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EXPRESSION OF INTEREST

FOR

Intelligent Track Condition Monitoring & Maintenance Management Services for DFCCIL

EOI-DOCUMENT

(Nov.'2021)

EOI No. HQ-ENWC0MMS(TMMS)/1/2021-O/o GGM/WC-I/DFCC/ 12527

Employer:

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
Under
MINISTRY OF RAILWAY

1. Background:

Dedicated Freight Corridor Corporation of India Ltd. (hereafter referred as DFCCIL) is a Special Purpose Vehicle set up under the administrative control of Ministry of Railways to undertake planning & development, mobilization of financial resources and construction, maintenance and operation of these Dedicated Freight Corridors on various identified routes in INDIA. DFCCIL is currently constructing Eastern and Western corridors and appx 1000 Km of the Corridor has already been completed and is under operation (New Rewari- New Palanpur (Appx 650 Km) and New Khurja-New Bhaupur (350Km).

Track being one of the most important infrastructure assets, DFCCIL intends to have most efficient and dynamic Track Condition Monitoring System for deploying state-of-the-art Track Inspection and Recording including the Maintenance Management to maintain the assets in an effective manner requiring least dependence on subjective assessment.

2. Objective:

Dedicated Freight Corridor Corporation of India Limited has decided to initiate Track Condition Monitoring and Maintenance Management and invites Expression of Interest (EOI) in sealed cover from specialized agencies for Deployment of necessary infrastructure, capturing track condition parameters, recording of such data, its analysis, providing solution for maintenance strategy, its installation, Operation and & maintaining of the same for three years with the provision of extension by two years on mutual consent..

3. Salient Features

ROUTES – PROPOSED TO BE COVERED

Western Corrider : Appx 800 Km from New Rewari to New Sanand and to be progressively increased to appx 1500km in next two years..

Eastern Corrider : Appx 500 Km from New Khurja to Shujatpur, New Khurja-New Dadri & New DDU to New SoneNagar and to be progressively increased to appx 1300km in next two years..

TRACK

Track Guage : 1676

Rails : 60 KG Gr. 1080 Head Hardened for main line / 60 KG 880 Gr. For loop lines and sidings in WDFC and 60Kg 880 Gr in EDFC.

Sleepers : PSC sleepers suitable fo 25 Tonne axle load

Turnouts: Canted T/Outs of 60 Kg thick web switches & weldable CMS crossings

Welding: Continuous Welded rails all through including yards and Bridges etc.

Level Crossings: No surface crossing is planned . Grade seprators are provided

Inspection system: Adoption of latest technology and instruments having least human subjectivity.

Maintance system: Mechanised Machine maintance in general and off track tampers for attending very urgent isolated bad spots.

4. Terms of References:

1. The Implementation of Track Condition Monitoring & Maintenance Management (TCMMM) is to be carried out on DFCCIL. The focus of the TCMMM should be on user friendly system to improve running, safety and efficiency of the entire track network and to optimize the amount of investment required to keep the assets in good health.
2. TCMMM has to ensure High quality, accurate and accessible information about the Track asset and evolve maintenance activity towards more sophisticated condition-based system.
3. The proposed system to generate instructions for planned and emergent attention and record maintenance planning with maintenance work schedules. These instructions should be generated in real time, in user friendly form easy to understand by maintenance supervisors and can be directly fed to DFCCIL track machines for rectification.
4. The system should provide Instant access to information requested during inspection activities and requisite information to be searchable by asset/defects and numerous other criteria.
5. The proposed TCMMM should be easily integrated with all major enterprise systems and should be compatible with various Track Machine data including Track Recording Cars being procured by DFCCIL. List of such machines are enclosed as **Annexure-B**
6. Wherever applicable, the system should integrate with the S&T and OHE assets maintained/likely to be maintained by DFCCIL.

7. It supports DFCCIL for maintenance planning, work order generation, work maintenance support etc.

8. It needs to have efficient and organized work flows for all preventive and corrective track maintenance works, giving new mobile working solutions that gives us much more confidence in the quality and accuracy of the data. Thus, giving better insight into the condition of assets to allow to maintain and invest in infrastructure more efficiently.

9. The system should also be able to categorise the track quality based on the parameters measured.

10. The system should have module for getting regular feedback of the users and modify/customize to suite the local conditions and DFCCIL requirement.

