

## **Terms of Reference (TOR) for Consultancy Services to DFCCIL in setting up & operationalization of Heavy Haul Research Institute (HHRI)**

The Dedicated Freight Corridor Corporation of India Limited (hereafter referred to as 'DFCCIL or Client'), an SPV under the administrative control of Ministry of Railways, is engaged in implementing the Dedicated Freight Corridor Project (Eastern & Western Corridor). As advised by Railway Board, DFCCIL is to go ahead with setting up of a Heavy Haul Research Institute (hereafter referred to as 'HHRI') on the lines of similar globally located Heavy Haul Railway Research Institutes. In this direction, DFCCIL, having received a Loan (No-IN-8513 of 650 million USD) towards the cost of Eastern DFC Project-III, intends to apply part of the proceeds of this loan for engaging a Consultant (hereafter referred to as 'Consultant') to provide Consultancy Services for setting up and operationalizing HHRI under the aegis of DFCCIL (here after referred to as 'Consultancy Services').

The implementation of the HHRI shall be oriented to develop system parameters for heavy-haul freight systems which, while catering to India specific site conditions, would be comparable with Global Heavy Haul systems. In this direction, the related Plan and Program shall provide comprehensive performance specific specifications for key asset components (e.g. infrastructure, motive power, wagons and maintenance equipment) related Technologies, in areas which may, also, include:

- (i) **Infrastructure:** Track standards and design; grade and curves (both horizontal and Vertical); rail specifications including improved metallurgy & Head Hardness, specification and methodology related with Sleepers and fastenings for improved load transfer with reduced vibrations and with related value adding Features e.g. Under sleeper Pads etc.; switches & Crossing to permit more speed in Turnout Track ;

Specification and methodology related with Formation improvement and improved track Drainage systems.

System and methodology to improve Working life of Rail by optimal use of most suitable Rail Grinding technology and related Technology to adopt the optimal Rail Profile post grinding.

Specification and methodology to improve tribology e.g. Top of Rail and Gauge face lubrication and;

Power requirements and catenary; bridges; loading gauge; track inspections; welding methods & maintenance regimes etc.

- (ii) **Rolling-stock:** Train mass and capability of progressive increase: axle-loads; motive power; wagon capacity and design; high performance braking systems; distributed motive power, hot box detectors, hanging part detectors; wheel testing and management, rolling-stock maintenance regimes, etc.

- (iii) **Power supply and energy savings:** Traction Power supply system with provision of increasing capacity to support heavier trains and increase in throughput; energy efficiency with reduced carbon footprint; full fuel cycle analysis of the power supply to reduce reliance on fossil fuels; technology assessments for energy efficiency of freight operations; connected driver advisory systems / driver advisory systems (C-DAS, DAS); methodologies to assess and certify of carbon savings.

- (iv) **Freight traffic operations:** Train-load and train-lengths and infrastructure consequences (e.g. loop lengths, marshalling yards); Signalling and communication systems, train dispatch system; operating and maximum speed of loaded and empty trains: train protection; driving methods; special operating rules and regulations; MIS, identification of routes requiring

capacity augmentation in planned manner; maintenance systems for track, wagons and locomotives that ensure very high levels of reliability as well as availability.

- (v) **Terminal operations:** Loading and unloading systems to reduce terminal delays and minimize wagon turnaround time; required development parameters; equipment needs; Stations and yards, gathering of loaded wagons and formation of trains; modification of existing terminals; etc.
- (vi) **Remote Condition monitoring:** Develop effective RCM systems suitable for DFCCIL environment and circumstances to deliver benefits in performance and long-term asset management.

#### I- **Objective of the Consultancy Services**

1. The object of the services is to provide Consultancy Services to the DFCCIL in establishing the said Heavy Haul Research Institute (HHRI) of Global standard and operationalizing the HHRI covering entire area (as exemplified above) of Heavy Haul operations. Towards this end, the Consultant shall , inter alia, be responsible for:
  - i. Develop organisational Policies
  - ii. Establishing Research agenda and Plan for HHRI for first 03 years along with detailed Planning and execution of developing requisite organization polices for HHRI.
  - iii. Provide support in identification and appointment of CEO, Theme Heads and other relevant Key Research Professionals for efficient setting up & operationalization of HHRI.
  - iv. Assessment and subsequent Procurement of the required (both Hardware and software) Equipment and Infrastructure for efficient setting up & operationalization of HHRI.
  - v. Procurement of Maintenance Management Information System (MMIS).
  - vi. Simultaneously, preparing the data collation roadmap for HHRI and provide support in related Procurement activities for and setting up a data center.
  - vii. Submission of Validation report and necessary documentation to facilitate the Issuance of necessary completion Certificates/ Taking over Certificate, after successful Procurement of all Equipment, infrastructure & Software along with relevant Maintenance support, Procurement of MMIS and all Procurement related with setting up of HHRI Data center to be followed by submission of a Validation certificate for complete setting up of a functional HHRI.
  - viii. After successful setting up of a Functional HHRI, provide support to the Client in operationalizing of HHRI i.e. in its operation Phase for a period of three years from the date referred in the Validation Certificate for complete setting up of a functional HHRI.
  - ix. Simultaneously, support DFCCIL in establishing twinning arrangement with global institute of repute.

