

CHAPTER II: MINISTRY OF DEFENCE

2.1 Medium Refit cum Upgradation of INS Sindhukirti

2.1.1 Executive Summary

Ten EKM submarines were acquired by the Indian Navy from Russia between 1986 and 2000. Of the ten submarines, Medium Refit (MR) of six submarines was offloaded to Russia due to lack of expertise, non-availability of spares and technical documentation. The first indigenous MR of an EKM submarine commenced at Naval Dockyard, Visakhapatnam [ND(V)] in July 1999. In order to develop alternative MR capability outside Naval Dockyards, the MR of INS Sindhukirti was awarded to a PSU yard i.e. Hindustan Shipyard Limited, Visakhapatnam, in June 2005. The execution of MR within the parameters of economy, efficiency and effectiveness was examined and salient points are mentioned below:

- While planning and scheduling the Medium Refit cum Upgradation of a submarine, INS Sindhukirti, the Operational-cum-Refit-Cycle (OCRC) was not adhered to. MR of the submarine was due for commencement by 2001 and completion in 2004, but was actually carried out from 2006 after the submarine witnessed extensive deterioration and was put on extended notice for motoring¹ in June 2004.
- Though the development of indigenous repair capability was envisioned in 2000 and the sanction for the first MR of submarine at an indigenous commercial yard was accorded in June 2002, yet the contract for the MR was concluded only in October 2005.

¹ Extended notice for motoring – indicates that deployment of a ship/submarine for operational duty will not be at short notice

- Against the scheduled completion of the refit by January 2009 as per the above contract, the submarine has been delivered by the shipyard to the Navy in June 2015, with Sea Acceptance Trials yet (September 2015) to be completed.
- Deficiency in manpower deployed for the refit by the yard, non-adherence to the requirement of protection of cables and delayed supply of yard materials as well as modernisation of equipment delayed the refit. Ineffective project management and lack of a dedicated project team to oversee the refit further hampered the progress of refit as planned.

Cumulatively, the cost of refit was enhanced from ₹629.50 crore (June 2005) to ₹990.52 crore (August 2013), with additional liabilities of ₹92.17 crore still being claimed (September 2015) by the yard. This apart, improper financial management led to diversion of funds to the tune of ₹92 crore.

- Resultantly, the Navy was unable to operate one of its EKM submarines since June 2004 and was deprived of one of its conventional platforms for more than 10 years.

Recommendations:

- (a) Planning and commencement of refits of submarines should be as per schedule, to avoid excessive exploitation of submarines as well as extended refit schedule.
- (b) The Ministry should ensure that efforts are augmented to improve the scale of utilisation of indigenous materials in refits, in line with its own directives.
- (c) The Navy should establish a dedicated Project Team, the expertise of which is available to each indigenous offloaded refit.

2.1.2 Introduction

Repairs and Refits are critical activities of a Ship/ Submarine to make it operational again by repairing, re-equipping or re-supplying. Repairs and refits are to be undertaken in accordance with the Operational Cum Refit Cycle (OCRC) promulgated by Integrated Headquarters Ministry of Defence (Navy)

[IHQ MoD (N)] for each class of ship/ submarine as stipulated in the relevant order. The OCRC is promulgated based on the operating experience, changes in technologies and induction/phasing out of different classes of ships/submarines. Essentially, the OCRC depicts the period the ship is to remain at sea, available for deployment, followed by a period to be spent on a particular refit.

2.1.3 Kinds of Refits for Ships/Submarines

Table 2.1

Refit	Description
Short Refit (SR)	caters to defects arising within the ship's operational cycle and is basically meant for essential repairs and for repairs on equipment that has fallen due as per the recommendation of the OEM, based on time and running hours
Normal Refit (NR)	includes full hull survey and major routine maintenance on main equipment such as gear box, main engine, pumps, etc
Medium Refit (MR)	includes all major repairs and replacements on the ship

2.1.4 MR of INS Sindhukirti

INS Sindhukirti belongs to the EKM class of submarines, ten of which were built under a contract between FSUE Rosvooruzhenie (RVZ) and the Ministry of Defence (MoD) and had been acquired by Indian Navy between 1986 and 2000. Up to June 2000, MR of two EKM submarines was offloaded (June 1999) to Russia while the MR of one EKM submarine commenced (July 1999) in Naval Dockyard, Visakhapatnam. As per OCRC promulgated (January 1996) by IHQ MoD (N), INS Sindhukirti was commissioned in November 1989, was due for her MR in 2001 which was scheduled to be completed in 36 months. Sanction for offloading of MR cum Upgradation of INS Sindhukirti to Hindustan Shipyard Ltd, Visakhapatnam [HSL (V)] at a cost of ₹629.50 crore was accorded (June 2005) by GoI, MoD. Accordingly, the

contract was concluded (October 2005) between ND(V) and HSL at a total cost of ₹629.50 crore, with commencement of refit in January 2006 and delivery of the submarine scheduled for January 2009. The cost and timelines, however, underwent several revisions during the MR, as detailed below :

Table 2.2

Contract/Extension Date	Probable Date of Completion (PDC)	Cost (₹ in crore)
October 2005	January 2009	629.50
June 2010	June 2011	778.30
August 2013	February 2014	990.52
June 2014	March 2015	-
June 2015	May 2015	-

In response to a query, Audit was informed by ND(V) (August 2015) that all the contracted works and trials in the scope/control of the shipyard were completed as on 31st May 2015. As of August 2015, ₹944.72 crore was paid to HSL for the MR cum Upgradation. Sea Acceptance Trials (SATs) of the submarine were scheduled to be undertaken after 30th September 2015.

