International Workshop on Seine Net Fishing

Date: 29 – 30 May 2008

Venue: Sudurnes Comprehensive College, Kevlavik, Iceland
International School for Commercial Fishing Gear Technology (ISCFT)

The International School of Commercial Fishing Gear Technology was established by organisations, individuals and companies from the fishing industry on the south-west corner of Iceland. ISCFT is located at Sudurnes Comprehensive School (Fjölbrautaskóli Sudurnesja), a college of further education in Iceland that has for many years supplied the theoretical training for net makers.

Organiser(s): Larus Palmason

Background:

With the growing interest in this relatively fuel-efficient method of fishing, the college invited speakers from Iceland and across Europe to share their experience and expertise in seine netting (also known as Danish seining, as this technique has its origins in Denmark).

Lárus Thór Pálmason, the college's senior lecturer in fishing gear technology and principal organiser of the event explained that rising fuel prices had driven a growing interest in seine net fishing and the college had been approached informally on several occasions to show groups of fishermen and vessel owners from other countries how seine net fishing works.

The visits allowed an insight into how fishermen from other countries were dealing with the problems related to high fuel costs and looking to methods such as seine netting as one way of mitigating the problem.

Programmes for visiting fishermen included visits to fishing gear suppliers, some gear simulation sessions in the small flume tank which the college has, and the chance to spend a day at sea with a working boat. These visits have been so popular that it was decided that it would be a good idea to try and pool a lot of the information that has been gathered into a workshop, and hence the international workshop was arranged.

Workshop:

The aim of the workshop was to cover subjects such as practical aspects of seine net fishing, design of seine net gear, seine net deck equipment, fuel consumption, environmental aspects and the quality, marketing and pricing of seine net caught fish.

The two-day event was organised with a range of speakers from fishing skippers and net makers to scientists and economists who have studied the price differences between seine caught fish and catches landed from other methods.

Additional time was set aside for visits to companies and other Icelandic fisheries related interests.

As well as lectures from invited speakers, there were opportunities to meet representatives of leading seine net equipment suppliers, as well as working fishermen and representatives of fishermen's federations and associations.

Scientists from the Icelandic Marine Research Institute who have worked on assessing ground impact of various fishing methods including seine netting presented evidence to demonstrate the relatively benign effect of this method in terms of seabed impact.

Economics experts who have analysed costs of seine net fishing compared to other methods demonstrated the potential financial benefits associated with this method.

The local authority hosted a cocktail invitation for all participants at the local museum and there were several other social events that took place alongside the workshop.

The workshop was attended by fishermen and other industry stakeholders from a number of countries from around the world including, Iceland, Norway, Holland, UK, France, Canada, Ireland, Namibia.

UK representation:

KA from Seafish assisted with the coordination of a presentation of a UK perspective on the resurgence of interest in seine netting in the UK. This presentation was put together and delivered by Mr Leslie Tait, Fisheries Technology Manager from the North Atlantic Fisheries College Marine Centre in Shetland. Leslie Tait is an ex skipper and vessel owner with over 30 years experience predominantly in seine netting and as such was approached by Seafish to assist with input to this workshop.

The presentation described the changes in technology in seine netting over recent years bringing the method up to date using the example of the first new seine netter to be built for Shetland in 20 years. MFV *Radiant Star* owned by

Burra Isle skipper Victor Laurenson and partners was built by Parkol Marine Engineering of Whitby and started fishing in January 2008. Leslie Tait spent some time onboard *Radiant Star* just prior to the workshop, collecting video material for his presentation. This enabled him to show the vessels approach to more efficient gear handling and modern fish handling systems which created a lot of attention from those present.

Mike Park, Chairman Scottish White Fish Producers Association (SWFPA) arranged for two seine net skippers to attend; Alistair Milne, MFV *Tranquillity* and William Smith, Seine net advisor.

Rory Campbell, Scottish Fishermen's Federation (SFF), Science and Environmental Policy officer also attended representing the Scottish Industry.

Unfortunately, a number of other UK industry representatives, (English and Scottish), that were due to participate were unable to attend due to other commitments.

