R1/10 In Confidence: Not to be quoted without prior reference to the Laboratory

FRV 'Goldseeker' 13GR82

Cruise 13/82 Part 1

Report

9-16 November 1982

Objective

To test the performance of a towed body for echosounding.

Report

Weather limited the operation to the sea area off Buckie and Macduff.

The technique for recording the pitch and roll angles of the towed body proved satisfactory. Trials were made in a variety of sea conditions and the opportunity was taken to test a few variations from the standard rigging.

The conclusion may be summarised as follows:

1. Mean Roll Angle

This particular body had a tendency to roll slightly to starboard, a tendency which was speed related. At 2 to 5 knots the angle was less than 1°, but this increased to 4° at the full speed of 8 knots. The reason for this is thought to be the offset in the vertical fin, which acted as a rudder, steering the body slightly away from the ship so that the lifting and towing connections imposed an inward component of force on the attachment point, which is on the upper side of the body.

2. Variability of Roll Angle

At the low end of the speed range, 2 to 5 knots, the roll variability was very slight, never exceeding $\frac{1}{2}^{\circ}$ on either side of the mean. At higher speeds the variability was greater, and could be as great as $1\frac{1}{2}^{\circ}$ on either side of the mean.

3. Mean Pitch Angle

This naturally varied with the rigging, but in standard form was about 6° nosedown at 2 knots, decreasing smoothly to 2° nose down at 8 knots. When the tailplane was adjusted, the transducer could be made level at 8 knots. At the lower speeds the angle is largely determined by the weighting of the body with respect to the attachment point, and is hardly affected by tailplane angle. This result was more or less as expected.

4. Variability of Pitch Angle

This is dependent on sea state and towing speed. At full speed a typical result was a variation of about 2° about the mean, and this would probably be even less at higher speeds when the towing wire would be more horizontal.

As speed was reduced the towing wire became more vertical and weight was partly transferred to the lifting rope. In these conditions vertical movement of the ship causes considerable changes in pitch angle. In the worst conditions the pitch angle varied more than 10° about the mean at 2 to 3 knots, and reasonable operation at these low speeds is dependent on smooth water.

Even in these worst conditions the Simrad sounder remained operational, and sea-bed lock was never lost.

R E Craig
15 December 1982

Seen in draft W B Reid