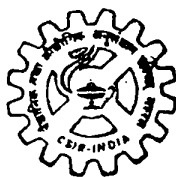


Report on Oceanographic Cruise of O. R. V. Sagar Kanya

CRUISE No. 85

6th to 20th August, 1993



**National Institute of Oceanography
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INDIA**

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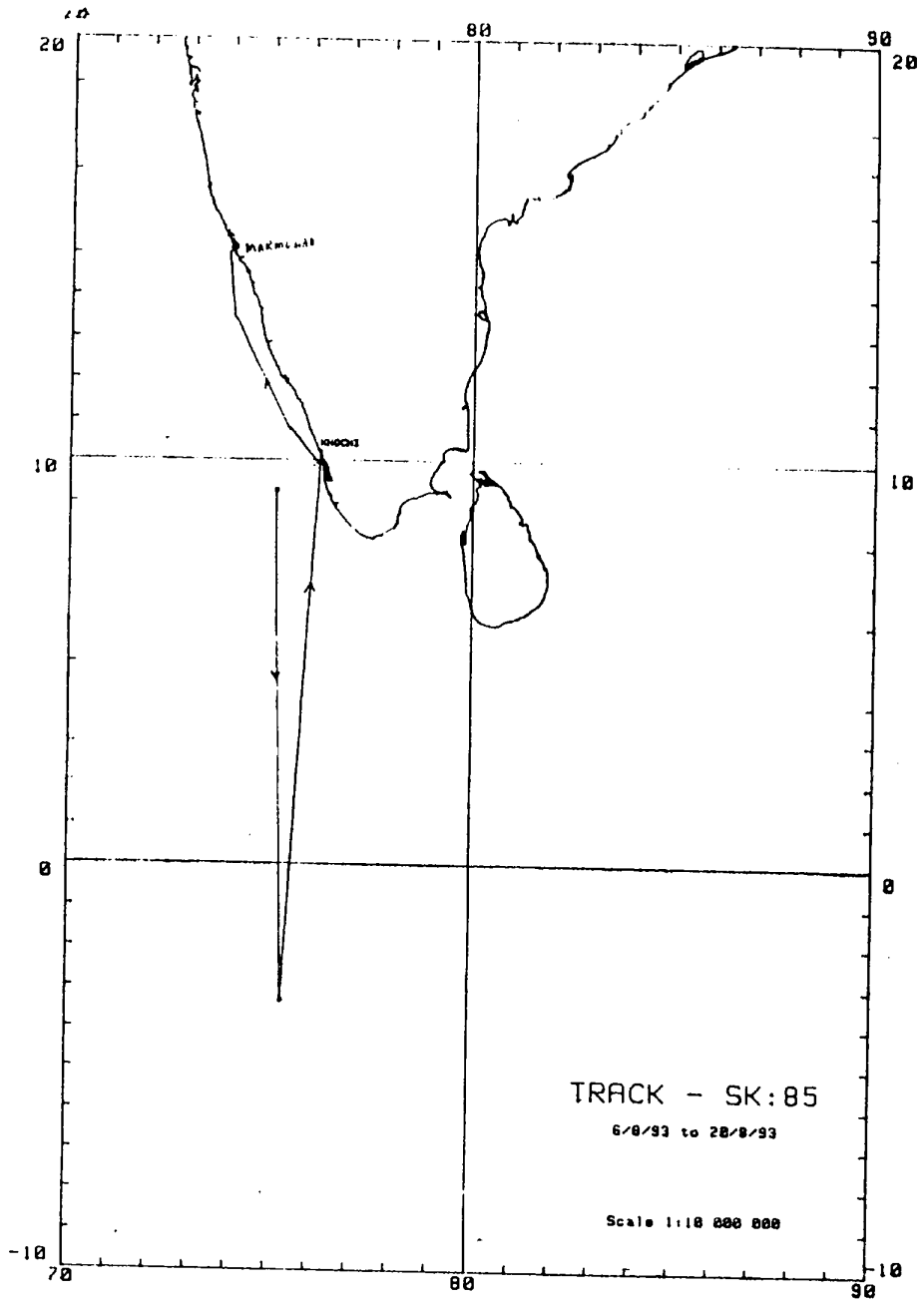
REPORT ON 85TH
OCEANOGRAPHIC CRUISE OF
O.R.V. SAGAR KANYA

(6 to 20 August, 1993)

REPORT ON THE 85TH OCEANOGRAPHIC CRUISE
OF O.R.V. SAGAR KANYA

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2. CRUISE SUMMARY

The 85th oceanographic cruise of ORV Sagar Kanya was of fifteen days duration from 6 to 20 August, 1993. This includes three days port stay at Cochin from 15 to 17 August. The main objective of the cruise was collection of bulk nodules from the Central Indian Ocean Basin to meet the requirement of laboratories involved in metallurgical work. The cruise plan included (1) testing of the winch at various depths and (2) if the winch performs satisfactorily during trials, continuation of the cruise for collection of bulk nodules in the Central Indian Basin.

