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New Gear Handling Systems for Coastal Purse Seining

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ABSTRACT

The paper is describing a new gear handling system for coastal purse seiners. The system consist of a hollow manuverable ring needle through which the purse wire is passing. Solid type rings can be used since the rings will remain on the ring needle or purse wire during the whole operation. The ring bridles are passing an open-topped power block.

This system is working very well in combination with the automated net stacking system developed by FIFI during 1976-78, and it is possible to haul and stack the net with only two men and greatly reduce the strain of the work.

## INTRODUCTION

On Norwegian coastal purse seiners, there is a great need for reducing the crew and to make the manual work easier, especially when hauling back the net.

During 1976-78 the Institute of Fishery Technology Research (FTFI) developed a new automated net stacking system (BELTESTAD 1978), by which the number of crew men could be reduced by about two. To improve the efficiency of the purse seining operation and to reduce the strain of work still further, FTFI has developed a new type of ring needle.

Preliminary trials were carried out onboard FTFI's research vessel R/V "Kystfangst" during fall of 1980 and spring 1981. The system was subsequently in May 1982 tested onboard the commercial 70' purse seiner, M/S "Bådsvik", in conjunction with the automated net stacking system.

## EQUIPMENT

The new ring needle and purse block are shown in Fig. 1. The aft purse block is hung from gallows mounted one metre in front of the net bin. The ring needle is made hollow as a pipe and pivot mounted on two axes to provide free movement in all directions. The purse wire is passing through the hollow needle and during operation the rings, which are closed, will always remain on the ring needle or the purse wire. To let the ring bridles pass the power block this has to be open-topped.

The tip of the ring needle is made of replaceable high tensile steel to minimize the wear of the purse wire. To rotate the ring needle from the forward hauling in position to the aft setting position a hydraulic torque motor is mounted to the purse block. The ring needle is locked by a bolt in the aft setting position.

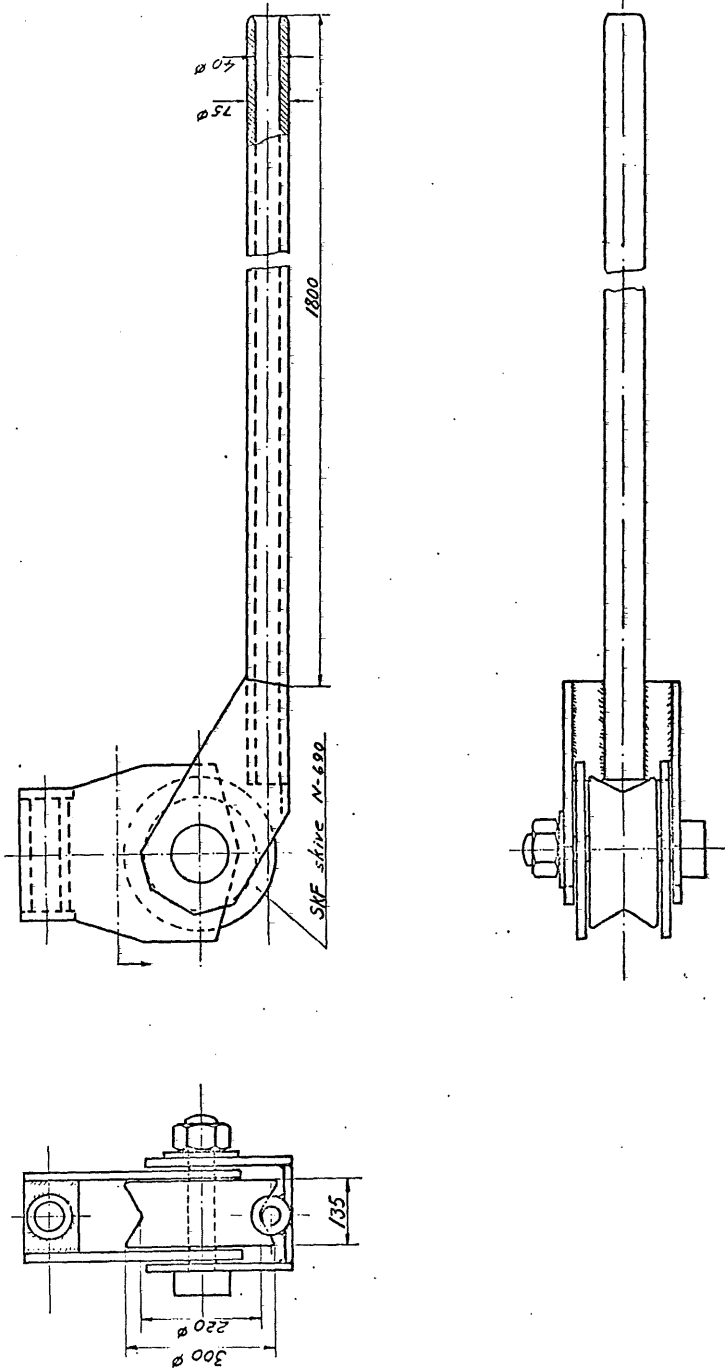


Figure 1. Hollow ring needle with purse block.

