries participating in the survey programme. However it can be anticipated that some non-EU Baltic countries will have difficulties to finance the purchase of the new gears. This may lead to the unfortunate situation that the research vessel capacity and the experiences of a number of countries are not utilized and consequently that the survey are to be conducted by rather few Baltic research institutes.

The tests of the two trawls in model scale makes it possible to optimize the rigging of the nets and they will reveal how sensitive the trawls are to alterations. Furthermore it will be possible to provide material for a manual on the use of the trawls. The flume tank tests should be evaluated and verified by full scale trials at sea.

It is anticipated that a number of suggestions regarding gear rigging and the operational procedures will be forwarded after the first surveys are commenced. A group of gear technologists should be established to supervise all the tests and enable an evaluation of the first practical experiments. They should suggest possible changes regarding the gear and the working procedures. The group should then finalize the technical manual of the survey, i.e., specify all necessary details of the gear parameters, the riggings and operational procedures.

The BIFS WG noted that time series from a new survey are only useful for assessment purposes after a period of approximately 5 years and that this implies that the existing surveys must be continued within this transition period. The BIFS WG noted that an intercalibration may be carried out during the transition period by covering each station with the traditional and the new gear. However, this procedure will lead to somewhat less precise abundance estimates in the transition period if the survey effort is kept at the historical levels. An alternative procedure is to conduct direct intercalibration studies between the existing gears and the new gears. The latter procedure will shorten the transition period as the existing time series may then be converted to the new standard.

The use of two different gears determined by vessel size also requires an intercalibration to be carried out between the two new gear types. As suggested by the BIFS WG this work may be carried out on the medium size vessels capable of operating both sizes of gears.

### 3 RECOMMENDATIONS

The workshop adopted the following recommendations:

- The new standard trawls for international fish surveys in the Baltic should be a TV3 trawl in two different sizes. The specifications - reproduced in this report - should be according to the ones given by Ray's Vodbinderi, Hirtshals, Denmark.
- The trawls should be thoroughly tested in model and full scale in order to optimize the rigging and to produce a manual.
- A 'task-force' should be established to supervise the model and full scale tests and recommend on changes in the rigging and use of the new trawls. They should also prepare the manual for the trawls.
- In the case that one of the laboratories wants to conduct national surveys on very hard ground and cannot do this with any of the specified trawl ground gears they should use one of the special ground-gears specified in this report (Appendix 3a or 3b).

