

Part C 3.1

Service Information by the Employer

Maintenance of Railway Track with Sleeper Replacement Machine: Countrywide for a Period of 12 Months

Transnet

CONTENTS	Page No.
1. Definitions	3
2. Description of the Works	5
3. Procurement	9
4. Engineering	9
5. Construction	9
6. Management	13
7. Health and Safety	23
8. Training	25

Transnet

9. DEFINITIONS

The following definitions shall apply in addition to those of any specifications attached.

- 1.1 **Free- on- rail:** Free on rail implies allowing the *Contractor* to move an On Track machine from one track destination to another with no track usage cost levied on the *Contractor*. The *Employer* provides the right of passage and the pilot required, without cost and at times whereby such a passage and pilot can be made available by the *Employer*. Free-on-rail passage will normally be allowed for at the start of a contract to deliver a machine to the starting place of work and at the end of the contract to return a machine to the *Contractors* depot if required by the *Contractor*. Free-on-Rail movement of a machine during a contract for major workshop repairs required of a machine may only occur if specifically agreed to by the *Service Manager*. Such a move shall then occur during the *Contractors* time.
- 1.2 **E7/1:** Specification for General Work and Works On, Over, Under, Or Adjacent to Railway Lines and Near High Voltage Equipment
- 1.3 **OEM** refers to the Original Equipment Manufacturer of the Machinery
- 1.4 **Sleeper Replacement Machine (SRM):** Also referred to as the Machinery: All on-track machinery provided by the *Contractor* for executing the Work, i.e. the entire on-track machine package, complete with all fittings, accessories and all ancillary equipment, as may be required to comply with the Contract specifications.
- 1.5 **Sleeper Replacement Train:** The consist of all on-track plant items used in association with the sleeper replacement operation, including loaded or unloaded sleeper wagons.
- 1.6 **Replacement Train Depot (RTD):** The area wherein certain tracks have been set aside and/or permanent way material has been or shall be stacked for use with the sleeper replacement train and/or the sleeper replacement operation.
- 1.7 **Service Manager.** The person or juristic person appointed by the *Employer* from time to time to administer the contract according to the NEC3 Term Services Contract (TSC3) and in terms of this contract.
- 1.8 **Supervisor.** Any person appointed by the *Employer* to to administer the performance and quality of the works according to the NEC3 Term Services Contract (TSC3) and in terms of this contract.
- 1.9 **Normal Working Hours (NWH).** A continuous shift of 8 hours out of every 24 hours for 5 consecutive days out of every 7 days or for 10 consecutive days out of every 14 days. The Supervisor will determine the starting times, which may vary to suit seasonal changes or train time tables.
- 1.10 **Maximum Occupation Time (TOM)** means the total occupation time granted by the *Employer* to the *Contractor* to execute the *services* as per the contract agreement.
- 1.11 **Working time.** The time between the actual start and end times of an occupation, excluding time on the critical path of the day's replacement operations lost which may be attributed by the Employer.
- 1.12 **Overtime.** Means any time worked in excess of the hours of a normal working day and any time worked on Saturdays, Sundays and statutory public holidays in excess of 5 consecutive days out of 7-day period or in excess of 10 consecutive days out of 14-day period, all on the written instruction of, or as approved by the Service Manager.
- 1.13 **Normal Shift Working** (not exceeding Normal Working Hours): Shifts (8 hours) worked on Saturdays, Sunday, or on Public Paid Holidays, up to Normal Working Hours.