2.1.5 Refit Implementation

The scope of work of the refit included removal of equipment, defect survey, repair of hull, lowering and installation of equipment, undocking and completion of Harbour Acceptance Trials (HATs) by the shipyard. The scope of work also included Modernisation of equipment² to be supplied by the Russian agency M/s ROE (Rosoboronexport) as well as

² Apassionata-EKM, AICS-LAMA-EKM, Torpedo Tubes and Water Cooling System (ROE scope) and Sonar Ushus, System Porpoise, CCS Mk-II and Air Conditioning system (Navy scope)

the Navy. The MR was being implemented through the following agencies/entities:

Table 2.3

Agency/Entity	Role in the MR of INS Sindhukirti
Ministry of Defence	Competent Financial Authority for all matters relating to cost and timelines of the MR.
Integrated Headquarters Chief Of Materials /Directorate of Fleet Maintenance (DFM)	Responsible for overseeing the execution and progress of refit.
ND (V)	Contract Operating Authority (COA) and a party to the contract with the shipyard.
Warship Overseeing Team, Visakhapatnam [WOT(V)]	Team of Naval personnel responsible for overseeing the refit and certifying completed work at the yard's premises.
HSL	The shipyard executing the MR in collaboration with M/s ROE, the Russian agency, providing technical assistance and material support for undertaking the MR cum Modernisation.

2.1.6 Scope and Methodology of Audit

In view of the significance of the MR cum Upgradation of INS Sindhukirti, we conducted a review of the MR cum Modernisation of INS Sindhukirti at DFM, ND (V) and WOT (V), by issuing preliminary audit memos and observations. We requested (November 2014) IHQ MoD(N) for an Entry Conference, however, there was no response from the Navy. Interactions were also held with Naval Officers at DFM, ND (V) as well as WOT (V) for better appreciation of the issues. The Draft Audit Paragraph was issued to the Ministry in February 2015. An Exit

Conference was conducted in May 2015. The reply of the Ministry was received in May 2015 and has been suitably incorporated.

2.1.7 Audit objectives

The primary audit objectives were to ascertain whether:

- (a) Overall planning for offloading of Medium Refit cum Upgradation of INS Sindhukirti was comprehensive and effective for implementation of the MR-cum-Upgradation?
- (b) Implementation of contractual provisions for MR by the parties for the contract was as per the contractual obligations and was efficient and effective?
- (c) Overall monitoring mechanism and financial management was in place and working efficiently to ensure timely implementation of the refit?

2.1.8 Sources of Audit Criteria

The major sources of audit criteria were:

1. Confidential Navy Order (CNO)
2. Navy Order 2/98
3. Navy Order 84/02
4. Detailed Project Report for infrastructural development concluded between FSUE Rosoboronexport, Russia and HSL
5. Government of India Sanction for offloading of MR cum Upgradation of INS Sindhukirti to HSL
6. Main Contract and supplementary contracts concluded between HSL and ND (V) and addendums thereof
7. Supplementary Agreements concluded between FSUE Rosoboronexport, Russia and HSL
8. Minutes of Review meetings held at various levels viz, MoD, IHQ MoD(N), HQENC(V), ND (V) for monitoring of progress of the MR cum Upgradation

9. Planning and PERT (Programme Evaluation Review Technique) chart

Our scrutiny showed non-consideration of vital performance parameters in selection of the yard, poor planning in commencement and execution of refit, improper financial management as well as non-adherence to extant orders/regulations in monitoring the progress of the project.

Major audit findings are discussed in subsequent paragraphs:

2.1.9 Whether the overall planning for offloading of Medium Refit cum Upgradation of INS Sindhukirti was comprehensive and effective for implementation of the MR-cum-Upgradation ?

As sufficient repair facilities were not available in India for undertaking MR level of repairs, the MR of submarines were offloaded to Russia in a progressive manner. In response to directives from MoD in January 2000 to bring out detailed position with regard to efforts to undertake refit/modernisation of submarines in India and further efforts, that would be required to make navy fully capable indigenously, the Navy submitted (June 2000) a paper on “Development of Indigenous Submarine Repair Capability” to MoD, which proposed offloading of MR of submarines to Public Sector Undertaking (PSU) shipyards in cases of capacity constraints in Naval Dockyards. The Navy shortlisted (June 2000) M/s Hindustan Shipyard Ltd (HSL) and M/s Mazagon Dock Limited (MDL) and subsequently proposed (November 2001) HSL to MoD, preferring HSL over MDL due to work order position as well as HSL’s co-location with Naval Dockyard, Visakhapatnam [ND(V)]. The Government of India (GoI) accorded (June 2002) approval for nomination of M/s HSL to undertake the MR cum Upgradation of INS Sindhukirti, in collaboration with ROE, on the conditions that the refit cost would be competitive, the timelines would be as per the Navy and the augmentation of infrastructure at HSL would be with minimal duplication between Navy and HSL.