Selected Presentations:

Day 1

The workshop was opened with a speech by the Icelandic Fisheries Minister:

Opening address of Mr Einar Kristinn Guðfinnsson,

Minister of Fisheries and Agriculture of Iceland

International Workshop on Seine Net Fishing,

Keflavík, Iceland, 29 May 2008

Ladies and gentlemen,

It is a pleasure for me to have the opportunity to address this interesting meeting that has the scope to discuss various matters related to the operation and performance of Danish-seine. Here in Iceland, the effects of the Danish-seine on benthic life and the fish stocks have been disputed for many decades. In fact, I believe it is correct to say that there has hardly been held a meeting related to marine resources, where these matters have not been debated.

One of the first attempts to discuss the Danish-seine on a scientific basis here in Iceland was undertaken by Dr. Árni Friðriksson, a fisheries biologist and Director General of the then Fisheries Department of The University of Iceland, and which for a long time was a Secretary General of ICES (The International Council for the exploration of the Sea). In the year 1932 Dr Friðriksson published a paper entitled "The Icelandic plaice fishery and the Danish-seine" where he discusses the potential use of the Danish-seine for our fisheries. Here he explains the criticism that had been raised against the use of Danish-seine in Icelandic waters and his reasoning that where Danish-seine had been in use it seems not to have caused damages to the benthos and that the benthic animals seem to sustain the Danish-seine fishery. Dr Friðriksson

hoped “that every person does understand” from his argumentation “that Danish-seine can not to any great extant damage the benthic communities”. Regarding the effects on juvenile fish he considered “even though Danish-seine fishery was to be permitted within our territorial waters most of the fish stocks exploited for human consumption would not have to worry about the fate of their offspring”. In conclusion he states that at least the Danish-seine would be less harmful for juveniles fish than the bottom-trawl.

The objections against the Danish-seine did not stop with Dr Friðriksson’s thorough argumentation and ever since Danish-seine fishery has by many people been considered causing damages for both benthic life and the fish stocks. In the late 70’s of last century Mr Aðalsteinn Sigurðsson and Guðni Þorsteinsson of the Marine Research Institute, Reykjavik led an experimental study on the function of the Danish-seine and the behaviour of fish in the vicinity of the gear. The experiments showed that a Danish-seine with 170 mm mesh caught a lot less of juveniles fish than comparative bottom-trawl and in 1978 Sigurðsson reported in an article in Ægir that Danish-seine “protects juvenile fish better than most other fishing-gear that are used in Icelandic waters”. However, he mentions that the Danish-seine does harm the halibut stock because two year old halibut doesn’t escape through the 170 mm mesh of the Danish-seine, while he also points out that a young halibut is caught by all fishing-gear. Aðalsteinn reflected on studies that had been done abroad on the influences of towed gears on the benthos and concluded that the Danish-seine caused limited damage on most benthic animals. As for advantage of the Danish-seine he mentioned direct observations in Faxaflói where “The seine itself floated lightly over the benthos and touched it only now and again with the fall and rise of the waves. Only in a few places could there be seen little marks in the sand”.

So many words, but we still today are debating the Danish-seine. This led last year Mr Hrafnkell Eiríksson and Jónbjörn Pálsson at the Marine Research Institute, Reykjavik, to compile available information on the development of the Danish-seine as a fishing-gear and the development of Danish-seine operation in Icelandic waters from the beginning of its use. The report points out that the length of the trawling-robes is usually greater than during the mid 1990’s, also rubber disks or stonestilts have been taken into use on the footropes. However, the interest amongst vessel owners for conducting Danish-seine fishery is at present a lot less than it was about 10 years ago so the fishing effort has gone down. The catch in the Danish-seine fishery has also decreased since it was at a peak in the years 1996-1997. That mainly results from a less catch of dab and rough dab even though the catch of round fish has increased, mostly because of increased catch of haddock almost all around the country. This is reflected in an increased round fish catch in almost every cast while the flatfish catch has been decreasing. This development in fishery, for example the increase in abundance of haddock in near shore areas north of the country, has resulted in continued dispute on the use of Danish-seine in competition with longline- and jigging in relatively shallow water. Some people have stated the need for further strengthening the legislation on the allowed size of the Danish-seine boats and also the design or size of Danish-seines. However, in this context it must be stated, that according to research conducted by the Marine Research Institute small fish is not caught to a lesser degree by the Danish-seine than by other fishing gear, except for gill nets.