- 1.14 **Night Shift Working** (Occupation time between 18h00 to 06h00): Night Shift Working will apply to any part of any shift for which occupation time has been approved and happens to fall between 18h00 and 06h00 on any day of the week inclusive of Public Paid Holidays.
- 1.15 **Double Shift Working**: A second shift of 8 hours within any 24 hour period. Double Shift Working may be used by the *Employer* as and when required.
- 1.16 **Occupation**: The formal closure of the line to normal rail traffic for a specified period of time arranged in accordance with Infrastructure Occupation Management System (IOMS) or any other system and implemented in accordance with the Protection Manual.
- 1.17 **Total Occupation Time (To)**: shall be the total of the time from when the first on-track machine arrives on site until the last machine leaves the site.
- 1.18 **Train Crossing Time (Tx)**: means the time for the machine to wait for train crossings.
- 1.19 **Travelling Time (Tt)**: means the time for the machine to travel on track between work site and the staging site (or vice-versa), or between work sites, or to clear the section.
- 1.20 **Movement Time (Tm)**: Time allowed to move from one staging area to another when machine is required to move to new depot or area.
- 1.21 **Breakdown time (Tb)**: means all periods during which any machine or any part of a machine is non-available.
- 1.22 **Shutdown**: Closure of a specific line, for example the Iron Ore line once a year for limited period of time (e.g. 10 days) to perform a large volume of work. Shutdowns on various lines may be to varying degrees i.e. it may range from total shutdown perhaps requiring Double Shift Working where all normal train traffic on a line is suspended for the duration of the shutdown to a situation utilizing extended occupations with normal train operation windows in between. Some Shutdowns will be partial in the sense that while work is performed on one line and on one section of the line, normal train operations will proceed on adjacent line/s and adjacent sections of the same line.
- 1.23 **Standing Time**: means the loss of Working Time (Tw) incurred by the Contractor due to reasons attributed to the Employer
- 1.24 **Emergency work** means unplanned work that may be requested by the Employer as and when an incident or risk arises. The Employer will make all the necessary arrangements to move the machine to and from the emergency work side.
- 1.25 **Normal Sleeper Replacement**: Sleepers replaced on sections where no derailment sleepers or other hidden obstacles in the ballast occur will be regarded as normal sleeper replacement conditions.
- 1.26 **Derailment Sleepers**: Sleepers are generally damaged to various degrees during derailments. In the more severe cases sleepers are broken in the length dimension into two or more major pieces, making it difficult or impossible to handle as one sleeper, especially by mechanized means. Included in the scope of this Contract, part of the total sleepers to be replaced will be as a consequence of derailment damage. For the purpose of this Contract however Derailment Sleepers will mean sleepers, which are broken to such an extent that it cannot be removed by mechanized means but instead shall be pulled out by manual labour from the track.
- 1.27 **Dunnage**: Means wood spacers of rectangular cross-section of either $\pm 37\text{mm} \times 37\text{mm}$ used in association with normal sleepers.
- 1.28 **Minimum Production Rate**: The minimum production rates for normal sleepers and derailment sleepers shall as per the Scope of Works (Particular Specification) considering the qualification of the *Contractor* as contained in his tender submission.

10. DESCRIPTION OF THE WORKS

10.1. Overview

This contract includes the maintenance of existing railway track, with an on-track sleeper replacement machine. The work shall consist of the provision of all on track machines required for sleeper replacement and related output, the operation and maintenance of all equipment, and the provision of all associated support required to achieve the output.

10.2. General Machine Requirements

- 10.2.1. The *Contractor* is required to supply, operate, and maintain mechanised on-track machinery. The minimum requirements for this contract shall include: a sleeper replacement machine, plus 1 Ballast Regulator, 2 Heavy On-Track Ballast Tampers. Additionally, the following shall be provided: at least 1 Logger Machines for sleeper loading and off-loading, equipment for installation and collection of fastenings, and all associated labour, supervision, road vehicles, ancillary tools and equipment, fuels, lubricants, spare parts, and consumables.
- 10.2.2. Sleeper replacement shall entail the replacement of sleepers on open track, tunnels, bridges and culverts, and adjacent to turnouts, using an on-track sleeper replacement machine capable of delivering at least the minimum production rate as specified.
- 10.2.3. All on-track machinery shall be self-propelled and capable of replacing all types of sleepers on any site. The Equipment shall be able to work at any time of the day or night with no restrictions (eg. rainy conditions, hard ballast, etc.)
- 10.2.4. The sleeper replacement machine, tampers, regulators and stabilisers shall be able to operate completely independently.
- 10.2.5. The sleeper replacement package will be required to work individually.
- 10.2.6. Resources offered in this sleeper replacement package may be required to work separately should the *Employer* require. This implies that contracted tampers, regulators, and stabilisers may work individually or separately from the sleeper replacement machine.
- 10.2.7. The following sleeper replacement machine capacity is required:

Machine and/or Type of Machine output required	Planned depot or area where machine is required to work	Estimated Workload: Number of sleepers to be replaced monthly*	Estimated Total Workload: Number of sleepers to be replaced over 12 months*
Low Production Machine: capable of re-sleepering 6 - 8 sleepers per minute	All depots country wide including neighbouring countries	Approximately 13181 sleepers/ year	Approximately 145 000 sleepers over 12 months

