

Ulrik Jes Hansen

Redesign of trawls and raised doors in demersal trawling gives large reduction in environmental footprint

financed
by:

Danmark og EU investerer i bæredygtigt fiskeri og akvakultur
Projektet er støttet af Fødevareministeriet og EU



Consulting and Training in Fisheries

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Best Available Technology

4 very different fisheries, 4 very different vessels, 4 similar approaches:

F/V Katrine Kim, 219 HP, 17 m
 Baltic cod,
 2010 – 2012, project completed



F/V Altje Postma, 625 HP, 31 m
 Roundfish, North Sea
 2012, project completed



F/V Lonny Hedvig, 734 HP, 45 m
 sand eel, North Sea,
 2012 – 2014



F/V Frank Maiken,
 Norway lobster, Kattegat
 2013 - 2015



Background

- ◆ Fuel costs are nearly 40 % of the operating costs of a modern fishing vessel and by far the largest operating cost
- ◆ Fuel costs will increase in future
- ◆ A new EU fisheries policy based on catch quotas will create incentives to use more efficient gear.
- ◆ Environmental concerns over towed fishing gear



Objective

- ◆ Reduce fuel consumption by 30-40 % per unit of catch.
- ◆ Reduce contact with the seabed
- ◆ Economic improvement due to result based fisheries management system
- ◆ Effort limitation and gear design rules are inferior to result based management