The above mentioned sums up the development of the use of Danish-seine in Icelandic waters and also demonstrates quite clearly the fact that the dispute mainly concerns the nature of different fishing-gears, i.e. it sort of competition between groups of stake holders using different fishing-gear to catch a limited resource in a limited ocean area. Also the dispute has emotional aspects. Thus a housewife or a small boat owner in a given village does not like when they see an efficient Danish-seine trawler sweeping the sea floor right in front of their kitchen window or, "almost in their back yard" as we sometimes say. But of course we are in favour of catching the fish with efficient and economic gear without damaging the environment and in harmony with other users of the resource.

Still there are people who believe the Danish-seine is an evil tool. However, with present-day technology there is more hope than before that we will be able to throw a light on the true nature of this matter. With this in mind I have secured financial support to the Marine Research Institute this summer for undertaking a detailed comparative study in two fjords in north Iceland, i.e. in an area that has for a long time been closed for Danish-seine fishing on the one hand and in an area where Danish-seine has been used over a prolonged period of time. Through such investigations and other related work we should be able to approach the answer to the question of flaws and advantages of the Danish-seine and therefore avoid unnecessary conflicts. Such research should also help us to identify and resolve issues that may emerge and in general help improving the fishing gear, which is in common interest for all of us working in the fishing industry.

I am confident that a conference like this, where exchange of views and information takes place will help constructive dialogue on this long debated fishing gear. I wish you a constructive and successful meeting and look forward learning about your conclusions.

Ladies and gentlemen, it is a true honour for me to formally open this international symposium on the Danish-seine.

Thank you.

Icelandic Federation of Seine Net Fishermen – Fridrik G Halldorsson

The workshop was started with a presentation from Fridrik G Halldorsson as spokesman for the Icelandic Federation of Seine Net Fishermen.

Mr Halldorsson described the longstanding and ongoing dispute concerning the environmental impacts of seine netting as mentioned in the Fisheries Minister's speech. He described a brief history of seine netting in Iceland and the establishment of their Federation in 1995 in response to areas of opposition to the method. Certain sectors of the Icelandic industry still claim adverse impacts on stocks and grounds by this method. The Federation lobbies strongly for scientific research into the effects of seine net fishing on the marine environment and works towards a good relationship and flow of information between the Federation and the Icelandic Marine Institute as well as other organisations.

Mr Halldorsson countered the criticism that seine netting frightens fish away from large areas of the fishing grounds by describing the situation in Faxa Bay in Iceland where after 30 years of seine netting the abundance of fish in these waters has never been greater. Other similar examples were quoted from other areas around the Icelandic coast including experiences relating to fishing going back to 1960 when the grounds were opened up to seine netting after a 7 year ban. Fishermen recounted that fishing was slow during the first year of opening of the grounds after the ban but improved over the following years as activity increased.

Mr Halldorsson went on to talk about the gear developments over recent years and the influence on efficiency and seabed impact. He supported the argument that the seine net ropes have little long term impact on the seabed by showing some underwater film of the ropes in action, clearly showing light contact with minimal disturbance.

A responsible approach to the fishing activities of the seine netting community was demonstrated by their commitment to ongoing research to monitor the effects of this activity on the marine ecosystem. The federation is working with the Marine Institute to conduct research to examine the impacts of the method by detailed comparative studies of two areas (fjords) in north Iceland, i.e. in an area that has been closed to Danish-seine fishing for a long time and one which has seen seine-net activity over a prolonged period of time.

Mr Halldorsson concluded by summarising the benefits of the seine-net method as the one that delivers the greatest variety of species of the highest quality with low environmental impact and is most economic in terms of fuel costs.

