

KENYA RAILWAYS

INVITATION FOR SUBMISSION OF COMMENTS/ SUGGESTIONS ON THE TECHNICAL SPECIFICATIONS FOR A CAR TRACK RECORDING CAR

Preamble

Kenya Railways (KR) is a State Corporation established under The Kenya Railways Act (Cap 397) of the Laws of Kenya. The mandate of KR is to:

1. Provide skills and technology for the railway sector
2. Provide efficient and effective railway services
3. Leverage our assets to grow business
4. Promotion, facilitation and participation in national and metropolitan railway network development

KR conceded its operating assets to Rift Valley Railways (RVR) in November 2006. It is the KR's policy to conduct periodic line inspections of its railway network by collection of track parameters for decision making, ensure maintenance standards are maintained and also to ensure safe and efficient operations of trains.

Scope of the Tender

1. To supply new unused self propelled Track Recording Car used for the measurement, assessment and recording of track geometry parameters under loaded conditions, which measures and produces consistent results, to the requirement of EN 13848-1 standards or any other equivalent acceptable international standards.
2. The Track Recording car shall be installed with the latest technology in carrying out track geometry measurement, record and analyze the track geometry. The track recording car shall be installed with an integrated GPS navigation system for analysis of measured data, a video monitoring system and an ultrasound monitoring system.
3. To supply maintenance spares, auxiliary equipment and software to support the equipment during the warranty period.
4. To supply the Technical drawings, maintenance manuals, operation manuals and spare catalogue document etc should be delivered with the equipment. All the documents should be in English language.
5. The track recording car shall be installed with an On Board Computer (OBC) to be integrated with Automatic Track Warrant System (ATW) used by RVR train traffic operations.

Specifications for track recording car

CHARACTERISTIC	DESCRIPTION	SPECIFICATION
Track	Gauge	1000mm
	Axle load	KR mainline track is 18 ton per axle and branch line 12 ton per axle
Dimension	Vehicle Length (buffer-buffer)	15000mm \pm 1000mm
	Vehicle Width	The dimensions to be compatible with KR structural and loading gauge
	Height above top of rail	
	Gradient (%)	Up to 4%
Wheel arrangement	Bogie type	4 axles
Speed	Transfer	100km/h
	Measuring	Not less than 40km/h

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CHARACTERISTIC	DESCRIPTION	SPECIFICATION
Engine	Type	Bidders to specify the engine type, model, engine output and aspirations to meet the operating specifications.
	Model	
	Cylinder/Stroke	
	Engine output (Traction power)	
	Aspiration	
Suspension type		Both Primary and secondary suspensions required
Transmission type		Specify
Fuel	Type	Diesel
	Tank capacity (Lts)	800lts ± 50 ltrs
Service life		35±5 yrs
Minimum curve radius	Travelling	80m
	Measuring	175m
Travel direction	Driver's control desk	Both direction
Capacity	Passengers including driver	Eight (8±1) passengers
Data viewing and reporting software		User interface to be windows
Measuring technology		Non contact laser technology
Track measuring base		≥1.8m
Coupling	Coupling type	MCA-DA
	Coupling height	585 mm
Wheel dimensions	Wheel profile	As per drawing attached
	New wheel size Dia.(Solid)	851 mm
	Scrap out wheel size Dia.	768 mm

Particulars

Track Geometry Measurement Standards

The track geometry measurement and testing shall be in accordance with EN 13848 International Standards or any other equivalent acceptable International Standards provided they are not inferior. The tenderer shall state the standards applied which should be internationally accepted

Non Contact Measuring Technology and Systems

The required Track Recording Car shall operate on meter (1000mm) gauge track and produce consistent results irrespective of measuring speed and direction of travel. The track recording car shall be able to measure and produce track geometric parameters to comply with EN 13848-1 and measuring systems as listed in EN 13848-2 or equivalent acceptable International Track Measuring Standards;

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CHARACTERISTIC	DESCRIPTION	SPECIFICATION
Geometry parameters precision	Gauge	± 1mm
	Cant	± 1mm
	Twist	± 1mm
	Versines (Alignment)	± 1mm
	Cross level	± 2.5mm
	Joint height or longitudinal level of the left-hand and right-hand rail	± 0.7mm
	GPS coordinates	GPS dependent
Track video Surveillance system	Video inspection capability for replacing human based visual inspection	

The track recording car should have a real time analyzer with the following features:

- Track geometry parameter signal pre filtering.
- Detection and assessment of isolated defects.
- Calculation of track geometry parameter standard deviation for each track section.
- Calculation of track global quality factors for each track section.
- Twist computation from cant measurements for several base lengths
- Twist defect survey according to ORE B55: The KR limits for track twist and cant necessary to maintain safety operations is 2.5mm per metre.

GPS Navigation System

The track recording car shall be installed with an integrated GPS navigation system for analysis of measured data, a video monitoring system and an ultrasound monitoring system.

The GPS navigation system is for geo-reference location and a map matching algorithm used to pin point the location of defect on the railway line with accuracy.

The supplier shall map the KR network into the track geometry measuring system.

Onboard data collecting and processing equipment

On Board Computer (OBC) should enable real-time recording and evaluation of Track geometry parameters. The computer unit should comprise of the following components; Digital computers with core memory, Data display unit, Input keyboard and an interface unit which connects the above components with the measuring system and the recording instruments. The Computer should be accompanied with Software (Programmable, computer-controlled track evaluation system) which can be used by the operator to make alterations in the operations.