Our scrutiny showed the following issues in planning the refit :

2.1.9.1 Non-adherence to provisions of CNO 2/96 for planning the refit

Confidential Navy Order (CNO) 2/96 contained comprehensive instructions in respect of the OCRC of all ships and submarines, encompassing other related aspects of refits and maintenance. We observed (September 2014) non-adherence to the provisions of CNO 2/96, which led to deterioration of the submarine by June 2004 and delay in conclusion of the contract for MR, before the MR commenced in January 2006, as discussed below:

(A) As per the OCRC promulgated vide CNO 2/96, MR of an EKM submarine has to commence 138 months after its commissioning. Based on that, the MR of INS Sindhukirti should have commenced in June 2001. We observed (September 2014) that the MR commenced only in January 2006 as the implementation of the proposal to carry out the MR at HSL and obtaining Government approval did not materialise till June 2005. The MR was also delayed due to problems associated with finalisation of Detailed Project Report (DPR) for infrastructure by HSL. The contract for the MR was concluded in October 2005.

The Ministry stated (May 2015) that the timelines given were to be utilised as a guideline and refits were actually scheduled based on the requirements of the operational periods and refits during the cycle, adding that the OCRC had been revised in 2004 and 2012.

The reply of the Ministry is not acceptable because the basis for planning the MR of this submarine was CNO 2/96 which reckoned the concerned cycles to be applicable from the date of commissioning of the vessel. Further, the Principal Director of Fleet Maintenance (PDFM) observed (March 2005) that the MR of INS Sindhukirti, commissioned in November 1989, was due in June 2001 and the commencement of refit was delayed due to the time taken for processing the case for government sanction. Further, due to delay in commencement of the refit, the material state of the submarine deteriorated and it had to be taken off from active operational

duty as well as placed under extended notice for motoring with effect from June 2004.

(B) CNO 2/96 further mentions that the Refit Planning Programme (RPP) aims at streamlining the planning process to facilitate effective scheduling, monitoring and execution of refit of ships and submarines. RPP clearly spells out schedule of various activities such as compiling the work carried out during the previous refits, compilation of defect list etc. in a time bound sequence along with agencies responsible for their execution. Our examination (September 2014) revealed that these activities were not followed.

On the issue of deviation from the provisions of CNO 2/96 with reference to RPP during the MR, the Ministry responded (May 2015) that as per CNO 11/04, the RPP procedure for fully offloaded refits differed as some of the standard RPP activities had to be advanced and some became irrelevant.

The contention of the Ministry regarding the applicability of CNO 11/04 is not tenable as nomination of the yard for the refit and finalisation of work package as well as the issue (September 2004) of Request for Proposal (RFP) for the MR, were completed under CNO 2/96 which was prior to the promulgation of CNO 11/04 (November 2004).

(C) As per Para 11 of CNO 2/96, Pre-refit Trials (PRTs) provide vital inputs to the yard for appreciation of the scope of work and assessment of spares required. In addition, they also aid in identifying fresh defects, inadvertently not projected or inadequately recognised for some reason. PRTs are to be completed five weeks prior to date of commencement. Prior approval of DFM is to be obtained for any deviation.

As per the contract (October 2005), the MR was to commence from 01 January 2006. Hence, PRTs were to be completed by the 4th week of November 2005.

When we enquired (September 2014) about PRTs, the Ministry replied (May 2015) that in the case of Sindhukirti, the Scope of Work (SoW) was drawn up by OEM specialists, therefore the requirement for a PRT would not be

significant as in other refits.

The Ministry's reply is not acceptable as the Set to Work (SoW) was firmed up based on the joint survey in June 2003 and the refit commenced only in January 2006. Hence, the intervening period of over 2 ½ years and further deterioration of the submarine since June 2004 made it all the more incumbent upon the Navy to undertake the PRTs to identify fresh defects/defects overlooked and further firm up the scope of work.

2.1.9.2 Selection of the shipyard

As discussed earlier, MoD preferred (November 2001) HSL over MDL considering certain inherent advantages like HSL's previous experience of undertaking refits of Russian origin submarines as well as its co-location with ND (V) where the Navy had built up its repair infrastructure.

Our scrutiny (November 2014) revealed the following:

- ND (V) expressed (October 2001) serious reservations to HQENC (V) regarding lack of expertise, manpower, quality control mechanism, infrastructure at HSL for undertaking the MR.
- Consideration of advantage of the yard's experience in undertaking refits of Russian origin was incorrect, as the earlier refit of INS Vagli, a Foxtrot³ class submarine, scheduled between August 1997 and August 2000, was completed by HSL only in September 2006. IHQ MoD(N) observed (November 2001), prior to nomination (June 2002) of HSL for the refit, that HSL would be attempting the MR of an EKM submarine for the first time and these submarines were a quantum technological jump on the Foxtrot class.