The **Key Performance Indicator (KPI)** for this Consultancy shall be a fully established, requisitely staffed, operational and functioning HHRI.

## **II- Description of the Tasks assigned to the Consultant**

Consultant, being fully informed having fairly assessed all aspects of the Consultancy Services for setting & operationalizing the HHRI, is fully cognizant of the facts that Consultant shall be required to deploy suitably qualified personnel (Consultant personnel) to carry out all the tasks explicitly or implicitly associated with setting up and operationalizing of HHRI of global standard which may include but not limited to, the below cited tasks;

1. **Task A: Develop organizational policies-** This shall include identifying key business processes within key functions of HHRI (mainly Finance, HR, research, and IT). The specific tasks to be undertaken for each function are as follows:
  - a. Developing detailed process maps and procedural outlines for activities and processes identified.
  - b. Designing rules of business for research and other departments. Such rules shall be designed with overall aim of nurturing innovation and delivering research objectives within prescribed targets
2. **Task B: Establish a Research agenda:** This shall include:
  - i. Establish detailed research plan for HHRI to be undertaken, in the first 3 years after setting up. The consultant shall take into consideration the research areas proposed above as well as new areas which have emerged or appear to be emerging ,as a result of the recent research and recommendations made in areas of Rail Infrastructure Maintenance philosophy, operations model, commercial and marketing model etc. of DFCCIL by various agencies and Global Trends available & prepare a detailed Program Report containing Research plan. Such research plan shall clearly include various research areas, objectives and expected outcomes which are aligned with priorities of DFCCIL as well as overall Heavy Haul ecosystem in India.
3. **Task C: Provide support in identification and appointment of CEO, Theme Heads and other relevant Key Research Professionals for efficient setting up & operationalization of HHRI**
  - a. The Consultant shall develop a detailed HR plan, also, including qualification, expertise, capabilities and desired skill sets from various HR resources (Managerial and researchers) including sample profiles of eminent experts globally.
  - b. The Consultant shall support DFCCIL, in identification and all aspects of selection and appointment of requisite HHRI Professionals e.g. CEO, various Theme Heads and relevant Key Research Professionals for efficient setting up and operationalizing of HHRI.
4. **Task-D- Assessment and subsequent Procurement of the required Equipment and Infrastructure for efficient setting up & operationalization of HHRI.**

The Consultant shall assess and support the client in subsequent procurement of all the required equipment, infrastructure and Software including maintenance support etc. Consultant shall;

- i. Develop Employer's Requirement & Specifications of each of such equipment, infrastructure and Software and identification of prospective Global Suppliers.
- ii. Preparation of necessary Tender documentation for the Procurement of aforesaid Equipment, related Infrastructure & Software with necessary maintenance support.
- iii. Provide Clarification of various Bidders' queries regarding the Tender Documents for the Procurement of aforesaid Equipment, related Infrastructure & Software with necessary maintenance support.
- iv. Evaluation of Bidders' Offers (Technical & Financial) for the work(s) of Procurement of such equipment, infrastructure & Software along with relevant Maintenance support, Support the Client in Negotiation with lowest Evaluated Bidder, if any to be followed by preparation of letters of Award, drawing up of necessary Contract Agreements.
- v. Regular Monitoring to ensure successful implementation, of Contracts for the work(s) of Procurement of such equipment, infrastructure & Software along with relevant Maintenance support, within timelines stipulated therein the referred respective contracts. It shall include necessary Factory acceptance Checks If applicable, and necessary Checks / tests associated with installation, Testing & Commissioning.
- vi. Submission of Validation report and necessary documentation to facilitate the Issuance of necessary completion Certificates/ Taking over Certificate, after ensuring above, to each of Contractor for the work(s) of Procurement of such equipment, infrastructure & Software along with relevant Maintenance support.

#### **5. Task-E-Setting up of a Data Centre**

The Consultant shall;

- vii. Simultaneously, prepare the data collation roadmap for HHRI and based upon the aforesaid Road Map, provide support in Collection, assimilation and communication of Data in real time and setting up a data center.

