

Multisept project: Semi circle plate spreading gear (SCSG)

The SCSG's spreading was approximately 7 % higher than that of the rockhopper gear for the same door spreading. The SCSG had good bottom contact and passed bottom obstacles (e.g. stones) easily. The size distribution of fish caught with the SCSG was very similar to that caught with the rockhopper, but apparently more cod (over 65 cm) and more haddock (of all sizes) was caught by this gear. However, the number of hauls performed with the SCSG and with the rockhopper was too small to draw a clear conclusion on catch efficiency.

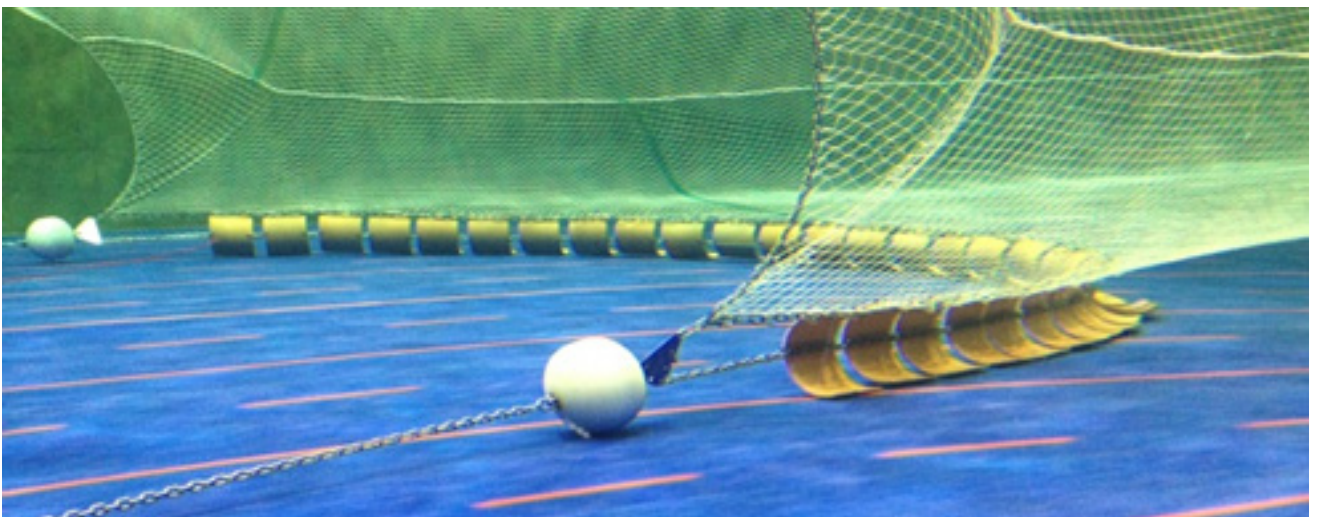


Figure 1: Initial prototype testing of the SCSG at the test tank in Hirtshals, Denmark.

Full scale tests of the SCSG has shown that this ground gear was easy to rig and operate, its geometry was stable during towing and it had good bottom contact.

The SCSG in average had 7 % more spread than the rockhopper gear (16.8 m vs 15.7 m) at similar door spread (115 m). The SCSG's larger spreading (compared to the rockhopper) is mainly due to the hydrodynamic spreading forces acting on the semi-circular plates of the side gear. In this regard the SCSG is similar to the self-spreading ground gear (plate gear) (Valdemarsen and Hansen 2007).

However, the self-spreading plate gear was very sensitive to small variations in rigging and geometry, causing the plates to dig or to fly and thus losing bottom contact.

These problems are eliminated with the SCSG, which is hydrodynamically and operationally far more stable. In addition, the curved-shaped of the SCSG's sections give the gear a lower angle of attack respect to obstacles (stones), allowing the gear to jump over them very easily.

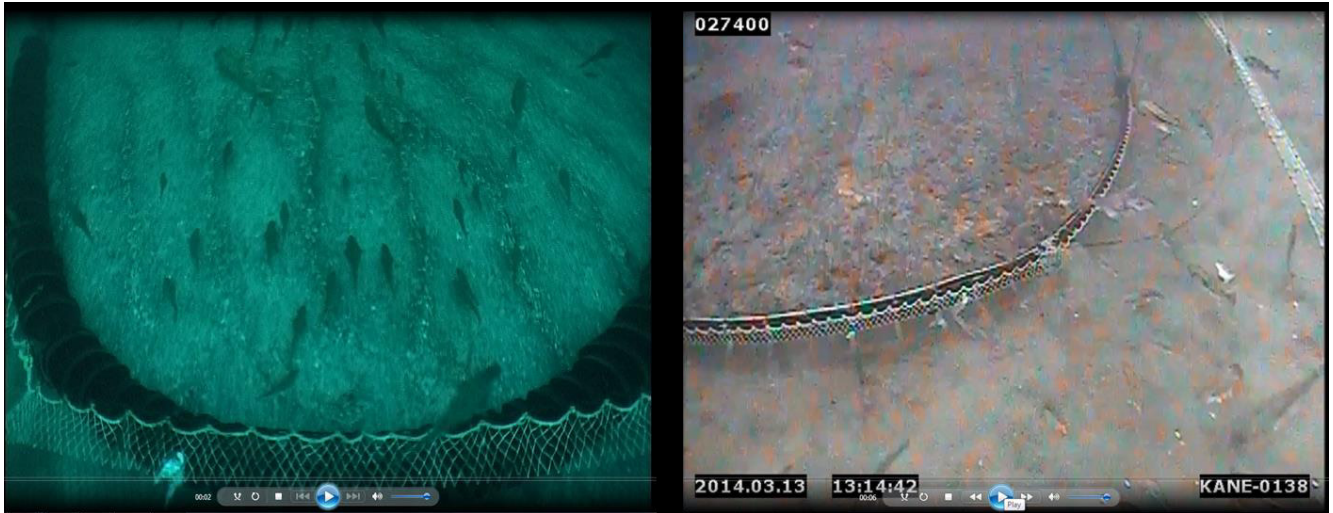


Figure 2: Images showing the performance and spreading of the rockhopper gear (left) and the SCSG (right).

There was no significant difference in towing tension between the rockhopper and SCSG hauls. However, the contribution from the ground gear is only a minor part of the total towing resistance, hence one cannot expect detailed information about minor differences in drag between the two gear types from recordings of winch tension alone.

Video observations showed that the SCSG generally had very good bottom contact throughout the entire tow, and that it easily slid over even large stones. Fish were observed swimming in front of the gear for some minutes before falling back to the trawls (Figures 2).

The size distribution of fish caught with the SCSG was very similar to that caught with the rockhopper, but apparently more cod (over 65 cm) and more haddock (of all sizes) was caught by this gear. However, the number of hauls performed with the SCSG and with the rockhopper was too small to draw a clear conclusion on catch efficiency. The catch comparison analyses lacked robustness due to the low number of hauls and the high variability between the hauls.

Finally, material wear of the SCSG-plates or profiles is one issue to address in the further development of a commercial product based on this first prototype. Very little wear of the semi-circular sections was observed after two cruises. However, the total towing time with this gear did not exceed 36 hours, and more wear must be expected in a commercial setting.

These results presented in this document belongs to the work package 3 (WP3: Development of new ground gear for semi-pelagic trawling) of the project "MultiSEPT".

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