The Ministry replied (May 2015) that during the period 2001 to 2012, there had been several instances wherein HSL, MoST, MoD/DDP and other agencies (including Russian side) had endorsed the suitability of the yard. However, the fact remains that ND (V) reiterated their reservations (2001) about lack of expertise and inadequate planning by HSL to HQENC (V)

³ Foxtrot – submarines with a displacement of 2475 T, 7 of which arrived in India from the former Soviet Union between July 1968 and December 1975 vintage where as EKM submarines were inducted between 1986 and 2000.

in 2011 in view of the inordinate delay in completion of refit. Further, in reply to an audit query regarding the delayed refit of INS Sindhukirti, HSL intimated (May 2012) that “the yard was more tuned to merchant shipbuilding and not very conversant even with the warships, let alone the refit of EKM submarines which was definitely far more complicated”.

2.1.9.3 Exclusion of certain cost components in the proposals for sanction of CFA

The Commercial Negotiations Committee (CNC) finalised the cost of MR cum Upgradation as ₹640.69 crore, which was revised to ₹629.50 crore. Even though the negotiated cost was found to be substantially high in comparison to the same work package of INS Sindhuvijay⁴ negotiated with ROE for an all inclusive cost of ₹419 crore during the same period (February 2005), CNC recommended the cost, considering the benefits that would accrue to the country and the strategic capability that would be developed for the nation from this project. CNC meeting for amendment to contract (October 2005) and financial sanction was held in February 2010 and an additional Government sanction of ₹148.80 crore was obtained in June 2010.

We observed from the papers (CNC meeting of February 2010) leading to the additional Government sanction of June 2010 that certain components *viz*; Growth of Work (₹52.70 crore) and Service Tax (₹21 crore) included in revised sanction were actually discussed (CNC meeting of May 2005) at the time of processing the original sanction (June 2005) but were not included in the sanctioned cost. Non-inclusion of these components in the initial sanction led to virtual reduction in the cost of refit by the Ministry and further effaced the cost competitiveness which was one of the three conditions on which HSL was nominated and sanction accorded.

The Ministry agreed (May 2015) with the audit findings.

⁴ INS Sindhuvijay – an EKM class submarine

2.1.10 Refit Execution:

Whether implementation of refit by the parties to the contract was as per the contractual obligations and was efficient and effective?

As per the contract, the refit was to be completed by January 2009. However, the duration of refit was extended four times up to 31 May 2015, due to delay of 11 to 19 months in supply of yard material by ROE, growth of work on hull and Main Line Cable (MLC) renewal, 16 months time taken in Govt approval for MLC renewal with consequent refit extension and problems arising in ROE scope of work and other refit related activities.

Our scrutiny showed poor refit execution and contract management, as discussed below:

2.1.10.1 Deficiency in engaging required manpower for refit

As per the envisaged/approved deployment of manpower planned by HSL, 3,81,000 man days were to be utilised in the refit activities for completion of refit by January 2009. The Contract Operating Authority *i.e.* ND (V) observed (January 2011) in their communication to HQENC (V) that the rate of deployment of manpower by HSL was very low and the focus of HSL was towards civil orders. We noticed (October 2014) that only 17 *per cent* of the envisaged manpower *i.e.* 64770 mandays (17 *per cent* of 3,81,000) was utilised by HSL as of January 2009 (due date of completion of refit as per contract). HSL replied (December 2014) that delay in supply of yard material by ROE and delay in finalisation of hull survey norms were reasons for low deployment of manpower during the initial three years of the MR. The reply of HSL contradicts the earlier admission (May 2012) to audit that large number of dedicated people were not employed as it was not cost effective for HSL in absence of assured future orders.

The reasons for not taking appropriate action to ensure adequate manpower deployment as well as not discussing this issue during the Annual Refit Conferences(ARC)/ Mid Year Refit Reviews (MYRR)⁵ were sought (December 2014) from WOT (V). WOT (V) replied that deployment of

⁵ **ARC/MYRR – ARC/MYRR** are conducted every year by IHQ MoD(N) to plan forthcoming refits as well as review the status and progress of on-going refits (in-house/offloaded) being executed under different Naval Commands

manpower is the prerogative of the contractor and they were neither equipped nor provided with manpower to check the deployment of manpower by the yard.

In its reply (May 2015), the Ministry reiterated that it was the shipyard's responsibility to ensure that adequate mandays were deployed to achieve requirements.

The reply of the Ministry has to be seen in light of the fact that timely completion of the refit by optimal deployment of manpower was in the Navy's operational interest and maritime security of the country. Thus, the Ministry could not be absolved of its responsibility to oversee that the deployment of manpower by the yard was optimal.

2.1.10.2 Inadequate protection of electric cables

As per Navy Order (NO) 84/02, electric cables are to be covered by asbestos cloth or other protective material during the hot work to be carried out on the submarine. Under the contract (October 2005), the contractor had to take requisite precautions as per the Navy Order *ibid* prior to commencement of hot work/ welding/burning during the period of vessel's refit.

