

ANNEXURES

Annexure-I

(Referred to in Para 2.2.3)

The Indian Naval Book of Reference (INBR) 31¹ specifies the following shipbuilding activities:

Activity	What happens
Production	Fabrication of blocks for construction of the ship is commenced
Keel Laying	Fabricated blocks are shifted from fabrication shop and laid on Keel Blocks at slipway for erection of the blocks/units
Launching	On completion of the ship's outer hull and major internal hull and part of machinery work, including lowering of major machineries/equipment and fitment of shaft, the ship is lowered in the water
Outfitting	After launching of the ship all outfit work is undertaken
Basin Trials	Propulsion machineries are tried out by trial agencies in the harbour
Contractor Sea Trials (CST)	Trials of all propulsion, other machineries and equipments are taken by trial agencies at sea
Final Machinery Trials	Propulsion machineries are tried out at 100% power
D-448 Reading	On completion of all trials and prior to commissioning of the ship, all balance works/contractual liabilities which the yard could not complete, gets listed as a final document

¹ INBR 31 - Hull Construction Inspection Norms for New Construction Ships

Annexure-II

(Referred to in Para 2.2.3)

The following are the agencies/entities involved in the construction and monitoring of Indigenous Aircraft Carrier :

S.No	Agency/Entity	Role	S.No	Agency/Entity	Role
1	Controller of Warship Production & Acquisition (CWP&A)	Monitoring of the ship building contracts	8	Directorate of Electrical Engineering	Technical matters pertaining to electrical, electronics, sensors and communication systems
2	Directorate of Naval Plans (DNP)	Allocation of funds	9	Directorate of Weapon Equipment	Technical matters pertaining to induction, acceptance, repairs and trials of weapon systems
3	Directorate of Staff Requirements	Formulation of Staff Requirements for the IAC	10	Directorate of Naval Air Staff	Formulates operational requirements for new inductions
4	Directorate of Naval Design	Undertaking design and co-ordinating all ship production activities	11	Directorate of Aircraft Systems Engineering	Technical aspects including installation, acceptance, inspections and trials
5	Directorate of Marine Engineering	Drawing specifications and undertaking system integration of marine engineering equipment	12	Directorate of Aircraft Acquisition	Co-ordinates the capital acquisition process for procurement of aircraft till conclusion of the contract
6	Directorate of Cost and Contract Management	Macro level financial planning for shipbuilding projects	13	Directorate of Aviation Projects Management	Execution of all contracts regarding aircraft acquisition
7	Warship Overseeing Team	Naval overseeing team supervising ship construction	14	Cochin Shipyard Ltd	Shipyard constructing the Indigenous Aircraft Carrier

Annexure-III

(Referred to in Para 2.4.4.2 (a))

Status and reasons* for delay in delivery of 49 equipment mentioned in Phase-I contract (May 2007)								
Sl No.	Equipment	PO No.	Date	Scheduled date of receipt as per PO	Actual dates as per records of CSL	Delay (in months)	Reasons for delay	Cost (in ₹Crore)
1.	Propulsion Gas Turbine	PUR/MOF/48185	30.12.05	31.10.07	31.12.08	14	Due to break down of dynamometer test facility and large volume of production engines scheduled for testing on their test cell & non-availability of test slot till early 2008 for testing of P71 GTs at GE leading to delay.	166.06
2.	Diesel Alternators	PO/IAC/AC1/000677/08-09	02.09.08	30.04.11	21.07.12	15	Delay on the part of the firm to adhere to delivery schedule. Further, delay accentuated due to accident of two sets during transportation.	155.70
3.	GT CO2 Fire Fighting module	PO/AD S/AC1/000262/08-09	30.05.08	15.12.09	31.10.10	10	Extension granted up to 31.10.10. Delay due to time taken by foreign collaborator to obtain requisite government authorisation for export.	21.30
4.	GT Local Control Panel (ECU)			15.12.09		10		
5.	CO2 Fire Fighting module LCP-NA			15.12.09		10		
6.	Bilge Pump	PO/AD S/AC1/001305/07-08	11.02.08	10.10.08	15.09.11	35	Firm failed to adhere to delivery schedule.	57.35