The Computer assembly (including software or additional evaluation programmes) described above should enable data evaluation and processing into different forms usable for; planning of track maintenance works (Tamping, Gauge adjustment, etc), Safety control schedule (Indicating danger sports on the track, detecting track sections where extreme faults make it necessary to undertake treatment before large scale machine work is done, planning spot maintenance work between regular maintenance operations).

RVR had installed Automatic Track Warranty System (ATW/Translogic soft ware) which receives and dispatches train between stations and monitors trains movement in a blocked section.

The Track Recording car OBC shall also be integrated with the train control system of RVR the ATW to enable its movement within the railway network. The communication between OBC is through a **Shunting Installation Kit** to be provided by the supplier. The **Shunting Installation Kit** comprises of various components like the MCFs, OBC lite, DC converters, Cables and Metallic Casings etc.

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The supplier shall map the Kenya Railway network into the track geometry measuring system.

Track Video Monitoring System

The track video monitoring system (TVM) should be capable of recording images of the rail surface, rail fasteners and sleeper conditions. Information provides visible anomalies such as rail surface defects, head checks, broken/ cracked sleepers, missing fasteners etc. The video monitoring system should comprise of a line scanner camera, an illumination system, and a recording and analysis computer.

Ultrasonic System Technical specifications

Ultrasonic rail flaw detection system (URFD) should be able to detect internal and external rail defects. A GPS location system allows absolute position of the track recording car during operation.

1. The Ultrasonic Rail Flaw Detection (URFD) shall operate at less than 40 km/h and adaptable to change of speed on rails with different surface quality and roughness.
2. The Ultrasonic Rail Flaw Detection (URFD) equipment should be able to detect defects in new rails and used rails profiles: The KR rails weights data comprises of: 115 lbs, 95 lbs, 80 lbs, 60 lbs and 50 lbs.
3. To conform with standards of rail defects UIC712 and treatment on rail defects UIC 725.
4. Some KR rail sections of the track are welded (flash-butt) and most section are fastened with fishplates.
5. The URFD shall be equipped with sufficient piezoelectric transducers for each rail, at least 7-12 transducers.
6. The URFD shall be computerized to ensure all test functions and results are given in real time.
7. The design of the URFD system shall have enough water capacity to operate continuously for at least eight (8) hours.
8. The URFD shall provide results for:
 - i. Transverse cracks
 - ii. Head checking in the rail heads dia. 4mm
 - iii. Longitudinal horizontal cracks (8mm in reference to the rail profile)
 - iv. Longitudinal vertical cracks
 - v. Bolt cracks 12 mm

Data viewing and reporting software

- The system should give accurate and objective output that is presentable in a PC compatible format to facilitate data transfer from track recording car to the KR's data base.
- The system should have a user friendly interface (Windows based, English language, etc) and the software should have a provision for updates.
- For Track sections, the output data should be computed in a format that can allow comparison of successive measuring runs for quality rating of the track.

Inherent properties

Measuring technology:- The measuring technology should be the latest and commonly used in the industry but not lower than Laser based technology and accelerometers. Video inspection capability for replacing human based visual inspection will be a mandatory.

Climate and Environment

Kenya Climatic and Environmental conditions where URFD will operate:

- i. Altitude: Sea level to 2750m above sea level.
- ii. Temperature: High 33 ° C and low at 15° C
- iii. Humidity: max. 90% and min. 66%
- iv. Hot and dry area
- v. Wet and cold at high altitude

KR drawings

KR shall attach the following drawings

- 1) KR Structural and Loading gauge drawing
- 2) Meter gauge sleeper drawings
- 3) KR wheel profile drawings

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SPARES LIST:

A comprehensive Catalogue of spares required for maintenance and repair of track recording car to be submitted by the bidder.

The bidder shall provide a list of components/spare parts which are expected to be required for trouble free operation and maintenance of the car for a period of five (5) years after the warranty period, indicating their description, part number, equivalent international part number, quantity and price.

GUARANTEES:

The contractor shall guarantee that the equipment supplied is as per the accepted offer and that it is free from defects in design, material or workmanship.

The contractor shall guarantee the proper working of the track recording car for a period of twenty four (24) months after commissioning.

If during such period of guarantee, any defect in design, failure of major component, material or workmanship shall appear or if proper working of the track recording car shall in any way deteriorate under proper use, the contractor shall make arrangement forthwith:-

- a) To supply and deliver to KR promptly and at its own expense such replacement or additional materials or parts as are necessary to put the track recording car in satisfactory working condition.
- b) To provide all consumables for the measuring systems necessary for maintenance and operations during the 24 months period. However, consumables such as oils and fuels ONLY shall be at KR expenses.

Any replacement part(s) or additional(s) which may be supplied under the terms of the contract shall be guaranteed for a period of 24 months from the date of replacement of the replaced item.

TRAINING OF STAFF

The contractor shall be required without extra charge to train at least five (5) Railway personnel in the operation and maintenance of the track recording car.

CHARACTERISTIC	AREAS OF TRAINING	NO. OF STAFF
1	Electro/Mechanical maintenance staff	3
2	Operator	1
3	Software maintenance staff	1

The contractor shall provide all materials necessary for training personnel both for theory part and practical part and such materials shall be left to KR. The training shall be conducted in English.

The contractor shall schedule the program for training and after commissioning of the track recording car including at least one month for operation of the track recording car.

Bidders are requested to send their comments/suggestions to procure@krc.co.ke

