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

financed by:

Consulting and Training in Fisheries
© Ulrik Jes Hansen 2013
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

Consulting and Training in Fisheries

© Ulrik Jes Hansen 2013
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
# 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

---

*Consulting and Training in Fisheries*

© Ulrik Jes Hansen 2013
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

Consulting and Training in Fisheries
© Ulrik Jes Hansen 2013
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 net manufacturers, trawl design
Thyborøn Trawl Doors
CATch-Fish, gear design
Danish Technological Institute (energy consumption measurements)
Local skippers, net manufacturers and fishermen associations

Contact:
Ulrik Jes Hansen – ujh@catch-fish.net
Poul Tørring – pt@aquamind.dk

Consulting and Training in Fisheries
© Ulrik Jes Hansen 2013