Seine Net Fishing in Iceland – Skipper Jon Arnason – *Vestri* BA-63

Skipper Jon Arnason gave a brief history of the development of seining in Iceland describing the changes in vessel size, gear design and catches. The main points of the presentation are summarised:

Development over last 20 years:

- Prior to 1990 deck equipment saw little change since 1970's
- Equipment concept relatively unchanged
- New type of winch appears around 1990
- Largely unchanged today apart from scale
- Major changes in fishing capacity and gear handling
- Net drums introduced making gear handling easier and safer
- Leading to larger gear
- Bigger gear leads to bigger vessels and opens up opportunity to explore new grounds further afield
- Greater variety of vessel size and to some extent design
- Further equipment developments:
    - Sonar for identifying and charting suitable grounds and deploying gear

    - Introduction of plotters
        - Better (more accurate) charting of grounds
    - Rope tension and length measuring
    - Current logs

- Fishing gear developments:
    - Larger vessels allowed more scope for gear development
    - Seine rope
        - Heavier and larger diameter ropes
        - Harder wearing/new materials
    - Nets getting bigger

- New investments/new vessels demonstrate optimism in future of seine netting
- Changes to fishing patterns
    - Less targeting of flatfish due to lower prices and cuts in plaice quotas
    - Big increase in haddock quota leads to greater increase in seine netters targeting haddock – more than other fishing methods
    - Leads to changes in gear designs
        - seine net design – higher opening
        - Groundgear design – hopper rigs to avoid flatfish and target grounds more suitable for catching haddock
    - Increase in seine net caught fish compared to other methods
    - Catch profiles changed - less cod – much more haddock (1:3)
    - More selective method

Reasons for change to Seine netting:

- Tighter quotas
- More selective – avoids cod to a greater degree than trawl
- Less plaice
- Seine netting highly adaptable and flexible , allowing use under changing conditions
- Fuel efficient
- ~50% of fuel consumption of similar sized trawler

Future developments?

- Will boats get bigger and lead to expansion in operations/grounds?
- Fishing in deeper waters?
- Targeting new species?

Design and Construction of Seine Nets – Rut Jonsdottir – Isfell (www.isfell.is)

Rut Jonsdottir from the net maker and gear supplier Isfell gave a presentation describing the construction of commonly used seine nets in Iceland and some recent developments in the design and construction of seine nets.

Points of note were the increasing use of more modern lightweight materials such as Dyneema for the construction of frame ropes, lighter, lower diameter compact (HPPE) twines for netting construction to reduce drag, the use of T90 netting for certain sections of the net, the use of selection panels to improve selectivity and coverless net designs to target flatfish more selectively.

Seine Net Fishing in Norway – Per Froystad/Roy Olsen –Refa Froystad Group (RFG) (www.rfg.no)

This company from Finsnes in Norway demonstrated the range of seine net gear designs and equipment supplied to a large proportion of the seine net market. Emphasis was on the introduction of new materials for the construction of seine nets using high strength, abrasion resistant ropes and strong, light netting materials such as '*Polar Gold'.* Other innovations included a rigging arrangement for the footrope of their seine net designs to enable the gear to be worked on rough ground.

This company produces very large gears for the Norwegian catching sector. Large purse seiners operating Danish seines for part of their fishing season to target species like cod and saithe were used as examples to demonstrate the scale of the gear being used. These gears are capable of catching 60 – 70 ton hauls of cod, haddock and saithe using seine nets with 340m headlines and capable of achieving up to 45m of headline height!

These gears are being used to catch white fish for live transfer to holding cages for growing on and/or later supply to markets.

Fuel Costs in Seine netting – Gudberger Runarsson – Federation of Icelandic Fish Processing Plants

This presentation gave a good statistical overview of the Icelandic seine net fishery compared to the other methods used in Iceland.

In terms of number of seine net vessels and their catch value over the last 10 years the catch value has grown (3,4 billion IKr to 4,8 billion IKr) whilst the number of vessels earning that value has declined by ~ 40% (140 in 1997 to 83 in 2007).

