RV EDWARD FORBES CRUISE 20/74

9 - 25 OCTOBER 1974

SOLENT

CRUISE REPORT NO 15
1974

Institute of Oceanographic Sciences
Crossway
Taunton
Somerset

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SCIENTIFIC PERSONNEL

Dr K R Dyer (Scientist in Charge)

N A Frederiksen (University of Copenhagen)

R A Haine

M R Lees

N Millard (IOS Wormley)

M A S Moore

Dr W R Parker

A P Salkield

R L Soulsby

Dr R Wilkinson

Cruise Report - RV Edward Forbes - Cruise 20/74 - Solent

9 - 25 October 1974

Senior Scientist - Dr K R Dyer

OBJECTIVES

Using electromagnetic flowmeters supported on a seabed mounted rig it was hoped to investigate the structure of turbulence, the turbulent intensities and Reynolds stresses near the sea bed. Simultaneous measurements with rotor flowmeters of the velocity profile would enable comparative values of bed shear stress and roughness length to be obtained. The attitude of the rig would be assessed using an inclinometer and the performance of the lowermost sensors, and perhaps sediment movement also, monitored using an underwater television. Experiments would also be carried out with a sand transport probe and measurements of self-generated noise completed.

Because previous attempts at measurements on this programme in the RRS John Murray were unsuccessful, due to the movement of the ship around a single anchor, this cruise was planned anchoring stern-to some large mooring buoys at Yarmouth Roads in the Solent. By this means it was hoped that the movement of the ship would be reduced to an acceptable amount.

INSTRUMENTATION

A ½-ton tripod-shaped frame which could be oriented by the current was used. Within the framework was a rotatable vane upon which two Colnbrook EM flowmeters and 4 Braystoke rotors were mounted. The electronic units of the EM flowmeters were synchronised and the head outputs were filtered and amplified and fed into a Bell and Howell 7-track FM tape recorder and a PDP8 computer. An inclinometer was attached to the rig to monitor any movement, and to register the attitude of the rig. Also an underwater TV was included to monitor the performance of the sensors and to watch the sediment movement. A sand transport probe sensor and a wide band hydrophone were mounted within 15 cms of the base of the rig.

TIMETABLE

Tuesday 8 October	Loaded Tone Vale Transport vehicle
Wednesday 9 October	1045 M Moore, M Lees and A Salkield left for Southampton arriving at 1330. Offloaded lorry and started setting up equipment. M Moore returned to Taunton at 1630.

Thursday 10 October	R Haine joined ship. Continued setting up and testing equipment.
Friday 11 October	Departure Southampton for Yarmouth Roads. Arrived 1015. Successfully moored by the stern to buoy No 2 at 1200. EM flowmeters outputs very noisy - tried unsuccessfully to remove this by altering the system earths. Departed Yarmouth 1730 for Southampton. Rewound resistors on EM units. Arrived Southampton 1900. W R Parker arrived from Taunton 2245. A Salkield departed for Taunton.
Saturday 12 October	Unable to sail because of crew change. Continued working on the flowmeters, inclinometer and computer. Boundary layer rig put over the side, winch brake leaked and put tension on the transducer cables. By evening the flowmeters were reasonable.
Sunday 13 October	Unable to sail because of crew change. A Salkield arrived from Taunton. EM flowmeters still noisy. Day spent trying to get them working properly.
Monday 14 October	Crew leave day. K R Dyer arrived 1200. EM units synchronised properly. TV light bulb blew. Inclinometer fixed on frame and zeroed. W R Parker left for Taunton 1845.
Tuesday 15 October	Calm, cloudy. Sailed for Yarmouth Roads 0800. Replaced two Braystoke rotors broken in transit and got all four Braystoke meters recording on the computer. Arrived Yarmouth 1030. Anchored and got a line onto buoy No. 2. On tightening up the anchor dragged. Moved to buoy No. 6, made two attempts at mooring there, on both occasions the anchor dragged. Returned to Stanswood Bay and anchored at 1630. Put rig midwater at 1640 and experimented with shrouds over EM heads. Eventually three channels were cleared of noise, the fourth channel noise caused at the head. Overnight at Stanswood Bay.
Wednesday 16 October	Light W wind. Changed noisy head for a replacement. Both heads noisy - after experimenting all day reasonably clean signals were obtained after cleaning the commutators on the main generators. Overnight in Stanswood Bay.

Thursday 17 October

Calm. One EM flowmeter channel had large offset. This was corrected by rewiring the head. The rest of the day was spent recording the EM outputs on the Bell and Howell tape recorder. However only two FM channels could be made to work. Taped data was replayed through the filters and the outputs compared. The ship would not stay stationary and the rig had to be lifted and replaced about every 20 minutes. Up anchor for Southampton at 1620. 1810 berthed at Southampton. At the berth the flowmeters were zeroed both with and without shrouds in the dock and on deck. (Upper EM 21 on Master, lower 24 on slave).