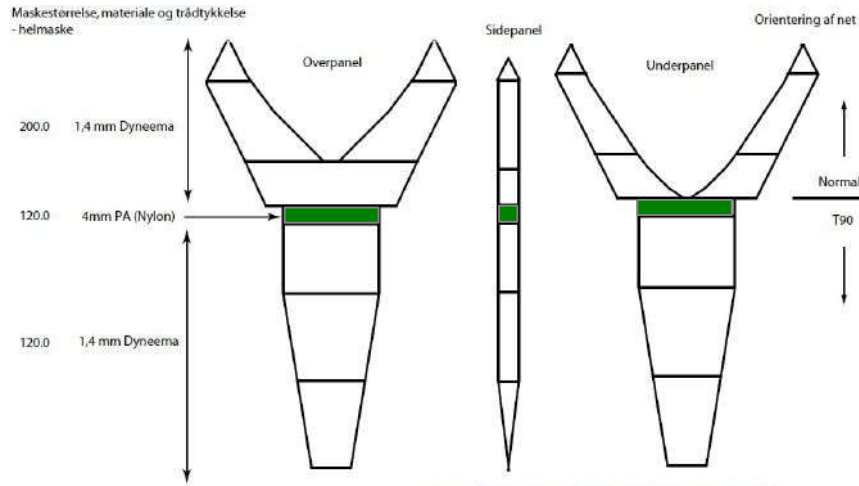


Best Available Technology

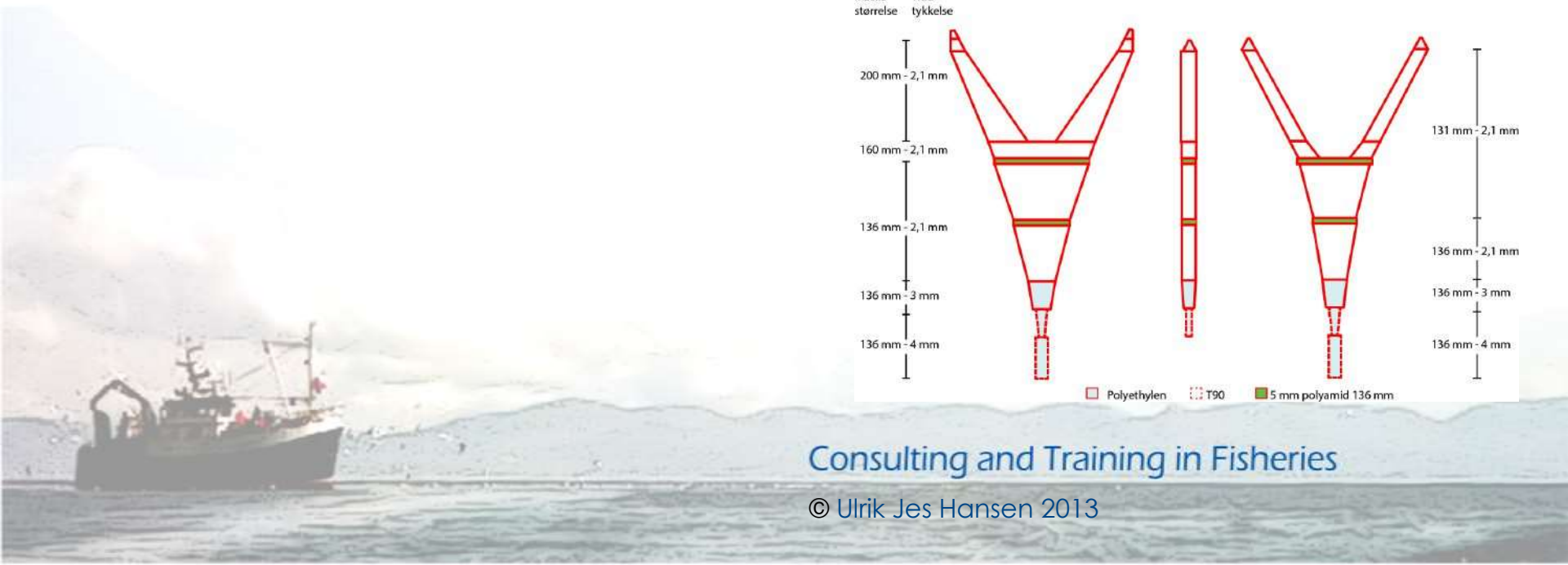
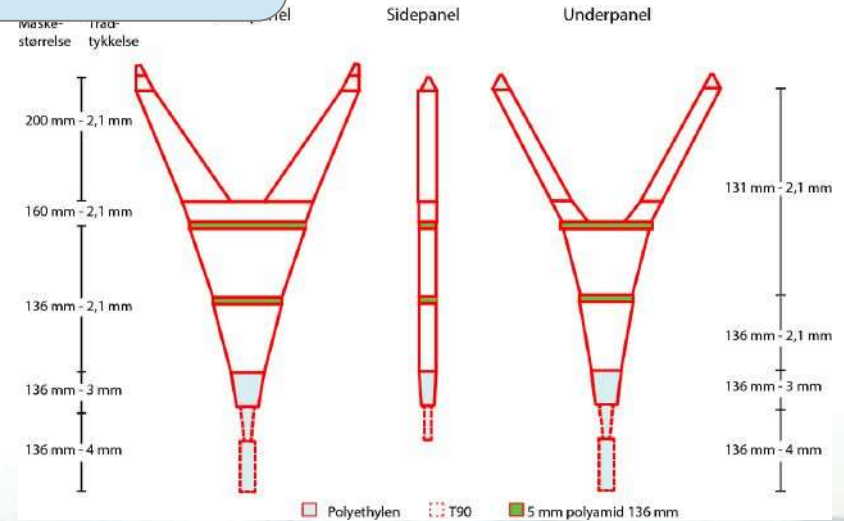
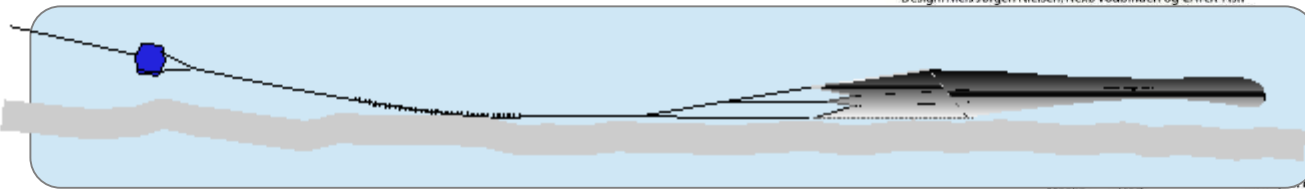
- ◆ Dyneema warps
- ◆ Pelagic Doors w/ height sensors
- ◆ Twin rig
- ◆ Dyneema trawls with nylon bands for elasticity
- ◆ 4-panel trawls, for better control
- ◆ T90 in codend for larger catches
- ◆ Redesigned trawls:
 - ◆ Huge trawls to compensate the reduced netting drag
 - ◆ Side panels – easier to manipulate trawl shape
 - ◆ Flymeshes (= drop-meshes) - large spread
 - ◆ T90 in belly - reduced drag from stickers, debris and algae, and large x-section area