### 4 REFERENCES

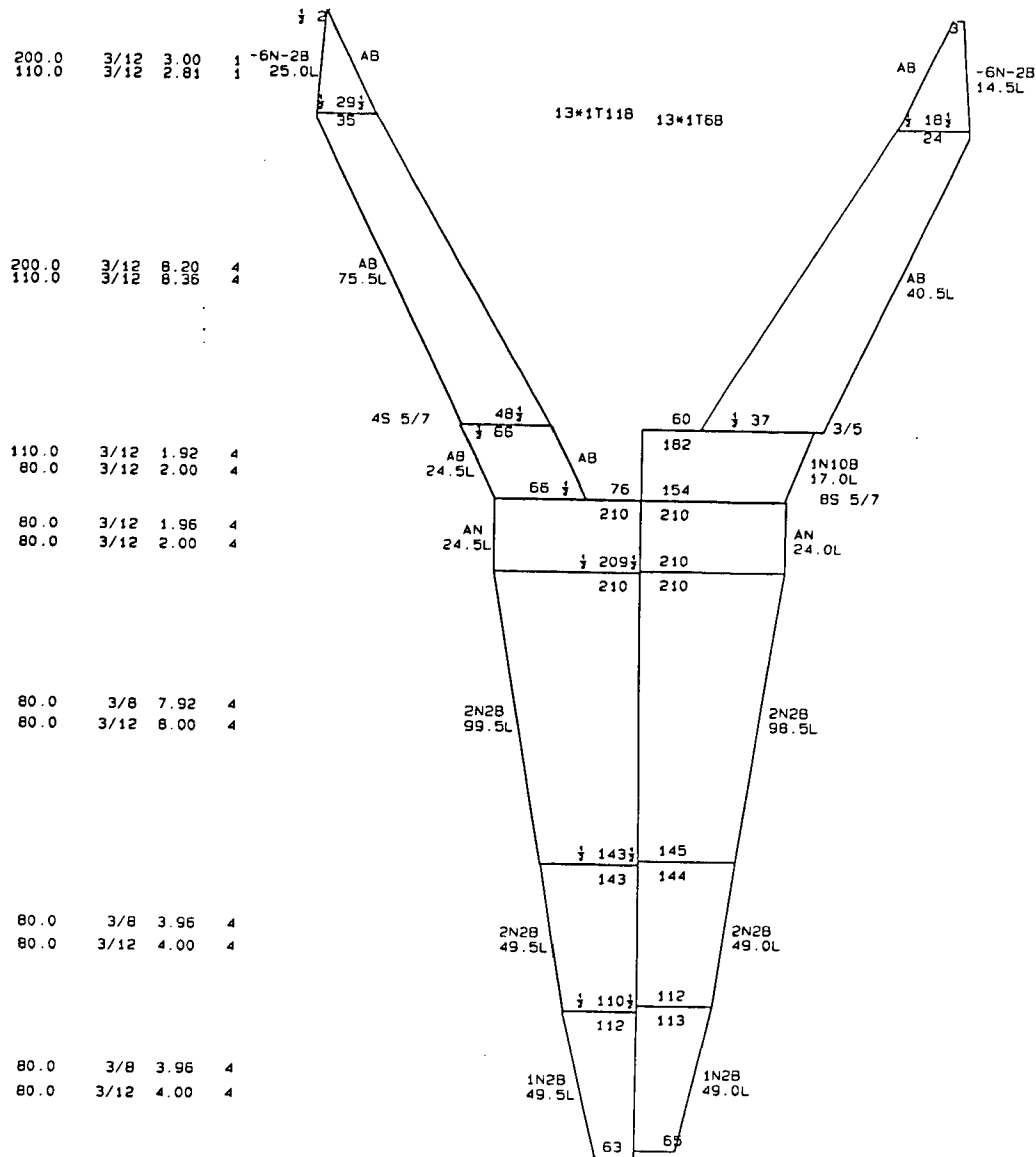
- Anon., 1997a. Report of the Workshop on Standard Trawls for Baltic International Fish Surveys. ICES C.M. 1997/J:6, 18 pp.
- Anon., 1997b. Report of the Baltic International Fish Survey Working Group. ICES C.M. 1997/J:4, 52 pp.
- Anon., 1997c. Report of the Working Group on Fishing Technology and Fish Behaviour. ICES C.M. 1997/B:2
- Anon., 1998. Baltic Fish Committee. In: ICES Annual Report for 1996/1997. 164-165.

## 5 APPENDICES

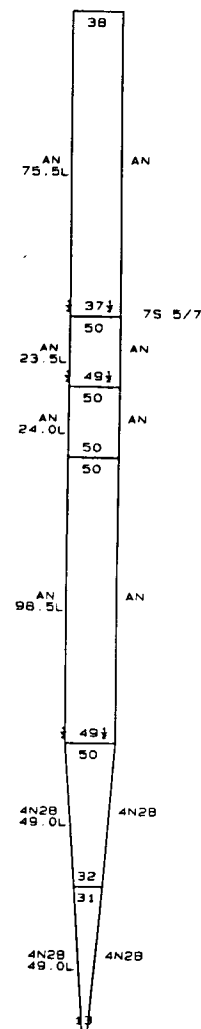
1. Specification of TV3 trawl, 520# in 80 mm full mesh
  - a) Net (Page 6)
  - b) Rigging of doors, bridles, and groundgear. (Page 7)
2. Specification of TV3 trawl, 930# in 80 mm full mesh
  - a) Net (Page 8)
  - b) Rigging of doors, bridles, and groundgear. (Page 9)
3. Construction heavy groundgear.
  - a) Swedish groundgear (Page 10)
  - b) Russian groundgear (Page 11)