The power block used was a modified version of Rapp Hydema 28 R with hydraulic tilt cylinder and open top. The preliminary trials showed that it was difficult to get the bridles to pass the power block. This was rectified by installing a separate V-belt driven wheel on the open side of the power block. To catch the bridles and carry them over the rim of the block 12 radial short spikes are welded to the rim of the wheel.

The power block is operated by a modified HIAB 1165 AWHS hydraulic crane. The same electronic unit as described by BELTESTAD (1978) and BELTESTAD et. al. (1979) was used to control operation of the crane.

#### OPERATION

When shooting the gear, the ring needle is positioned to face aft as normal. But instead of the purse wire passing through the rings below the needle, it passes through both rings and needle. The bridles pull the rings off the needle during shooting (Fig. 2).

Before pursing starts the ring needle is released from the locked setting position so as to be free to always follow the direction of the purse wire. If only a part of the net is set the remaining rings have not to be uncipped before pursing start. During pursing, the needle swings out from the shipside and forward, following the movement of the purse wire, until it eventually faces forward (Fig. 3).

Before the net hauling is starting the crane is maneuvered to the starting position, the power block over the forward port side of the net bin, and the electronic control unit is switched on. As soon as the power block starts to haul the net the crane starts moving and the power block is moved in a fixed pattern over the net bin. The webbing and leadline are stacked below the power block without manual assistance, while the floatline is laid manually on the port side of the net bin. The control unit is

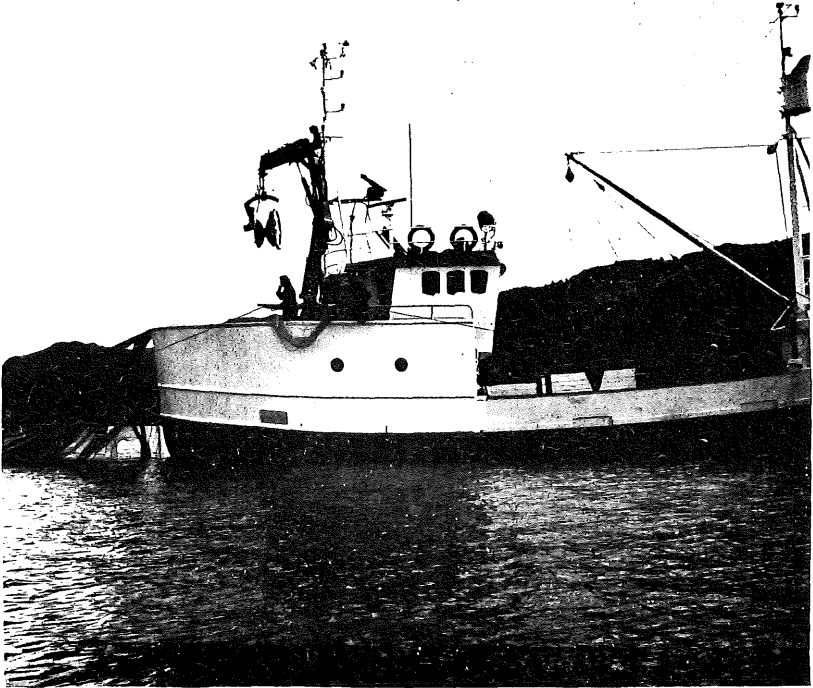


Figure 2. Setting

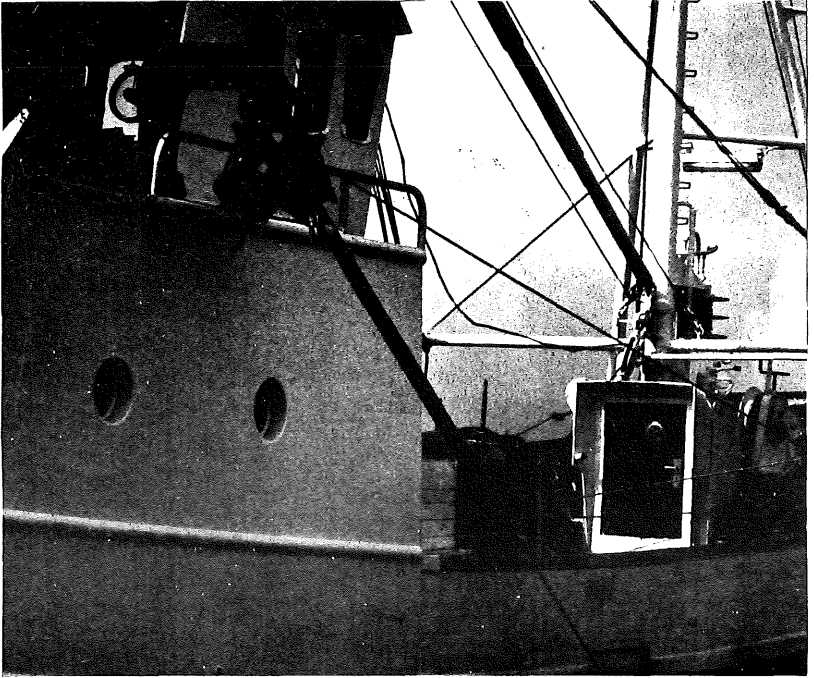


Figure 3. Pursing

made so that the crane will stop and start at the same time as the power block. As the net is hauled the bridles pull the ring back on to the ring needle. The short spikes on the extra wheel catch the bridles and carry them over the rim of the power block (Fig. 4).