Our scrutiny of records revealed that the Russian team had carried out initial survey (November 2006) of Main Line Cables (MLCs)⁶ and stipulated (November 2006) that HSL had to protect the cables from thermal and mechanical damages during the refit work. However, five years after commencement of refit, specialists from M/s Arktika (OEM) noticed (December 2010) deterioration in the state of MLCs while undertaking repairs of the cables. A joint inspection report (February 2011) of Russians, HSL and WOT(V) brought out that main cables showed flexibility loss due to their long time exposure to ambient air of high temperatures and suffered mechanical/thermal damages caused at the time of dismounting of equipment and repairing hull structures by HSL during 2008-10. The report also mentioned that the cables were protected with asbestos only at an advanced stage of refit, i.e. in April/May 2009 - 40 months after

⁶ MLCs – Cables which conduct current from the batteries to various equipment including the main propulsion motors and form the core of the power generation distribution network

commencement of refit. Russian specialists recommended 100 *per cent* renewal of MLCs. HSL proposed the cost for renewal of MLCs as ₹228.92 crore (November 2012). However, the cost was negotiated and renewal of MLCs was sanctioned at a cost of ₹191.80 crore out of the financial sanction of ₹212.22 crore accorded in August 2013.

We observed that though HSL proposed to ND (V) for an additional work for the renewal of MLC, neither HSL's proposal nor ND(V)'s letter forwarding such proposal contained reasons for damage to MLCs. Even HQENC (V)'s recommendation of the proposal to IHQ MoD (N) for 100 *per cent* renewal of MLCs did not contain the fact that the cables were damaged.

We enquired (December 2014) about the reasons for not referring the causes for damage to MLCs to IHQ MoD (N) while seeking their renewal, WOT (V) replied (December 2014) that a mention about the Russian reports was made in the Statement of Case (SOC) forwarded by HSL.

The Ministry replied (May 2015) that asbestos covering was not a pre-requisite prior to any hot work on the submarine, adding that cables were not required to be covered with asbestos cloth during dismantling of equipment. The Ministry also stated that the primary reason for change of MLCs was deterioration of cables, which pointed to the life of cables.

The reply of the Ministry is not acceptable because the contract stipulated that electric cables had to be covered by asbestos cloth or other protective material prior to the commencement of hot work on the submarine by HSL during the refit work. But, the main cables suffered mechanical/thermal damages caused at the time of dismantling of equipment and repairing hull structures by HSL during 2008-10 as brought out in the joint inspection report.

From the above, it is clearly evident that lack of compliance to NO 84/02 and instructions of OEM by HSL for protection of MLCs from thermal and mechanical damages during the refit work resulted in 100 *per cent* renewal of MLCs leading to an extra expenditure of ₹191.80 crore and consequent time overrun of 27 months. In addition, the facts related to non compliance of regulations by HSL, were not highlighted by the Navy while forwarding the proposal to CFA for financial approval and extension of refit duration.

2.1.10.3 Poor Material Management for refit

(a) Contracts between HSL and ROE

HSL concluded (November 2003, September 2004 and October 2005) nine contracts with ROE (being Russian collaborator for the Refit) for undertaking the MR cum Upgradation of INS Sindhukirti. Out of these, one contract was concluded (October 2005) specifically for supply of materials such as steel plates, welding electrodes, pipes, cables, associated fittings and accessories, required for the MR and to be delivered between December 2006 to October 2008. However, the delivery under the contract was not completed timely by ROE, leading to delay in receipt of materials by 11 to 19 months which had a cascading effect on the commencement of major repairs in hull structure. Our examination (December 2014) of six contracts between HSL and ROE for supply of materials and services further revealed that Liquidated Damages (LD) clauses were not included in any of the contracts.

The Ministry replied (May 2015) that the issue was not relevant to the implementation of the contract between HSL and MoD. The reply of the Ministry is untenable because the scope of work for ROE was included in the MR contract between ND(V) and HSL and hence linked to completion of the MR. Therefore, the Ministry cannot abdicate its overall responsibility of ensuring the inclusion of standard contractual clauses in ROE contracts.

Thus, lack of LD clauses prevented remedial action against ROE despite delayed deliveries which had affected the overall progress of refit.

(b) Lack of due diligence while using indigenous electrodes in the MR

The contract for MR of Sindhukirti did not contain a provision for usage of indigenous electrodes and was formulated based on Russian methodology which catered for overall repair and refit of submarine as per Russian Technical Documents (RTDs) which do not cater for use of Indian equipment. However, when the electrodes contracted from ROE were substantially delayed by 19 months, HSL utilised the indigenous electrodes, Ultratensal-MH and Ultratherme-H, in place of 48N1 and 48N11 electrodes authorised

under RTDs. The Russians raised (May 2009) objections to the use of indigenous electrodes. Eastern Naval Command intimated(June 2012) to IHQ, MoD(Navy) that the Russians expressed their inability to depute representatives for Sea Acceptance Trials (SATs) of the submarine, till the issue of electrodes was resolved. Further IHQ MoD (N) intimated to HSL (June 2013) that issue of use of indigenous electrodes has been a point of contention with the Russians in all Indo Russian Inter Governmental Committee (IRIGC) meetings, wherein in the 13th IRIGC meeting they have demanded a separate contract for certification of indigenous electrodes.