The catch value has gradually increased despite declining landings (down from 46.303T in 1997 to 32.831T in 2007). The total value of landed catch from all 83 Danish seine vessels in 2007 was 4.805 million IKr (~42 million €). The catch value per vessel is approaching 60 million IKr.

Danish seines are mainly used in shallow water (40 – 60m) all around Iceland. Both trawl and Danish seine catch groundfish and flatfish. The trawl is the number one fishing gear in Iceland for groundfish and flatfish, pelagic, shrimp and *Nephrops*.

The value of Danish seine catch is similar to that of the gillnet and purse seine fisheries; 4,3 to 4,7 billion IKr. The value of trawl fisheries (bottom and pelagic) in 2006 amounted to 46.9 billion IKr – 62% of the total landed catch value.

Midwater or pelagic trawls landed 37% of the total catch. Purse seine landed herring and capelin catch totals 29.5% of the total catch. Trawls account for 20.1%, line and gillnets 11.0% and Danish seine 2.4%.

When comparing with trawl fisheries which typically catch the largest variety of species consisting of ~71% groundfish,~ 20% redfish, ~5% flatfish and ~3% other fish, the Danish seine catch consists of: ~73% groundfish; ~2% redfish; ~22% flatfish and ~3% other species. The main difference in value between these fishing gear types is in the high priced flatfish compared to lower value redfish from the trawl gear.

Danish seine is today an important fishing gear in shallow water and close to shore. The main species are flatfish that are found on fine sandy/muddy seabed areas. About 40% of flatfish landings are caught by Danish seine. Almost all of the dab catch, the rough dab catch and about 2/3 of the plaice catch are taken by this method.

The vessels in the Icelandic fleet that fish with the Danish seine vary in size and age. A lot of the older vessels have been converted from purse seine, gill netting or longlining, i.e. were not originally designed as seine netters. The newer Icelandic vessels have been purpose built as seine net vessels and have more modern catch handling systems incorporated such as ice making and some catch processing equipment onboard.

There have been 12 Danish seine net vessels built between 1999 – 2001 with an average size of 101GT and typical engine power of around 380kW. The latest vessels are increasing in size slightly to 125GT at a LOA of 22m – 24m. In comparison, a small inshore trawler is typically 29m LOA, 300GT with ~700kW engine power.

When considering the fuel efficiency of seine netting compared to trawling it is evident that there is a lot of variation between vessels. The average oil consumption is 0.20L/kg of wet fish with a range from 0.14L/kg to 0.28L/kg. The differences are mainly down to fishing effort, distance to grounds and difference in age and design of vessels. A typical small trawler operating on inshore grounds would consume ~0.41L/kg on average, twice the average consumption of a similar class of seine netter.

The bottom trawl is currently the most valuable fishing gear by value of catch landed. The landed value has consistently been 40% to 50% of the total value landed over recent years.

Today's high oil prices are likely to alter the fishing effort in Iceland to some degree towards other fishing gears such as long line, gillnets and Danish seine. High oil prices will require higher quotas for those trawlers that remain in the fleet and new solutions for fisheries, for fishing vessels as well as fishing gears if operations are to remain viable.

In summary:

- Danish seine has low oil consumption compared to trawl
- It is an effective fishing method
- Target species are similar to trawl fisheries
- Catch value is high compared to that of trawls
- Low bottom impact
- Vessels are generally smaller than trawlers and as such can be constrained by weather
- Operations generally restricted to shallower water (constrained by installed rope length)
- Operations generally restricted to fine ground

Seine Winches – Daniel Sigurdsson – Osey Winches, Urk, Holland

Daniel Sigurdsson, Manager of Osey Winches gave a brief history of the development of seine winches/deck equipment from the introduction of rope reels in the early 1980s up to date with a description of some of their new lightweight winches.