11. The system should also have security features to prevent unauthorized users.

12. The scope of work shall broadly consist of:

I. Installing, Commissioning and Operation for 3 Years (With the provision for further extension to 2 years on mutually agreed terms):

a) **Self-propelled/Portable Track Condition Monitoring System** with the provision of capturing & recording Track Parameters and conditions (listed as under) at not less than 20 Kmph. The generated data need to be developed in digital/numerical and graphical form showing various parameters recorded and their inter-relationship where ever applicable. Scripts to provide workflows that guide field official through the asset condition verification process effectively providing a list of questions that they need to answer in order to complete the condition verification exercise. Analyze these parameters captured through the aforesaid, Track recording Cars being procured by DFCCIL, Oscillograph results and any other method deployed by DFCCIL etc. Categorizing the analyzed data and giving outputs for planned, predictive and preventive/immediate maintenance need. The output should also be provided to users through mobile app.

b) Internationally proven device for measuring **Stress Free Temperature** of continuous welded rails on the principal of force (vertical/Lateral) required to lift/slew a rail varying with the axial force contained within without involving cutting of rail (non-destructive SFT measuring technique) or any other technology, to capture record and analyze data for Stress Free Temperature (SFT) of the rail well before the onset of summer and winters (**VERSE** or similar equipment) for deciding need taking action against for de

stressing or other measures for safety of track. The equipment to have curve compensation and all other technical provisions for the accurate data and the least count of stress free (output) should be of 0.1° C and the accuracy of ± 2°C. The output of the above shall be compatible with the TCMM software for necessary records history and retrieval of data etc.

c) **Portable Vision Devices** for capturing the visual conditions of rails, sleepers, missing fittings, mud pumping locations and analyze the data by Artificial Intelligence for giving input to TCMM for regular/ predictive and preventive measures based on threshold parameters furnished to the service provider.

d) Instruments/hand **held devices like tabs/mobiles** etc./sensors and accessories etc. used to measure/record the required parameters at Field level including "in the field" data entry of track inspections, defects and repairs, for its implementation of TCMMM as per suggested yardsticks with due approval by DFCCIL.

e) Training to DFCCIL maintenance staff.

II. To transmit the processed data and other required software files into an object storage provided by DFCCIL/or the developer as the case may be as per the designated time schedule. A web and mobile application shall be developed by the developer to analyze, process and display the historical stored data in the format desired and approved by DFCCIL

III. To provide central repository and back up inspection and defect records securely.

IV. Generate reports and MIS in the prescribed manner and frequency.

V. TCMMM to record, analyse and monitor Track Condition with details and parameters as under: (the list is indicative and not limited to following)

Track Parameters recording -

- Gauge
- Cross level
- Unevenness
- Alignment
- Twist
- Rail Wear.
- Rail, Sleepers, Fittings, Mud Pumping visual condition through visual devices at every identifiable location through (through VISION DEVICES with GPS)

- Stress Free Temperature of Rails.
- Recording and correlating of all running track asset information including special features like points & crossings, LC, ROB, RUB, MIB, MJB, IMB etc.
- TRC/OMS Recording
- Rail fracture - location/rail section/LWR wise, de-stressing & welding records.
- Feeding of defect recorded directly into track machine.
- Track Machine Panning and Deployment
- MMU works- works done, usage, attendance etc
- Inspection record, due, compliance other analysis

Track Condition Analysis

- Analyse the data / parameters feed recorded by measuring equipment/by inspecting official to monitor the health and performance of all assets as above and provide solutions to ensure that these are kept in the best of health all the time.

- To diagnose defects if any and suggest immediate/ planned/ predictive attention. Record rectifications done / due etc. giving alert for immediate attention through SMS, email, mobile app etc.

- To monitor the data being received from the devices and check for any abnormal/absurd data being received. In case any absurd data is noted, it should be notified with likely cause of the same.

- TRC/OMS Recording Analysis Report

- Rail Condition, Sleeper conditions, missing fittings, Mud pumping (through VISION DEVICES) with the help of Artificial intelligence.

- It should provide maintenance work support related to ongoing maintenance works.

- It should give Graphic representation, recording GPS coordinates on reported defects and correlate the underlying asset with the available asset mapping system " .

- Output/Retrieval of information in desired proforma/ format.

- Location needing Inspection - OMS, TRC, means through Portable Devise.

- Location needing attention- History

- History of each asset on its alteration/improvement/deterioration. The system should be able to anaylyse historical data and generate asset degradation model (deterioration of asset condition over time) so as to plan the maintenance activity before the asset reaches to the urgent attention level.

- Inspection and compliance

- Record and retrieval of data in requisite form.

- Module to feed the attention given by maintenance team in acceptable form and display the same in the various reports in the acceptable form.

Recording Frequency

- Track Measurements as above have to be taken in an interval of maximum 10 days for every running track of main line and loop lines (Frequency 15 days).