Since the aft purse block is fixed just in front of the net bin the use of a lead wire for the rings is eliminated and makes it possible to start hauling the net before pursing is fully completed.

The bridles have to be of the same length as the distance between the ring needle and power block when this is far aft over the net bin. On M/S "Bådsvik" this is 7.5 metre. By using a bridle arrangement as shown in Fig. 5 the bridle length can be reduced to 5.5 metre, which is the normal length used on M/S "Bådsvik". When the first arm of the bridle is passing over the power block the ring is sliding to the opposite arm of the bridle and visa versa.

When hauling the net is completed and the purse wire is wound back to the storage drum of the winch, the ring needle is rotated aft by means of the hydraulic torque motor and the needle is locked in this position. The net is now ready for the next shoot.

#### CONCLUSION

The trials have been very promising. The HIAB crane seems to stand the horizontal load during hauling the net, and the combination of the hollow ring needle with the automated net stacking system works very well.

The new system has a lot of advantages compared with existing systems used on Norwegian coastal purse seiners.

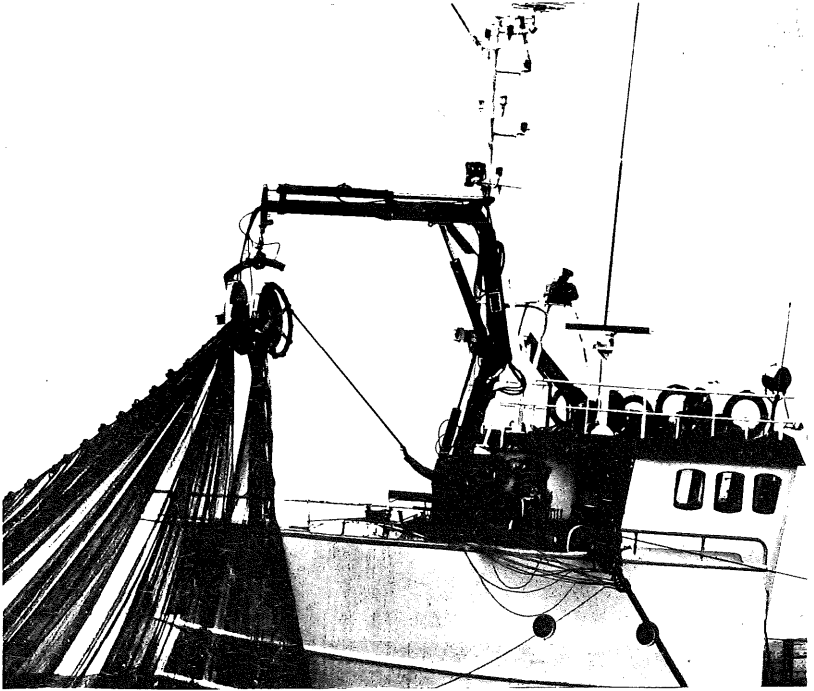


Figure 4. Hauling

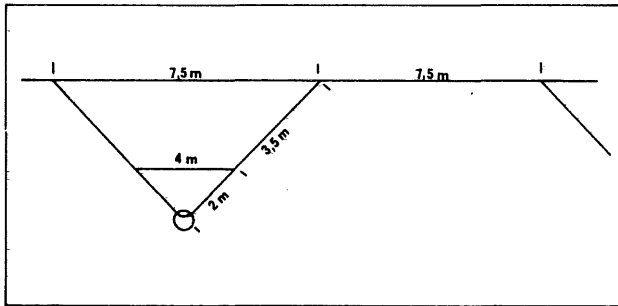


Figure 5. Ring bridle arrangement



- If only a part of the net is shot the remaining rings do not have to be unclipped before pursing starts.
- It is possible to haul and stack the net with only two men and the work is much easier.
- The rings need not to be unclipped from the purse wire and put on the ring needle again during hauling and simple, solid rings can therefore be used.
- The rings are not passing through the power block and the danger of crew members being hit by the rings is therefore eliminated.
- The ring needle is facing forward and thereby out of way during net hauling.
- The solid rings are much cheaper than the clip-on type and wear from the purse wire is evenly distributed instead of being concentrated at one point.

A comparable but more simple ring needle system has been tried with good results onboard a smaller purse seiner of 31'.

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