Over 90% of the Icelandic fleet have Osey winches onboard. They are working in partnership with other companies in Urk in Holland (TCD/VCU Maritime specialists) to introduce seine netting techniques and gear to the Netherlands. Projects include converting beam trawlers to Danish seining as well as fitting out purpose built fly-shooters for the Faroe Islands and also purpose built vessels in Holland capable of twin-trawling and seine netting.
These new vessels are being fitted with modern winches producing 12T core pull and capable of carrying 1000m x 34mm seine rope. Latest developments are looking at winch capacities in the region of 4000m x 40mm ropes (1.7m x 1.7m). These technology developments give an indication as to the direction in which seine netting is moving, i.e. away from the traditional small inshore operation.

Seine Netting in Holland/France – skipper Anton Dekker, *Johanna* SL-9

Anton Dekker is an ex skipper, vice chairman of the Dutch Fishermen's Organisation, ship owner and Fleet Manager of Jaczon.

Jaczon operate ~110 vessels worldwide including a pelagic fleet, a tuna fleet and a fresh fish fleet. The fresh fish fleet includes 14 French stern trawlers

ranging from 17 – 38m, 4 twin trawlers and one beam trawler operating out of Holland (24 – 42m). They also operate one 38m twin rig trawler from the UK.

A recent project has involved the conversion of one of their French stern trawlers, MFV *Aravis* to become the first seine netter (flyshooter) in France. The conversion was completed in 2007 with the vessel being fitted with 2 x 3200m capacity rope reels carrying40mm rope (1.3kg/m). The vessel is fitted with two net drums, one carrying a hard ground hopper net (36m footrope) and the other a clean ground net with 28m footrope for targeting red mullet (80mm mesh).

The *Aravis* splits it's fishing operations between the English Channel grounds in February/March, Dutch coastal waters in April/May, Central North Sea in June/July/August and the rest of the year operating back in the English Channel.

The main target species are:

- 30% squid
- 30% red mullet
- 10% whiting
- 10% flatfish
- 10% cod
- 10% red gurnard

By operating two crews of five the vessel can remain at sea operating full time allowing the crews to work one week on and one week off.

Catches are landed every two days to maintain top quality. Fish is landed in Le Havre, Boulogne, Brixham, Oostende, Den Helder and transported to Scheveningen fish auction.

The success of this operation is put down to a number of main factors:

- Choice of seine net rope for their particular target fisheries
- Type of net design used
- Choice of fishing grounds and season
- Choice of double crew operation
- Using 'slurry ice' and short trip length to maintain high catch quality
- Fuel efficiency of the method – (also conversion of vessel from fixed pitch to variable pitch propeller has produced a fuel saving from 3.5T/day to 2.5T/day).

The success of this conversion has lead to the consideration of other vessels for changeover.

The Dutch experience with seine netting is built around operations involving 11 flyshooters operating on fishing grounds in the English Channel in the winter and moving to the North Sea during the summer months. The main target species are similar to the *Aravis* i.e. red mullet, red gurnard, squid. The

vessels tend to work only between Monday and Friday as a fuel saving exercise.

Anton Dekker described another conversion of his own vessel MFV *Johanna* SL–9 which arrived in Holland in 2007 for conversion by the Padmos shipyard and completed in February 2008. The vessel is now capable of operating as a seine netter (flyshooter), squid jigger and twin rig trawler. Since the seine netting is most effective during daylight hours the decision was made to operate squid jigging equipment during the hours of darkness. This is a seasonal fishery (September – June) but has proved to be very successful in the English Channel. The vessel uses Japanese squid jigging equipment.

Seine Net equipment – Holmsteinn Bjornsson – Isfell - (www.**isfell**.is**)**

This presentation was based around the equipment supplied by the company Isfell to Icelandic seine net fishermen.