7.	Oily Water Separator	PO/IAC /AC1/00 0070/09 -10	06.05.09	30.08.09	23.02.10	6	Delay in supply of four months condoned by IN/CSL in view of delay in approval of L1 & L2 level documents by Navy.	0.62
8.	Propulsion Reduction Gear	PO/AC1 /000444 /06-07	10.01.07	10.01.09	25.02.13	49	Delay due to failure of few discs/wheels during heat treatment at M/s Elecon necessitating rectification at M/s Renk, Germany.	38.90
9.	RG Lube Oil Module	PO/AC1 /000444 /06-07	10.01.07	10.01.09	22.09.12	44	Firm failed to adhere to delivery schedule.	
10.	RG Local Control Panel			10.01.09	22.09.12	44		
11.	Thrust Blocks			10.01.09	06.02.11	25		
12.	Shafting Sections (Intermediate Shafts) Port & Star Board	PO/AD S/AC1/0 00552/0 7-08	07.08.07	30.09.09	30.04.11	19	Firm failed to adhere to delivery schedule.	152.09
13.	CPP Hydraulic Module			30.09.09	06.01.11	16		
14.	CPP Local Control Panel			30.09.09	06.01.11	16		
15.	Oil Supply Boxes			30.09.09	30.10.11	25		
16.	Fuel Oil Stripping Pump			PO/IAC /AC1/00 0373/09 -10	29.06.09	30.06.10		
17.	Main Fuel Oil Transfer Pump	30.06.10	06.04.13			34		
18.	Aux Fuel Oil Transfer Pump	30.06.10	10.12.12			30		
19.	Fuel Stripping Centrifuge	PO/IAC /AC1/00 1203/08 -09	16.01.09	31.12.10	08.08.11	8	Firm failed to adhere to delivery schedule.	12.81
20.	Fuel Oil Centrifuge			31.12.10	28.12.12	24		
21.	RG Lube Oil Centrifuge +Oil Heater/ Lub Oil Centrifuge			31.12.10	08.08.11	8		

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22.	Sullage Pump	PO/IAC /AC1/00 0597/10 -11	23.07.10	20.01.11	17.08.12	19	Firm failed to adhere to delivery schedule.	0.19
23.	DA Lube Oil Transfer Pump/ Lub Oil Pump	PO/AD S/AC1/0 00578/0 8-09	16.08.08	20.06.09	22.12.11	30	Firm failed to adhere to delivery schedule.	1.20
24.	LP Air Compressor	PO/IAC /AC1/00 0779/ 09-10	22.12.09	30.10.10	04.08.11	10	Firm failed to adhere to delivery schedule.	3.54
25.	HP Air compressor	PO/IAC /AC1/00 0690/09 -10	29.08.09	15.07.10	01.03.12	20	Firm failed to adhere to delivery schedule.	2.01
26.	HP Air bottles	PO/IAC /AC1/00 0631/09 -10	14.08.09	30.06.10	09.06.11	12	Firm failed to adhere to delivery schedule.	1.40
27.	LP Air Bottles	PO/IAC /AC1/00 0376/09 -10	29.06.09	30.04.10	08.10.10	6	Firm failed to adhere to delivery schedule.	2.56
28.	Salvage pump	PO/IAC /AC1/00 0997/08 -09	12.11.08	20.11.09	13.07.11	20	Firm failed to adhere to delivery schedule.	3.99
29.	GT Water washing module	001709/ 07-08	18.03.08	30.09.09	31.12.09	3	Delay was mainly due to delay in inspection by QAE (WE). Accordingly delivery date was extended 31 Jan 10.	53.03
30.	GT Lube Oil Module (LSCA)			30.09.09	31.12.09	3		
31.	GT Fuel Feeding Module			30.09.09	31.12.09	3		
32.	GT Fuel Filtering Module			30.09.09	2312.09	3		
33.	GT Hydraulic Starting Module			30.09.09	31.12.09	3		
34.	GT module Cooling e-fan			30.09.09	31.12.09	3		
35.	Sea Water Ballast Pumps	PO/IAC /AC1/00 1132/09 -10	09.12.09	20.10.10	30.01.12	15	Firm failed to adhere to delivery schedule.	6.10
36.	Fire pumps			20.10.10	30.01.12	15		
37.	Sewage Treatment Plant	PO/IAC /AC1/00 0268/09	01.06.09	05.12.09	10.05.10	5	Major delay due to non-availability of IN/CSL team at the	13.85

		-10					firm's premises for Factory Acceptance Trials.	
38.	Fresh Water Pumps	PO/IAC /AC1/00	08.04.09	31.01.10	13.09.11	20	Firm failed to adhere to delivery schedule.	0.68
39.	Fresh water Hydrophores	0041/09-10		31.01.10	13.09.11	20		
40.	Fresh Water RO Plants	PO/IAC /AC1/00 1297/08-09	15.01.09	31.01.10	02.04.11	15	Firm failed to adhere to delivery schedule.	11.48
41.	Fresh Water Chlorinators	PO/IAC /AC1/00 0755/09-10	16.09.09	30.06.10	12.04.11	10	Firm failed to adhere to delivery schedule.	0.48
42.	Sea Water Cooling Pumps	PO/AD S/AC1/0 00267/0 8-09	31.05.08	31.01.09	18.12.09	11	Firm failed to adhere to delivery schedule.	1.01
43.	Steering Gear	PO/AD S/AC1/0 00286/0 8-09	04.06.08	31.12.09	31.07.11	19	Delay in approval of binding drawings, shock test, etc which are not attributable to L&T and raising of a new control priority, which was not as per the PO/POTS, by DQA(WP) leading to delay of almost 19 months in delivery.	9.23
44.	Heat Exchangers for Machinery Ventilation Sys (HVAC)	PO/IAC /AC1/00 0273/10-11	29.05.10	31.03.12	Partial delivery	Not measurable	Frequent design changes by IN.	97.42
45.	AC Plants	PO/AD S/AC1/0 00159/0 8-09	06.05.08	15.06.09	02.03.10	9	Firm failed to adhere to delivery schedule.	78.42
46.	AC Chilled Water Pumps			15.06.09	27.09.10	15	Major reason for delay was delay in supply of pumps by Navy nominated single vendor (M/s Beacon) to AC Plant vendor (M/s KPCL). LD levied by CSL to the maximum. Firm failed to adhere to delivery	
47.	AC Sea Water Pumps			15.06.09	22.06.10	12		