# Appendix 1a

Mesh Twine stretch Knots  
mm length selvedge



Mesh Twine stretch Knots  
mm length selvedge



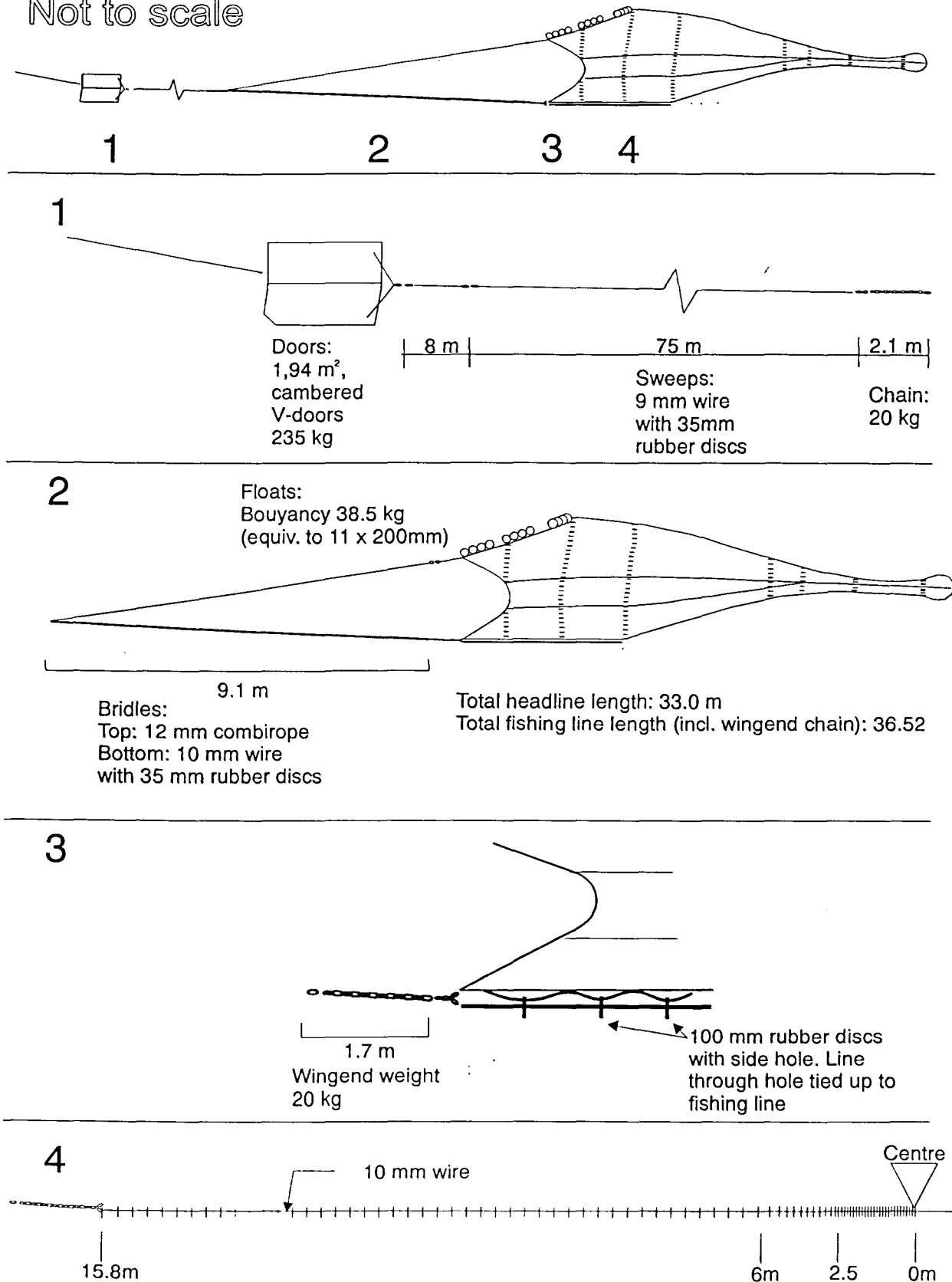
V3, 520# in 80mm full mesh  
CES International Baltic Fish Survey Trawl  
MALL VESSELS  
April 1998