Main points of note:

- Braided PE material almost exclusively used for the netting
- Combination wire for headlines and fishing lines and bridles in 14 – 16mm 6 strand form with steel core
- Recent trend towards pre-stretched PE and PP rope for frame ropes of nets and also some use for bridles
- Increasing use of Dyneema SK 75 for headlines and bridles, gradually replacing combination wire and pre-stretched rope – advantage of high strength, light weight and high abrasion resistance.
- Wire used for footropes, lower bridles and rigging rockhopper gears – 6 x 9, 1261 steel fibre core in 14 – 18mm diameter.
- Chain – alloy grade 8 or 10 used for some footropes, in particular for flatfish nets where additional weight is required. Long-link chain predominantly being used. Some use of chain for rockhopper rigs.
- Floatation provided by combination of 8'' spherical, lightweight floats for centre sections of the net for use in shallow water and 'egg' floats for the wing sections – prevents tangling. Number dependant on gear type and size.
- Leaded rope used to provide additional weight – wrapping footrope and/or used in lower bridles.
- Groundgear: hoppers in 10'' or 12'' rubber discs with rubber disc spacers in 40 – 200mm diameter with 14 – 60mm centre hole dependant on wire or chain.
- Fishing line slack is rigged into the bosum section

Key Benefits of Liquid Ice – Reynir Gudjonsson – Optimar – (www.**optimar**.no**)**

This presentation looked at one of the options available to further enhance the quality of seine net caught fish which is based around a pumpable slurry ice system.

OPTIM-Ice is the trade name of the system which uses a concentration of micro ice crystals to achieve a higher cooling capacity and smoother treatment of the material being cooled. It is claimed 'to have 10 to 80 times more refrigeration capacity than typical refrigerated seawater systems and cools 10 times faster'.

The presentation included a description of an OPTIM-Ice system and concluded with a summary of the claimed benefits of the system:

- Removes requirement for bulky ice storage
- Improves residual product temperature and lengthens product shelf life by up to 40%
- It does not damage sensitive products
- Facilitates compliance with strict hygiene standards
- Improves catch quality
- Pumpable fluid material which flows where directed
- Reduces manual labour – time saving

Seine Ropes – Hans Petter Selstad – Selstad AS – (www.**selstad**.no**)**

Selstad AS is the world leader in Seine net rope production/supply. The presentation described the specification of the seine ropes currently being used by the industry with an indication of latest developments.
Main points of note:

- Rope construction: mixed PE/PP with galvanised steel core, 4-strand construction with hard lay to reduce wear.
- Minimum diameter produced is 20mm at~0.4Kg/m; maximum diameter is 60mm at 3.0Kg/m. Lifetime is increased with increase in diameter.
- One of the main areas of wear/abrasion caused by running gear, i.e. poor match of blocks/sheaves in relation to rope diameter and lead angles. Sheaves should have a diameter in the ratio of 9 x rope diameter and ropes must run centrally through blocks to avoid damage and uneven wear.
- Correct selection of winch diameter and spooling gear
- Bearing swivels to be avoided as they create too much spin/twist
- Splicing: Traditional splicing recommended and/or eye spliced 'G' link connectors. 'Terminal' connections/joints under development particularly for Scottish market.

Day 2
Fishing Electronics for Seine Net Operations – Oscar Axelsson - Marport (www.**marport**.com**)**
This presentation described Marport's range of 'SmartCatch' trawl performance monitoring sensors based on their Software Defined Acoustic Technology platform. This new technology enables a sensor to be reconfigured to perform several different functions with a very fast updating capability and extended battery life.
None of this equipment was specifically designed for the seine net operation, but as with other similar systems it does have applications to help monitor

gear performance. Full details of their product range are available from the website identified above.

Underwater film showing aspects of the seine net operation – Larus Palmasson (ISCFT)

This was the first of a two part showing of a film produced by the Icelandic Marine Institute to describe the effect of the seine net operation and to obtain a visual appraisal of the effects of the seine rope as it traverses the seabed. The film was produced in 1989 but is regularly used to describe the seabed impact and fish behaviour in relation to this method.

The film received a lot of attention and raised a lot of comments. Many of the experienced fishermen in attendance learned a lot about fish reactions and fish behaviour. There is a proposal for the Marine Institute to conduct a similar exercise in the near future to examine two areas, one which has had extensive seine net activity in it and the other that has been clear for a number of years. The aim is to identify/film any long term impacts attributable to the method in the areas under consideration.