In response to our query (October 2014) about electrodes, ND (V) stated (November 2014) that IHQ MoD (N) had approved (March 1995) the usage of indigenous electrodes Ultratensal-MH and Ultratherme-H in lieu of imported electrodes 48N1 and 48N11. IHQ MoD (N) had also stated (June 2012) that indigenous electrodes were used for hull repairs on board EKM class submarines during previous refits at ND (V) and ND (MB)⁷ prior to MR at Russia.

We observed (November 2014) that non-consideration of the usage of indigenous material at the contract stage and resorting to their utilisation only after delay in supplies by ROE and without obtaining specific approval from ROE, indicated lack of due diligence by the Navy.

The Ministry admitted (May 2015) that objection of the Russians created hurdles in progress of refit.

Resultantly, utilisation of indigenous yard materials, despite past knowledge and experience of their use in refits of other EKM submarines, could not be sufficiently ensured in the refit effort.

2.1.10.4 Modernisation package for INS Sindhukirti

Scope of Work under the MR cum Upgradation included Modernisation package of INS Sindhukirti by installation of equipment/systems to be supplied by both ROE as well as the Navy.

⁷ ND(MB) – Naval Dockyard, Mumbai

(a) Modernisation by ROE

In our analysis (September 2014), we found that as per the scope of work of ROE under the Modernisation package, (i) Supply and installation of Apassionata-EKM (ii) Supply and installation of AICS-LAMA-EKM (iii) Adaptation of Torpedo Tubes and (iv) Installation of water cooling system were included.

As per the contract (October 2005) for Modernisation, guarantee of items supplied was 12 months post completion of SATs but not more than 24 months from the date of delivery, whichever was earlier. We observed (September 2014) that the validity of guarantee of the systems Aius Lama⁸ and Appassionata⁹ received under ROE contracts for Modernisation package and for equipments Pirit-M¹⁰ and Pallady-M¹¹ expired even without installation between December 2012 and December 2013.

Resultantly, Supplementary Agreements (SAs) for Maintenance Support (up to 12 months Post SATs) for Appassionata/AICS-Lama and Pirit/Pallady were concluded (October 2013) by HSL with ROE at a cost of ₹6.34 crore. It was further seen from the records that the equipments were installed between June 2014 and September 2014.

The Ministry replied (May 2015) that no costs had been agreed to with HSL by MoD towards the additional guarantee costs.

The Ministry's reply is factually incorrect as the sum of ₹6.34 crore towards the additional guarantee cost for Appassionata/AICS Lama and Pirit/Pallady was included in the total amount of ₹212.22 crore sanctioned by the Ministry for renewal of MLCs in August 2013.

⁸ AICS LAMA - Automated Information Control System

⁹ Appassionata – Appassionata is a navigational complex for EKM submarines

¹⁰ Pirit M - an auto pilot system of the submarine

¹¹ Pallady – M – an auto control system of the submarine

(b) Modernisation by the Navy

As per the indigenous part of the Modernisation package, the Navy had to provide four equipment (i) Sonar USHUS¹² (ii) System Porpoise¹³ (iii) CCS Mk-II¹⁴ and (iv) Up-gradation of Air Conditioning system¹⁵.

Audit observed mismatch between date of receipt of equipment by HSL and completion of MR, with regard to two out of four equipment as discussed below :

(i) Sonar USHUS

Sonar USHUS, to be supplied by Navy under Modernisation package, was procured (March 2001) by Navy from M/s Bharat Electronics Ltd. (BEL). Due to recurring defects and sub-optimal performance of the sonar on previous platforms¹⁶, engineering enhancements were recommended to the Navy for INS Sindhuvijay by a core team consisting of M/s BEL and Naval Physiological and Oceanographic Laboratory (NPOL). For Sindhukirti, HSL was directed (September 2012) by IHQ MoD (N) to undertake similar enhancements and sanction for the same was accorded (October 2013) by MoD at a cost of ₹11.40 crore.

The Ministry replied (May 2015) that the sub-optimal performance of USHUS did not affect the overall refit schedule.

The Ministry's reply is factually incorrect because delay of more than 10 months in supply of engineering enhancement package of Sonar USHUS by M/s BEL was cited as one of the reasons by HSL for seeking extension of delivery period up to 31 March 2015.

(ii) Upgradation of AC

Under the indigenous part of modernisation in the Navy's scope of work, existing AC system onboard of INS Sindhukirti was to be upgraded. Our examination (November 2014), showed that the above AC plant ordered (August 2008) by the Navy along with two other AC plants, was allotted to INS Sindhukirti. The AC plant allotted to INS Sindhukirti was received in

¹² Sonar USHUS – Active and Passive Sonar

¹³ System Porpoise- An Electronic Support Measures (ESM) system

¹⁴ CCS Mk-II - Composite Communication System, CCS Mk II is an integrated communication system designed to provide external and internal communication facilities onboard Naval ships

¹⁵ Air Conditioning System- Air conditioning system is used for maintaining the ambient temperature of submarine

¹⁶ INS Sindhuhwaj, INS Sindhughosh and INS Sindhuvijay

October 2009 and carried a warranty up to April 2011. Due to delay in completion of refit, the warranty for the AC plant procured at a cost of ₹2.56 crore expired.