## Appendix 1b

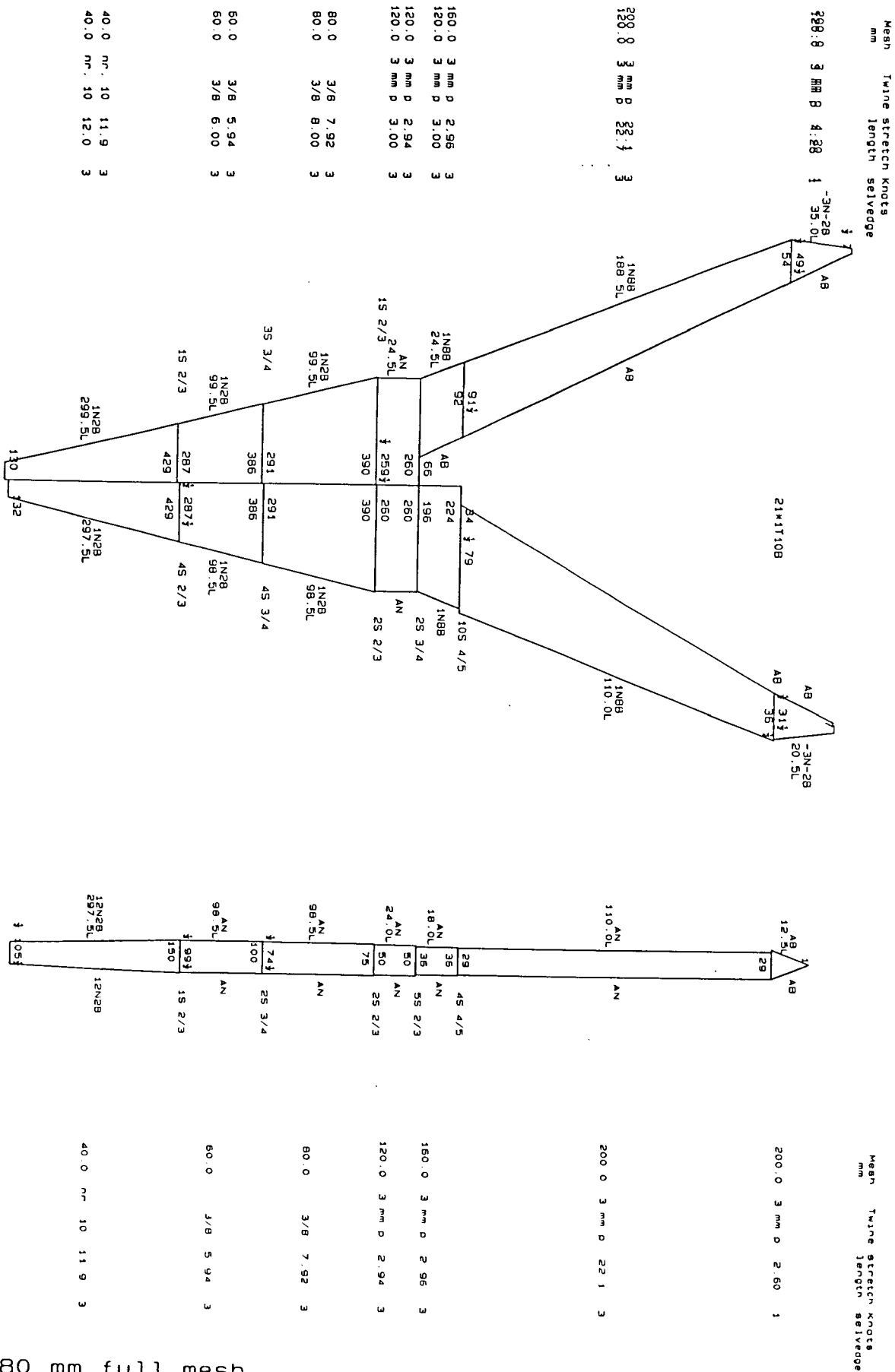
### TV3, 520#, rigging of doors, bridles and groundgear

Not to scale



- 0 - 2.5 m: 100 mm rubber disks with side hole, 100 mm distance
- 2.5 - 6 m: 100 mm rubber disks with side hole, distance gradually increasing from 100 mm to 500 mm
- 6 - 15.8 m: 100 mm rubber disks with side hole, 500 mm distance
- 0 - 15.8 m: 14 mm rubber or plastic tube filling all the space between the large discs