Friday 18 October

Overcast, wind SW Force 3. W R Parker and R Haine joined the ship with instruments to enable repair of the Bell and Howell tape recorder. 0900 left Southampton for Stanswood Bay.

1020 Anchored Stanswood Bay. EM flowmeters noisy again - eventually rectified by earthing pin C on the Master Unit and floating all the other earths.

1300 Wind gusting Force 8 SW and tide beginning to ebb. Up anchor for Southampton.

1445 Berthed Southampton.

1505 Recording all EM channels with rig at midwater. (B4 channels 1-4 = XU, YU, YL, XL). Recording stopped at tape 290 feet. WRP and RH left for Taunton at 1630. From 290 feet onwards on Tape 1, Channels 3 - XU, 4YU, 5YL, 6XL, because BH channels 1 and 2 were noisy.

Saturday 19 October

Crew leave day

Sunday 20 October

Wind WNW Force 5 - 7. N Millard, N Frederickson, R Wilkinson and R Soulsby joined the ship.

1230 Sailed for West Lepe.

1415 Anchored West Lepe. Carried out experiments with sand transport probe and with acoustic apparatus with various combinations of earths and instruments running.

1730 Up anchor for Southampton.

Sunday 20 October (cont) 1930 Moored at Southampton. During the mooring procedure the leading hand fell into the dock and sustained head and facial injuries. He was taken to hospital.

Monday 21 October Sunny. Wind NW Force 3-4. Unable to sail because of shortage of crew. Spent the day doing acoustic experiments in the dock and correcting the computer programs for the sand transport probe.

1900 N Frederickson departed for Taunton.

Tuesday 22 October Wind N Force 4-5. Zero check of EM flowmeters in dock.

0910 Sailed for West Lepe.

1105 Anchored West Lepe, Wind NNE Force 5-6.

1142 Started a recording run on the EM flowmeters and of noise. Ship moving and rig lifting and dragging.

1255 Dragged to such an extent that electric cables strained and broken. Three Braystoke flowmeters had stopped working. Head No 24 cable had pulled off junction box connectors, replaced by No 23.

1735 Rig replaced with only top head (No 21) working. Recording until 2208. Ship dragging and lifting rig restricting each record to about 20 min.

2215 Rig in with 2 EM. Contined with noise measurements and flow measurements until 2400. Overnight at West Lepe.

Wednesday 23 October Wind N Force 5-6.

0840 N Millard left ship via Thosbro launch. Repaired Braystoke flowmeters. Rotors at 15, 45, 90, 180 cm.

1137 Rig on bottom. EM Heads at 75 and 130 cm. Successful series of recording runs though because of vessel movement lifting and dragging the rig individual records were of 10 min or so duration.

1607 Zero check with shrouds on.

1803 Further recording until 1835, though rig lifted every 2 mins or so. Overnight at W Lepe

Thursday 24 October	Wind N Force 3-4.
	0850 Up anchor for Yarmouth Roads
	1130 Anchored and stern to No 6 buoy.
	1207 Zero check with shrouds on
	1243 Recording with rig on bottom. X lower very noisy - eventually traced to broken wire in slave unit. This could have caused patches of noise on previous days.
	1322 Recording with rig on bottom, top head only.
	1406 Rig lifted
	1423 Rig replaced. Recording upper head only Continuous until 1600.
	1630 Up anchor for Southampton
	1830 Berthed Southampton
Friday 25 October	Packed up equipment. Loaded Transit, Landrover and Tone Vale Transport lorry. Returned to Taunton. RV Edward Forbes on passage to Harwich.

COMMENTS

This cruise was not an entirely satisfactory one. Because the cruise had to be put back by 6 days, spring tides occurred in the middle of the cruise rather than at the beginning and at the end. This meant that we could not manage to moor stern-to to the mooring buoys until the last day. As a consequence measurements had to be completed while the vessel was lying to a bow anchor. This restricted the length of individual measurements due to the lifting and dragging of the rig and caused damage to the cables and EM flowmeter heads. The damage caused considerable delay and affected the data quality at the end of the cruise. When moored stern-to a buoy the vessel was adequately stable though the weather conditions were ideal. It is essential to have more than a single point mooring.

Accidents to two of the crew members also caused some delay and inconvenience.

The EM flowmeters caused a great deal of trouble though they were working satisfactorily in the laboratory beforehand. The troubles were mainly due to earthing problems and bad connections at the heads. A number of satisfactory runs were completed, however, but, because of subsequent malfunctions which may affect their calibrations, the results may be difficult to interpret. The Braystoke meters worked well.