Seine Netting and Fish processing – Skipper Orn Einarsson – Audbjorg hf

This was a description of another aspect of Icelandic seine netting. The operations onboard FV *Arnar* AR – 55 as one of Iceland's largest seine netters (39m) and only seine netter freezing its catch at sea were described.

The vessel concentrates on flatfish fisheries freezing at sea for the Japanese market. Initially (1985) the target species was witch for the Japanese market which later diversified into other flatfish species into other countries and markets.

Today's operations concentrate on dab and rough dab which account for 4% and 3% respectively of the total of flatfish sales.

Icelandic seine netters take 65% of plaice caught, 58% of lemon sole, 98% of the dab, 82% of the rough dab, 77% of the witch and 54% of the megrim landed in Iceland.

The main areas of operation for the different species were described and indicated that between 2 and 5% of the Icelandic EEZ is suitable ground for seine netting activity (sand, mud and gravel seabed).

It was emphasised that the seine net operation with its short duration (30 – 50mins) is an important factor in ensuring top quality raw material for freezing at sea and it was this high standard that the Japanese market insisted on.

The presentation included video film describing the catch handling and processing onboard FV *Arnar*.

Seine Netting in Scotland – Leslie Tait – North Atlantic College, Marine Centre

This was the UK contribution to the workshop and included a brief description of how seine netting has changed over the years with the development of new technologies and being brought up to date with the building of a new vessel for Shetland, MFV *Radiant Star.* A video showing the operation aboard the new vessel was presented. Emphasis was placed on good catch handling techniques to maintain high fish quality and the fuel saving benefits of this operation compared to similar sized vessels operating trawl gear. Figures of 100 litres of fuel/day for the seine net operation were quoted as compared to 280 litres for a comparable trawler.
Other points that were emphasised were the loss of experienced skippers from the industry as a result of decommissioning scheme in 2002 and the decline in popularity of this method with the development of twin rig trawling. The UK is now experiencing resurgence in interest in the method as a consequence of the current fuel crisis.

The full presentation and video film is available on the Seafish website www.seafish.org

Environmental Impact of Danish Seine – Haraldur Arnar Einarsson - Marine Research Institute

This presentation examined some of the arguments concerning the impact of seine netting on seabed and marine life.

Issues such as discards, unaccounted mortality habitat impact, energy use etc. with specific reference to the seine net method were covered.

Methods of quantifying and comparing the various impacts of the fishing gear were covered as well as looking at environmental sustainability vs. catch controllability and operational functionality. In these situations seine netting scored relatively well being placed around the mid point when compared with other methods where bottom trawling and dredging would be at the bottom end of the table and operations like pole and line fishing, trap fishing and jigging would be at the high end of the table.

From the discard perspective, the method scores well for species like cod but less well for haddock when compared to other gears such as bottom trawl, gill nets and longlines. This was explained by the fact that there are more quota opportunities for haddock and that the gears tend to be 'tuned' to avoid cod, again due to quota limitations.

In terms of seabed impact, the effect of mobile fishing gears is a function of the frequency with which an area is fished and the type of seabed in question. Sandy seabeds can withstand some repeated activity without too much damage. An example of an exercise that was conducted to examine the affect of dredging on the seabed sediment was carried out by the marine Institute. Underwater observations showed that even deep dredge tracks

(12cm) recovered well in a very short time and the recovery of bivalve molluscs present on the grounds was good. From this it is reasonable to assume that on similar sediment types the relatively light ground contact associated with the seine ropes and gear in general would have minimal impact.

There is some evidence to suggest that benthic organisms are adapted to disturbance, particularly in shallow water where they are regularly exposed to natural disturbance as a result of weather and sea conditions.

The area of impact of the seine net was described as being on average ~2.25km^2 or 0.66nm^2 and that as an example all the hauls in 2004 would have covered an area of~101 thousand km^2 (Iceland has a land area of 103 thousand km^2). Methods of estimating the environmental impact of the method were presented which rely on more and better information on seabed types and habitat being collected. This is a task that the Marine Institute will be addressing in the near future to get a better understanding of the impact of seine netting and other gear types on the marine environment.