Specs



Design: Niels Jørgen Nielsen, Nexø Vodbinderi og CATCh-Fish



Materials

Dyneema

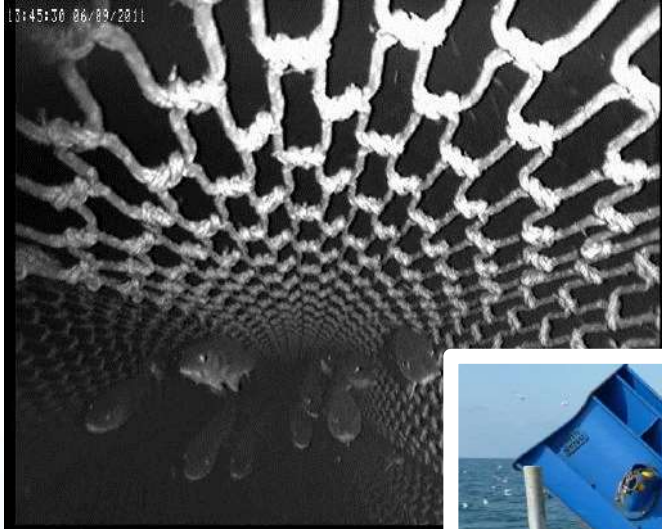
- ◆ Wings, square and belly 1,1mm – 2,0 mm
- ◆ Countless loads close to breaking, - but not peak loads

PA – Nylon

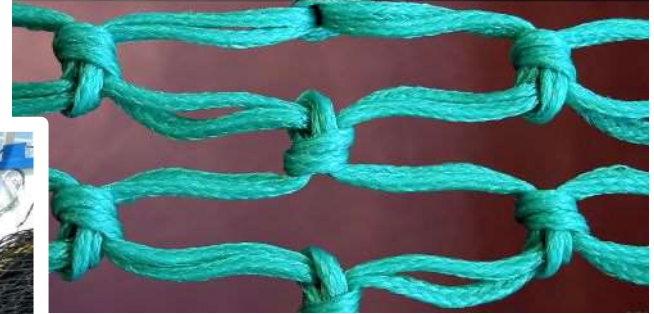
- ◆ Narrow sections in belly
- ◆ Codend



T90



T90



Results

Vessel 17 m - Baltic cod

- ◆ Fuel cons. - 7.5%
- ◆ Catch per hour +17%
- ◆ Catch per litre +26%
- ◆ Combined effect +40%
- ◆ Investment 52,000 €
- ◆ Payback time 11 months
- ◆ Profitability +48%

Vessel 31 m - whitefish in the North Sea

- ◆ Catch +18%
- ◆ Gross earnings +13%
- ◆ Investment 120,000 €
- ◆ Payback time 7 weeks



Conclusions – Trawl doors

- ◆ The doors contribute by 15% savings
- ◆ The shoe of the door after 12 months in use:
- ◆ No maintenance



Conclusions – Dyneema warps

No cover on smaller diameters

New and used warp

Nylon sheaves



Warp drums without warp guides



Conclusions – Dyneema nets

- ◆ No elasticity – therefore narrow sections of PA
- ◆ Reduced twine area should be used to build larger nets
- ◆ T90 to reduce increased amount of debris and algae (?)
- ◆ Longer lasting nets due to less uptake of sand etc. (?)
- ◆ Codend in thicker twine – PET or PA



Thank you!

Aquamind, project leader

Local netmanufacturers, trawl design

Thyborøn Trawl Doors

CATch-Fish, gear design

Danish Technological Institute
(energy consumption measurements)

Local skippers, net manufacturers and fishermen
associations



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