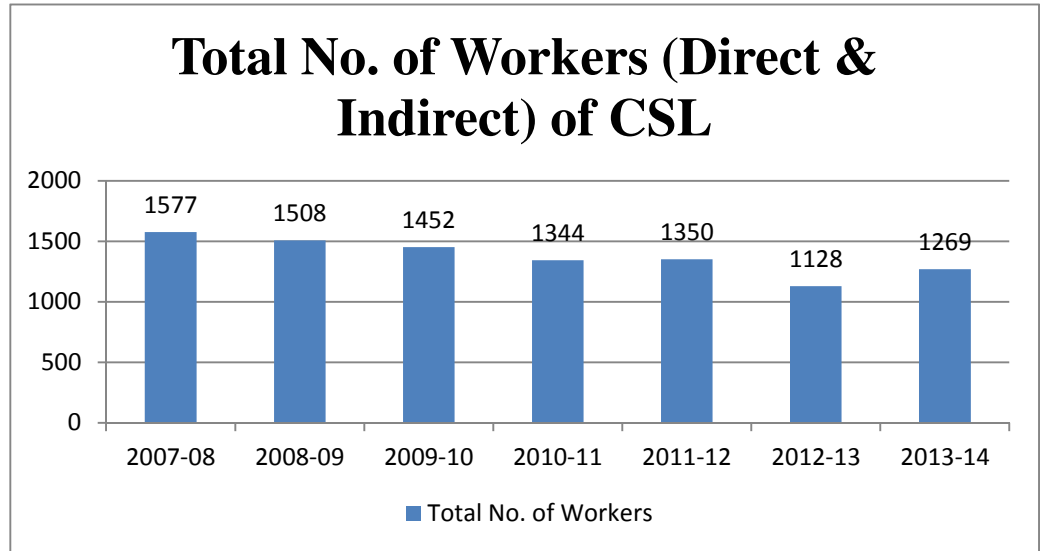
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							schedule.	
48.	Sea Water Pump for Ref Plants	PO/IAC /AC1/000004/09-10	06.04.09	31.03.10	06.06.11	15	Firm failed to adhere to delivery schedule.	9.68
49.	Refrigeration Plant			31.03.10				

**compiled from the records of CSL*

Annexure-IV

(Referred to in Para 2.6.1.2)



Annexure-V

(Referred to in Para 2.6.1.3)

SI No.	Item description	Cost of completed scope of work as per accepted rate under Phase I Contract		Cost of completed scope of work with reference to actual man days consumed		Undue benefit to the yard
		Structure	Outfit	Structure	Outfit	Difference (₹in Crore)
A	Weight in Tonnes	12894	1310	12894	1310	
B	Man-Hour per Tonne	1030	2060			
C	Labour Man-Hours A x B	15979420		6864000*		
D	Labour Rate per Man-hour (₹)	163.00		163.00		
E	Labour Cost (₹Crore) C x D	260.47		111.88		148.59
F	Overhead rate per Man-hour (₹)	322.90		322.90		
G	Overhead cost (₹Crore) C x F	515.98		221.64		294.34
H	Total yard effort without profit (₹Crore)	776.45		333.52		442.93
I	Profit @ 7.5%	58.23		25.01		33.22
J	Total yard effort (₹Crore)	834.68		358.53		476.15

*1 man-day = 8 man-hours. Thus, 8.58 lakh man days = 68,64,000 man-hours

Annexure-VI

(Referred to in Para 2.6.2)

(₹in crore)

Year	Funds available in the Flexi Account at the beginning of the F.Y.	Funds released into flexi account during the F.Y	Interest generated during the F.Y	Expenditure during the F Y (B+C+D)-F	Balance available in the account at the end of F.Y.
(A)	(B)	(C)	(D)	(E)	(F)
2006-07	(Flexi a/c opened in August 2006)	520.56	8.74	318.54	193.28
2007-08	193.28	475.53	26.59	93.31	602.09
2008-09	602.09	531.00	42.88	620.54	555.43
2009-10	555.43	378.15	37.55	634.56	336.57
2010-11	336.57	334.93	19.72	505.14	186.08
2011-12	186.08	431.00	22.24	251.63	387.69
2012-13	387.69	449.50	41.02	638.11	240.10
2013-14	240.10	326.00	11.00	577.07	0.03