## Appendix 2a

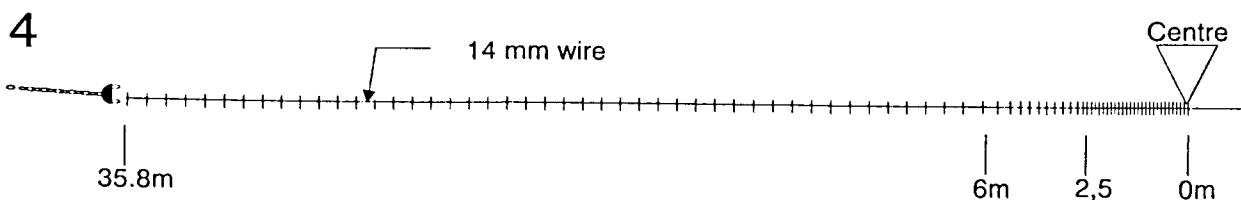
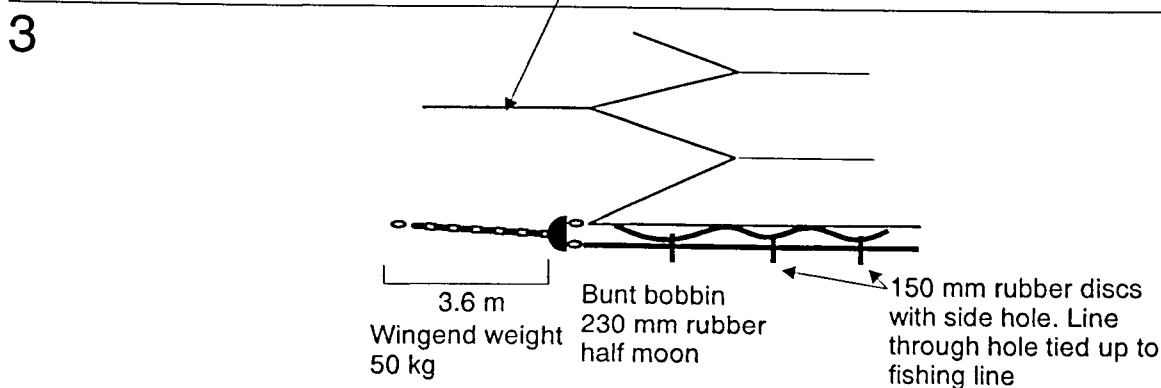
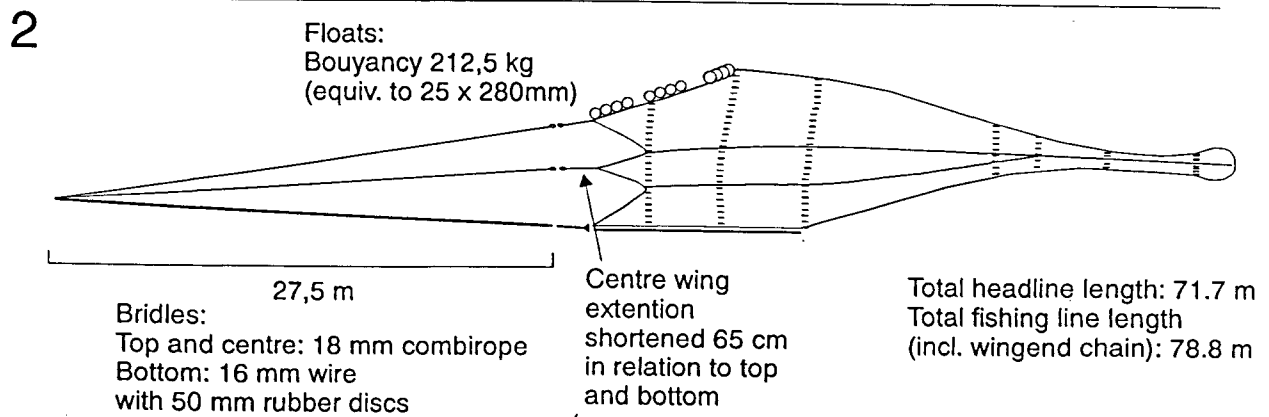
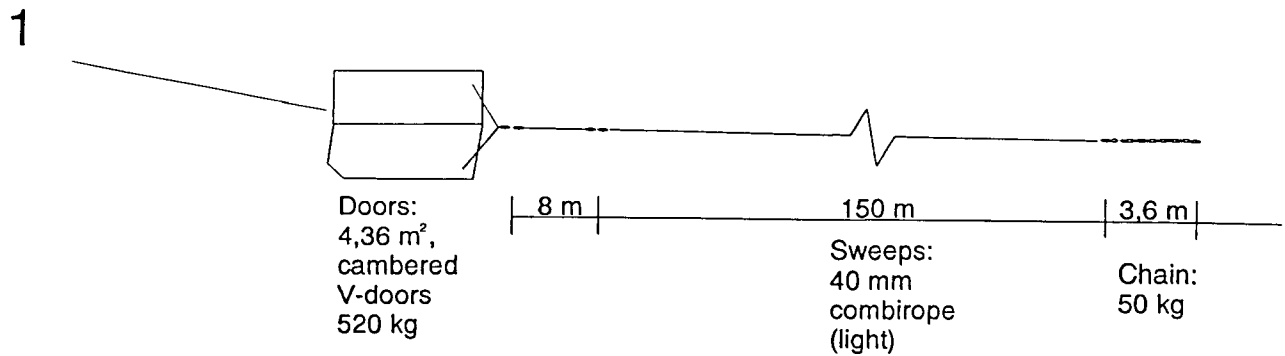
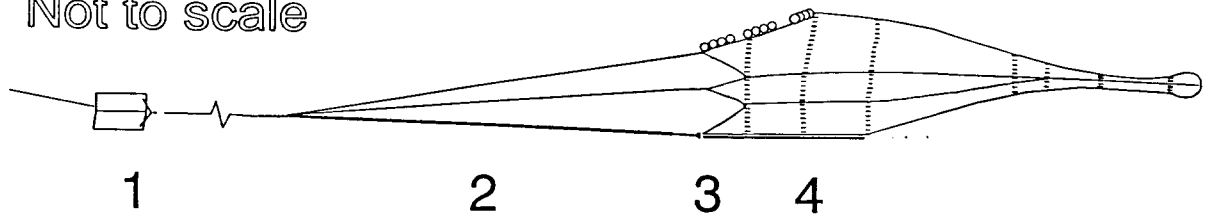