- Stress free condition of Rails through VERSE or Similar Devices for every Km once before the onset of winters and once before the onset of summer during the first year and 25% of the total stretch before the onset of winters and of summer during subsequent years .
- Portable Vision Device can be attached to the Portable Track Condition Monitoring System for simultaneous reception of this data also along with other track parameters as above.

13. **Service conditions**

- 9.1 Equipment/system should be able to work satisfactorily under following
- service conditions:
- i) Ambient temperature: 0^0C to 50^0C
- ii) Rail temperature: (-) 5^0C to (+) 70^0C
- iii) Humidity: 100%
- iv) Rain fall: Fairly heavy
- v) Atmospheric condition: Very dusty and heavy fog
- vi) Electrified traction: Overhead electric (2 X 25KV AC traction)
- vii) Permissible rail wear: Vertical wear 13 mm, Lateral wear 10mm
- The equipment should not get affected by induction effect of electric

- traction.
- On DFCCIL network, the electrified traction consists of over head electric system of 2 X 25 KV AC system with residual return current passing through one of the rails in the track. The equipment/system and its accuracy of measurement shall not get affected in any manner due to induction or any other effect of above stated electric traction.

14. **Other Instructions**

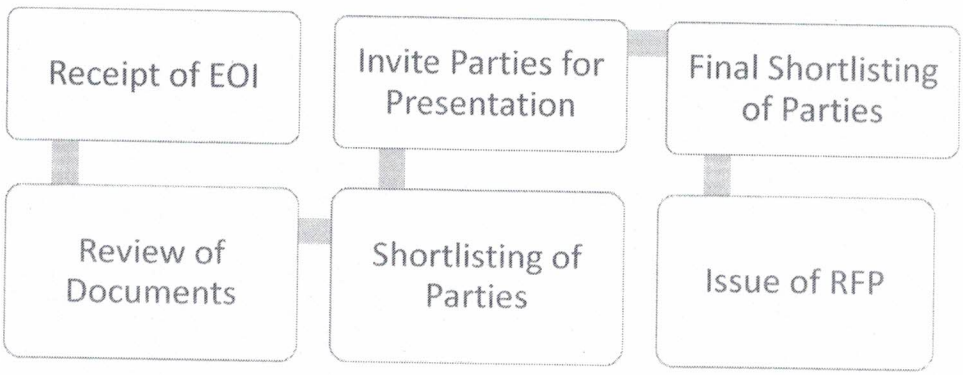
15. Traffic Block of 4 Hrs in Up direction and 4 Hrs in Dn direction shall be assured for recording of Track Condition.
16. The Track Condition Monitoring should consist of Self Propelled/ Portable Geometry Car (With simple arrangement of trouble-free attachment with Motor Trolleys, RCRVs, Tower wagon etc).
17. The Track Measurement Device should be able to carry measurement at minimum speeds of 20 kmph.
18. The Track Measurement Device should be equipped to facilitate Turnouts measurements also.
19. It should be fitted with wheels which does not interfere with MSDC in Automatic Signalling Territory .
20. It should be capable of working under tough conditions and work in temperature range of 0° C to 60 ° C and during rains.

21. **MEASUREMENT SPECIFICATIONS:-**

- Track Gauge variation over nominal gauge of 1676 mm Range: - 10mm to + 15 mm or higher.
- Track Gauge Accuracy: ± 0.5 mm or lower.
- Cant/ cross level Range: ± 200 mm
- Cant/ cross level Accuracy: ± 1.0 mm or better.
- Twist Range ± 25 mm (on 3.0 mt chord)
- Twist accuracy ± 1.0 mm (on 3.0 mt chord)
- Horizontal Alignment Physical Range: ± 15 mm (on 3.0 Chord).
- Horizontal Alignment Accuracy: ± 0.1 mm or lower (on 3.0 chord).
- Uneven ness- Range: ± 12 mm (on 3.0 chord).
- Uneven ness Accuracy: ± 0.1 mm or lower (on 3.0 chord).
- Data acquisition can be on 3.0 mt chord , but system should be able to correctly extrapolate it for 9.0 mt chord also to match with defined short chord of TRC.
- SFT : - accuracy of 2°C

5. Prequalification Process:

The prequalificatoin process can be breifly described as:



6. Submission Requirements:

The interested parties would be required to fill the form given in Annexure A below-

ANNEXURE A

A. Company Details

Company Name:	
Type of Firm: (Corporate or company / Subsidiary / Division / Proprietor / Partnership.)	