#### **6. Task F: Maintenance Management Information System(MMIS):** The consultant shall be responsible for supporting DFCCIL in procurement of MMIS system including

- a. Holding consultations with maintenance teams and other stakeholders to crystallize the requirements of DFCCIL from such system.
- b. Development of high level requirements for such system.
- c. Develop Employer's Requirement & Specifications of each of MMIS system and identification of prospective Global Suppliers.
- d. Preparation of necessary Tender documentation for the Procurement of aforesaid MMIS System.
- e. Provide Clarification of various Bidders' queries regarding the Tender Documents for the Procurement of aforesaid MMIS System.
- f. Evaluation of Bidders' Offers (Technical & Financial) for the work(s) of Procurement of such MMIS System, Support the Client in Negotiation with lowest

Evaluated Bidder, if any to be followed by preparation of letters of Award, drawing up of necessary Contract Agreements.

- g. Regular Monitoring to ensure successful implementation, of Contracts for the work(s) of Procurement of such equipment, infrastructure & Software along with relevant Maintenance support, within timelines stipulated therein the referred respective contracts. It shall include necessary Factory acceptance Checks If applicable, and necessary Checks / tests associated with installation, Testing & Commissioning.
- h. Submission of Validation report and necessary documentation to facilitate the Issuance of necessary completion Certificates/ Taking over Certificate, after ensuring above, to each of Contractor for the work(s) of Procurement of such MMIS System.

**7. Task G: Support in setting up HHRI Data centre:** The consultant prepare the digital and IT strategy for HHRI and provide support in setting up a data room. This shall inter alia include:

- a. Preparing the IT strategy and Digital agenda for HHRI with an overall aim to catalyse innovation and primary research.
- b. Preparing the technical design specifications for equipment and software required for the data centre.
- c. Develop Employer's Requirement & Specifications of each of such equipment and Software including Maintenance support for setting up of HHRI Data Centre and identification of prospective Global Suppliers.
- d. Preparation of necessary Tender documentation for the Procurement of such equipment and Software including Maintenance support for setting up of HHRI Data Centre.
- e. Provide Clarification of various Bidders' queries regarding the Tender Documents for the Procurement of aforesaid such equipment and Software including Maintenance support for setting up of HHRI Data Centre.
- f. Evaluation of Bidders' Offers (Technical & Financial) for the work(s) of Procurement of such equipment and Software including Maintenance support for setting up of HHRI Data Centre, Support the Client in Negotiation with lowest Evaluated Bidder, if any to be followed by preparation of letters of Award, drawing up of necessary Contract Agreements.
- g. Regular Monitoring to ensure successful implementation, of Contracts for the work(s) of Procurement of such equipment and Software including Maintenance support for setting up of HHRI Data Centre, within timelines stipulated therein the referred respective contracts. It shall include necessary Factory acceptance Checks If applicable, and necessary Checks / tests associated with installation, Testing & Commissioning.
- h. Submission of Validation report and necessary documentation to facilitate the Issuance of necessary completion Certificates/ Taking over Certificate, after ensuring above, to each of Contractor for the work(s) of Procurement of such equipment and Software including Maintenance support for setting up of HHRI Data Centre.

**8. Task H- Setting up and Operationalizing the HHRI**

- a) Consultant shall support the Client in ensuring that all the requisite explicit or implicit tasks associated with the setting up of HHRI are carried out, optimally and HHRI is set up in full functionality.
- b) Based upon above, Consultant shall issue a Validation certificate for complete setting up of a Functional HHRI.
- c) Consultant, after complete setting up of the HHRI, shall support Client in operationalizing the HHRI i.e. in its (HHRI) operational phase for a period of three years from the date of aforesaid Validation Certificate.

**9. Task-I : To develop and Implement a Structured Safety Management System**

Consultant shall support the Client in developing and implementing a well-structured Safety Management system cover the entire Heavy Haul Operations with a view to have a Safety Protocol built into every operational process and into decision making. This would entail framing, developing a range of Policies, Processes / Procedures to support the planning and execution of Day to day Heavy haul operations including response to various types of Accidents and Disasters i.e. developing a detailed workable Disaster management plan, improvement in Accident Manual & Risk Management.

**10. Task L : Support in establishing twinning arrangements with global institutes of repute.**

This shall include:

- a. Identification of Global Heavy Haul Railway Research Institute of repute in the field of heavy haul rail research.
- b. Development of a framework to identify the research institute with potential to partner with DFCCIL team comprising parameters such as ;
  - a) Research experience in the field of heavy haul rail
  - b) Extent of research equipment
  - c) Width of research capacity
  - d) Similarity with Indian context
  - e) Willingness to share technical knowledge with DFCCIL / IR (to be undertaken through interaction with the institute)
- c. Evaluation of these research institutes in line with the developed framework and presentation of the evaluation to HHRI Committee.
- d. Developing proposal for twinning with identified institute keeping the envisaged role of HHRI in consideration. This shall include drafting a tentative structure for such twinning arrangement.
- e. Consultant shall support the Client in effectuating the aforesaid Proposal for Twinning with Global Heavy Haul Railway Research Institutes of repute.

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