In its reply (May 2015), the Ministry admitted the loss of warranty period.

2.1.11 Financial Management

Whether overall financial management was in place?

Audit findings with regard to financial management during MR cum upgradation of INS Sindhukirti are discussed below:

2.1.11.1 Lack of provision for accounting of scrap due to renewal of steel and replaced material/machinery

As per para 6 of Appendix A of Navy Order (NO) 02/98, old ferrous scrap consequent to steel/ pipe renewal would be the property of the contractor if *pro rata* discount per tonnage/meter was given in the refit cost against respective serial.

We sought (September 2014) details of the return/accounting of scrap as well as the *pro rata* discount per tonnage in the refit cost. ND (V) admitted (December 2014) that the contract did not contain the provision either for returning of scrap / old spares or for *pro rata* discount for these scrap/old spares in the refit cost.

Thus, due to non-inclusion of the clause for return/accounting of scrap, the Navy could not derive the benefits of better financial management as the cost of scrap and consequent *pro rata* discount on the refit cost could not be ascertained.

2.1.11.2 Variance in stages for payments between Request for Proposal (RFP) and the contract

As per the deliberations of CNC, the contract with 19 stage payments was concluded (October 2005) mainly to keep the stage payments by and large similar to those agreed with the MR contract of another submarine, INS Sindhuvijay.

Our examination (December 2014) of the stage payments of the contract revealed that 61 *per cent* of total value was payable to the contractor for completion of only degutting/removal of machinery and engines in

comparison to payment of only 20 *per cent* on completion of degutting as per RFP. Similarly, for completion of guarantee after SATs, only 3 *per cent* of the total value was assigned in the contract against the 20 *per cent* of the total value envisaged for this purpose in the RFP.

We further observed that most of the stage payments were of the nature of advances rather than payments for physical completion of various parts of the MR, which provided leverage to HSL for diverting funds meant for the project leading to delay in completion of refit.

The Ministry replied (May 2015) that the decision was taken to provide level playing field to Indian and Russian shipyards undertaking MR of submarines of the Indian Navy.

The Ministry's reply is not acceptable because as per the payment terms of MR contract of INS Sindhuvijay, off loaded to Russia, repair of the equipment was linked from the ninth stage payment onwards whereas the repair of equipment of INS Sindhukirti was linked from twelfth stage payment only. Thus, HSL had received three additional stage payments without linkage to the physical completion of refit work. Further as per the CNC, 15 *per cent* advance was proposed with final two stage payments being exactly similar to Sindhuvijay and other payments had been so compiled so as to facilitate HSL in making payments to ROE.

2.1.11.3 Non-inclusion of provision for payments through ESCROW¹⁷ account

HQENC (V) informed (October 2009) IHQ MoD(N) that HSL had diverted ₹92 crore from the total payments of ₹448 crore made to HSL under the project for other projects of HSL and recommended that all future payments be paid through a dedicated ESCROW account in order to avoid any diversion of funds and ensure timely payment to sub-contractors and ROE.

¹⁷ ESCROW - An account wherein the fund out flow would be based upon certification by Warship Production Superintendent (V) and Contract Operating Authority for actual invoices of work done by various sub-contractors on INS Sindhukirti

Despite diversion of funds in the previous refit of INS Vagli, no efforts were made by the Ministry for inclusion of provision of payments through ESCROW account since commencement of this refit, to ensure better financial control and timely completion of refit.

The Ministry admitted (May 2015) that funds had been diverted by HSL and the issue was intrinsic to HSL's management. The Ministry further replied that there was no option of opening of Escrow account available and was a fall out of the thought process during the refit.

The Ministry's contention that diversion of funds was intrinsic to HSL is not tenable as monitoring of fund utilisation by the Navy could have prevented diversion of funds, especially as the prior experience of diversion of funds during the earlier refit of INS Vagli was evidently available before this refit. Further, most of the stage payments were in the nature of advances, i.e. payments for conclusion of contracts with ROE and opening of Letter of Credit (LC) etc. rather than payments for physical completion of various parts of MR. Moreover, 61 *per cent* of total value was payable to the contractor for completion of only degutting/removal of machinery and engines.

Thus, non-exercise of the option of opening an ESCROW account from the commencement of refit prevented smooth progress of the refit of INS Sindhukirti.