During the trials of the winch performance, it was found that in the storage winch master unit hydraulic pump pressure was building up to a maximum of 16 bars only against the required pressure of 25 to 30 bars. This pressure was necessary in order to actuate zero stroke piston in lowering mode. Even after adjusting the speed in different modes the pressure in the hydraulic pump of storage winch was not improving. It was observed that the hydraulic pump had to be opened, which could not be done while on cruise. Hence, the vessel returned to Cochin Port on 15 August. The consultants for winch repairs M/s Ramakrishna Engineers visited the ship on the same day to attend the repairs. They

felt that the master unit pump pressure cannot be adjusted or improved and recommended replacement of the hydraulic pump. Since no spare pump was available on board, the cruise was terminated and the vessel sailed to Mormugao.

3. PARTICIPANTS

a) Scientific component :

P.S. Rao	- Chief Scientist	X	Geological
N.H. Khadge		X	Oceanography
G.P. Naik		X	Division of
		X	N.I.O.
D. Gracias		X	
K.L. Naik		X	
K.M. Sivakholundu		X	
G. Chandvale		X	
		X	-- Shipboard trainee

b) Ship's complement:

R.S. Soni	- Master
A.K.B. Nair	- Chief Engineer
J.B. Singh	- Chief Officer
A. Rocha	- Radio Officer
M. Fernandes	- Catering Officer

4. ITINERARY

Departure	Cochin	20.00 hrs	6.8.1993
Arrival	Cochin	09.30 hrs	15.8.1993
Departure	Cochin	08.00 hrs	18.8.1993
Arrival	Mornugao	09.00 hrs	20.8.1993

5. INTRODUCTION

As part of the polymetallic nodules programme financed by the Department of Ocean Development, Govt. of India, dredging of nodules along with the geophysical data collection was planned during the 84th cruise of ORV Sagar Kanya in the Central Indian Ocean Basin. However, nodules could not be dredged in that cruise due to problems with the winch. Hence the vessel was called at Cochin Port for winch repairs. The present cruise (85th) was planned exclusively for dredging of nodules.

5. OBJECTIVES

- (i) To test and ensure proper functioning of the winch and
- (ii) if the winch performs satisfactorily, continuation of the cruise for collection of nodules of required grade in the Central Indian Ocean Basin by dredging.

7. WINCH TESTING

The winch system onboard ORV Sagar Kanya consists of a friction winch and a storage winch. Basically the friction winch does the job of lowering and heaving while the storage winch keeps the wire under specified tension in both lowering and hauling modes to avoid kinks on the wire. The operation of the winch is controlled through a joy-stick from the winch control room.

During the previous cruise (SK-84) the storage winch had developed the following problems : (i) Speed/torque adjusting bolt of the master unit got seized, (ii) excessive leakage of oil from master and slave units and (iii) Overheating of the master unit. These problems were attended by M/s RK Engineers from Bombay. A new speed adjusting bolt was fabricated and installed. The oil leakage was minimized. Regarding overheating, RK Engineers observed that there was no control between the joy-stick and the stroke adjusting servo motor of the master unit in auto mode. It was observed that when the storage winch is put on in auto mode, the stroke adjusting servo motor turns to the maximum heave in position irrespective of friction winch lowering or heaving. Since the friction winch has more

torque than the storage winch, in lowering mode the wire rope is pulled away from the storage winch drum although the hydraulic pump remains at the maximum heave in position. According to the consultants this simultaneous action of the two opposing forces results in the heating of the master unit. It was observed that when friction winch is in lowering mode, zero stroke piston should be actuated through a reversal valve. This reversal valve is connected to a solenoid that is energized when the joy-stick is in lowering position. The consultants felt that once electrical supply comes to the solenoid, the winch should work perfectly. Accordingly, the electrical connections were restored and the vessel left for trials.

During the trials, it was observed that overheating of the master unit still persisted. Also when the friction winch is in lowering mode the storage winch remains in maximum heave in position. On opening the pipe lines connected to the reversal valve, it was noticed that the inlets do not get oil flow. It was also observed that the hydraulic pump pressure develops up to a maximum of 16 bars initially and falls to 9-13 bars subsequently; whereas the pressure should be about 16.5 and 25 bars at the two inlets. In order to actuate zero stroke piston, the pressure required

in the main unit is 25 to 30 bars. Even after adjusting the speed, the hydraulic pump pressure was not improving and hence the vessel was diverted back to Cochin. The consultants felt that the master unit pump pressure cannot be improved or adjusted and recommended replacement of the hydraulic pump.

Since no spare pump was available, the cruise was terminated and the ship sailed to Mormugao harbour.

8. RECOMMENDATIONS

Discussions with Chief Engineer, Mechanical Engineer of NIO and RK Engineers (consultants) led to the conclusion that the main problem lies with the hydraulic pump of the storage winch. As advised by RK Engineers, it was recommended to replace the hydraulic pump in the main unit of the storage winch.

9. ACKNOWLEDGEMENT

The Chief Scientist and other participants, thank the Master and his colleagues for cooperation during the cruise.