RV3, 930# in 80 mm full mesh  
ICES International Baltic Fish Survey Trawl  
LARGE VESSELS  
1 Feb 1998

## Appendix 2b

### TV3, 930#, rigging of doors, bridles and groundgear

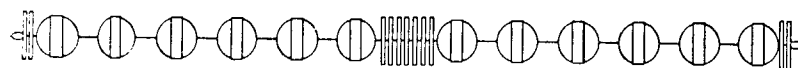
Not to scale



- 0 - 2.5 m: 200 mm rubber disks with side hole, 100 mm distance
- 2.5 - 6 m: 200 mm rubber discs with side hole, distance gradually increasing from 100 mm to 500 mm
- 6 - 35.8 m: 150 mm rubber discs with side hole, 500 mm distance
- 0 - 35.8 m: 45 mm rubber discs filling all the space between the large discs

## Sweedish groundgear, for Fotö codtrawl.

### Centre (bosom) section



5,30 m




### Wing section



28 cm

10,00 m

### Explanation:

-  Rubber sphere,  $\varnothing = 280\text{cm}$
-  Rubber disc,  $\varnothing = 300\text{ mm}$ ,  $L = 30\text{ mm}$
-  Plastic disc,  $\varnothing = 45\text{ mm}$ ,  $L = 22\text{ mm}$

All space between large rubber discs filled with plastic or rubber discs  $\varnothing = 45\text{ mm}$ .

**Russian groundgear, for Hake trawl.**







**Centre section, bosom**



### Wing section



### Explanation

-  Rubber sphere,  $\varnothing = 400$  mm
-  Rubber disc,  $\varnothing = 400$  mm
-  Rubber half-spheres,  $\varnothing = 400$  mm
-  Metal spacer,  $L = 200$  mm
-  Metal spacer,  $L = 75$  mm
-  Small rubber discs