Registered With & Registration No.:	
Date of Incorporation:	
Statutory Details GSTIN: PF No.: PAN No.:	
Address:	
Telephone:	
Website:	
Name of the Contact person:	
E-mail of the contact person:	
No. of years of relevant experience:	

B. Details of Relevant Work Performed in the last three years:

(attach completion certificates / references/recommendations)

Name of Client, Client's representative & contact details	**Project Description**	**Contract Values.**	**Start Date**	**Completion Date**

C. Details of Current Works in Hand:

(attach additional sheets if necessary)

Name of Client, Client's representative & contact details	Project Description	Contract Value Rs.	Start Date	Completion Date

D. Total Value of Projects completed each year, for the previous three years.

Year	Location	Total Value of Works completed (Rs.)

E. Qualifications and experience of key personnel proposed for administration and execution of works. *(attach resumes of key personnel)*

Position	Name	Qualifications	Years of experience in proposed position

F. Financial Referees / References

(attach Solvency Certificate from the bank confirming that the company's bank account in a good standing)

Bank / Financial Institution	Name of Referee	Position	Contact Details

G. Current Financial Details

(attach financial statements & profit/loss statements for the previous 3 years)

Financial information in Rs.	Actual previous three years		
	1	2	3
1. Total assets			
2. Current assets			
3. Total liabilities			
4. Current liabilities			
5. Profits before taxes			
6. Profit after taxes			

H. Details of Current Litigation Involvement

Year	Award For or Against Applicant	Name of opponent and relation, cause of litigation, and matter in dispute

I. Quality Assurance – Industry Certificates & Awards

Does your company maintain a current ....?	Yes	No
Quality Assurance Program		
ISO 9001 certification		
Other Certificates & Awards		
Industry Accepted Quality Assurance Program		
What Industrial Codes and Authorizations does your company hold? (Please specify)		
With which other clients are you registered as a contractor? (Please specify)		

J. Health, Safety and Environment Management Program

Details	Yes	No
ISO 14001 Certification		
OHSAS 18001 Certification		
Other Certificates & Awards		
Do you have a current written safety program for field operations?		
Does your company implement a Health and Safety Policy for all its employees?		
Does your company have a written Health and Safety Policy Statement? please provide a copy		
Does your company employee qualify Safety professionals? If yes, include their CVs in the submission.		
Does your company have a Safety Management plan at the ongoing sites?		
Does your company maintain records of all accidents and injuries sustained?		

Health & Safety Performance for the past three years

Occurrences	Previous three years		
	1	2	3
Injuries requiring first aid			
Injuries requiring 1 day's absence			
Injuries causing hospitalization			
Fatal Injuries			
Total Man-Hours worked on Sites			

K. Client references

Name of Client	Name and Designation of Key Personnel	Contact Number	Email Address

Annexure - B

List of Machinery and Plant

Sl. No.	Specification Section No.	Description	Qty.
1	9.1.1	Continuous Tamping Machine with Integrated dynamic stabilizer	3
2	9.1.2	Ballast Regulating Machine with Hopper	4
3	9.1.3	Shoulder Ballast Cleaning Machine	1
4	9.1.4	Points and Crossing Tamping Machine	1
5	9.1.5	Dynamic Stabilizer	1
6	9.1.6	Duo-Matic Two Sleepers Tamping Machine	2
7	9.2	Mobile Rail Grinding Machine	1
	9.3	Self-driven Measurement and Recording Cars	
8	9.3.1	Track Recording Car	1
9	9.3.2	OHE Recording Car	1
10	9.3.3	Inspection Vehicle	2
	9.4	Self-driven Rail Bound Mobile Maintenance Vehicle	
11	9.4.1	Rail Bound Mobile Vehicle for Civil Engineering works with MMU equipment	11
12	9.4.2	Tower Wagon 8-wheeler	12
13	9.4.3	Bridge Inspection Vehicle	2
	9.5	Rail cum Road Maintenance Vehicle	
14	9.5.1	Rail cum Road Multi Utility Vehicle with MMU equipment	12
15	9.5.2	Rail cum Road vehicle with crane for Civil works	3
16	9.5.3	Rail cum Road Vehicle with crane for OHE works	2
17	9.5.4	PSI equipment testing Van (Road only)	2
18.	9.6	Rail cum Road based vehicle with motorized elevated working platform (MEWP)	26
19	9.7	Vehicle Condition Monitoring Equipment Base Station Consisting of Wheel Impact Load Detector PS 9.7.1 and Hot Axle and Hot Wheel Detection Ps 9.7.2	3
20	9.8	Ballast Hopper Wagon with remote Control discharge	100
21	9.9	OHE Rehabilitation/Renewal Equipment	1
22	9.10	Flat wagon for carrying Rails	25