2.1.11.4 Delay in accord of financial sanction/ Delivery Period (DP) extension resulted in extra demand of ₹92.17 crore by HSL

HSL forwarded (April 2012) a Statement of Case (SOC) for additional cost of ₹162.58 crore, which was further revised (November 2012) to ₹228.92 crore. Additional sanction for renewal of MLCs at the cost of ₹212.22 crore was accorded (August 2013) by the Ministry. In view of the delay in conclusion of CNC, for the additional cost and consequent 16 months time taken to accord sanction from the request (April 2012) by HSL, the shipyard demanded (February 2014) additional funds of ₹125 crore towards services to Navy for the extended period, deployment of additional labour during extended period and escalation of cost for works services & deputation of specialists etc. HSL

subsequently reduced (September 2014) the amount to ₹92.17 crore due to reduction of tax amount.

We observed (December 2014) that the Ministry acknowledged the delay and approved (June 2014) early conduct of CNC for the additional demand of ₹92.17 crore, The Ministry replied (May 2015) that the additional financial sanction had not been negotiated/approved.

However, the fact remained that the demand for additional sanction by the yard had not been turned down by the Ministry.

2.1.12 Refit Monitoring

Whether overall monitoring mechanism was in place to ensure timely and effective implementation of the refit?

As per the contract dated October 2005, WOT (V) was entrusted with monitoring of the progress of refit at HSL. In addition, the contract also provided for a monthly review meeting at ND (V) level.

Issues related to monitoring noticed during the audit of MR cum Upgradation are discussed in detail below:-

2.1.12.1 Lack of a dedicated Project Team

As per guidelines for offloading of refits of ships and submarines to Indian PSUs/ Private and foreign ship repair yards promulgated by NO 2/98, a dedicated project team consisting of officers and men having intimate knowledge of the work package and ship/submarine's layout was to be nominated/ constituted for close supervision of the refit at the contractor's premises. Local Warship Production Superintendent (WPS), suitably augmented if necessary, would undertake the duties of project team whenever the refit was being undertaken by DPSU/PSU yards.

In response to an audit query (September 2014) regarding constitution of any dedicated project team for close supervision of the refit work, WOT(V) informed (November 2014) that no dedicated project team was constituted for monitoring this MR.

The Ministry replied (May 2015) that the WOT along with COA had effectively monitored the refit. The Ministry's reply has to be seen in light

of the fact that WOT was functioning as an extension of the unit earlier established for the MR of INS Vagli and was facing shortage of manpower, with only six officers posted from January 2006 to January 2014. Further, even at HQENC (V), three officers were initially posted for refit management, out of which two officers were transferred out over a period of time due to non-deployment of manpower by the yard as well as low priority accorded by the yard to this refit.

2.1.12.2 Lack of regular refit monitoring by the Contract Operating Authority (COA)

As per Clause 2.9.3 (a) of the contract (October 2005), in order to ensure proper monitoring of the refit, refit meetings at the level of ND (V) (being the COA) were to be conducted on monthly basis. When we enquired (September 2014) about adherence to the above periodicity, ND (V) admitted (November 2014) that regular review of the refit was conducted at Command level by HQENC (V) and ND (V) prior to conduct of Annual Refit Conference (ARC) and Mid Year Refit Reviews (MYRR). The authority and reasons for not adhering to the contractual provisions on conduct of monthly review meetings by ND (V) were enquired (December 2014).

The Ministry replied (May 2015) that refit progress meetings had been conducted on a monthly basis by the COA. The Ministry's reply contradicts the statement of the COA which stated that the refit was being reviewed prior to conduct of ARC and MYRR.

2.1.13 Conclusions

The refit had to be completed within 36 months as per the extant naval policy and the contract, however, there was inordinate delay in refit execution and hence the submarine was not available for operational exploitation for more than nine years (January 2006 to June 2015).

Ineffective planning and scheduling of the MR led to commencement of the MR in 2006, though it was due in 2001. Consideration of advantage of the yard's experience in undertaking refit of Russian submarines, i.e. INS Vagli prior to its nomination for the refit of INS Sindhukirti, was inaccurate as the yard had not completed the refit prior to its

nomination. This, coupled with lack of serious efforts to use indigenised materials as well as non-adherence to contractual clauses for protection of main line cables, caused delays in progress of the refit. Low manpower deployment for the refit contributed to tardy progress in the execution of the MR.

Even refit management suffered with no dedicated project team and inadequate Naval manpower with necessary technical expertise at the yard, to steer the project.

The cost of refit was not competitive as cost of growth of work and service tax were excluded from the negotiated cost of refit. Belatedly, these had to be included in the refit cost leading to its revision, resultantly defeating one of the three cardinal conditions which formed the basis for nomination of HSL to undertake this refit.

Thus, the objectives envisioned by the Ministry could not be realised.

2.1.14 Recommendations

- (a) Planning and commencement of refits of submarines should be as per schedule, to avoid excessive exploitation of submarines as well as extended refit schedules.
- (b) Expertise held by the Navy in dealing with prospective suppliers of materials and equipment should be gainfully utilised by the shipyard to ensure robust contract management.
- (c) The Ministry should exercise stringent financial control to prevent diversion of project funds.
- (d) The Ministry should ensure that efforts are augmented to improve the scale of utilisation of indigenous materials in refits, in line with the directives of the Ministry of Defence.
- (e) The Navy should establish a dedicated Project Team, the expertise of which is available to each indigenous offloaded refit.