**Quantities are not guaranteed production, i.e. the above workload is estimated for tender purposes only and is therefore not guaranteed by Transnet.*

- 10.2.8. The rate of work i.e. rates of sleeper replacement, regulating, tamping, stabilisation capability are factors which shall be considered for the award of the contract. The supplier is required to declare production rates for all auxiliary machines.
- 10.2.9. The machines are required to complete and finalise all sleeper replacement, including all ballast work, lifting/aligning, tamping and ballast stabilising, i.e. all work associated with the project, within an 8 hour occupation.
- 10.2.10. The *Contractor* shall give clear details of production rates (in sleepers per minute) offered in his tender referenced to all factors e.g. track curvature, gradient, length of occupation time, weather (raining, cold and hot), rail temperature, ballast fouling, tunnels, platform, derailment sleepers and level crossing that might have an influence on production rates.
- 10.2.11. All machines shall be designed and able to work under the following conditions:
- All on-track machines shall fit within the vehicle gauge given in Annexure 2 of the Manual for Track Maintenance. Should the SRM exceed the vehicle gauge in any respect, this shall be clearly indicated by the Tenderer by means of suitable drawings. The Bidder shall submit vehicle gauge drawings with the tender document.
 - All on-track machines shall be able to work and travel within the structure gauges given in Annexure 1 of the Manual for Track Maintenance.
 - All on-track machines shall not exceed a loading of 20 tons per axle.
 - Track gauge: 1 065mm.
 - Single lines or multiple lines with a minimum distance between track centre lines of 3.8m.
 - Travel around curves of down to 85m radius.
 - Move over track with maximum 1 in 30 gradients.
 - Meet or exceed the minimum specified production rates while working self-propelled on maximum uphill track gradient of up to 1 in 50 for Low Production Machines.
 - The machine should be able to work self-propelled while pushing up to 14 loaded sleeper wagons for Low Production. If not, the Contractor shall specify how many wagons his/her machine can push.
 - Work during sleeper replacement on curves of a minimum radius of 250 m for Low Production Machines.
 - Work site altitude range: 0 to 2000m above sea level.
 - Rail temperature range: -10°C to +60°C.
 - Mass of rail: 40 kg/m to 60 kg/m (inclusive)
 - Risk study to be provided for the machine working in rainy conditions.
 - Types of sleepers in track: steel, wood or monolithic concrete sleepers.
 - Sleeper spacing of 600 mm to 750 mm (inclusive).
 - All machines shall have service brakes and independent emergency brakes capable of providing minimum retardation of 12.5% and gravitational acceleration of 6%.
- 10.2.12. The contract shall include the provision of, and management of a suitable number of basic crew of qualified operators and *Supervisors* as well as all skilled and unskilled labour to operate the machine safely in line with tendered production rates and within available occupation times. The *Contractor* in his tender shall supply accurate and comprehensive details of all staff and machinery, which will be available on site.
- 10.2.13. The extent to which the SRM minimizes the need for other labour inputs to prepare the site before sleeper replacement will be considered during adjudication of the tender. The

Contractor shall clearly state in his tender the SRM capabilities in this regard.

- 10.2.14. The SRM shall comply with all *Employer's* safety requirements while it is working, travelling or when staged. All reasonable measures for fire prevention and firefighting shall be included and form part of this contract. The cost thereof shall be deemed to be included in the rates tendered and no separate payment shall be made.
- 10.2.15. The SRM train shall not work on track which is not at least strapped 1-over-20 sleepers to prevent the rails from rolling over.
- 10.2.16. Sleeper replacement will be required on routes with multiple and single lines, open lines, tunnels, platform lines, loop, yard lines and construction of new lines.
- 10.2.17. The method of sleeper replacement shall be mechanized and shall always comply with the *Employer's* Specification E7/1.
- 10.2.18. The machinery shall be compatible with Transnet Freight Rail's fleet of NZ /NST Sleeper Wagons.
- 2.2.19. The contractor shall always include the provision of spare parts in the machines. Machine maintenance report will be required for each work site.

10.3. Specific Requirements Relating to Sleepers

- 10.3.1. It will be required that all different types of sleepers, inclusive of various types of concrete, steel, monolithic and wood sleepers be removed from track and replaced with new or second-hand concrete sleepers of various types.
Transnet
- 10.3.2. The Contractor to ensure that replacement of rail-to-sleeper fastening systems is done concurrently with the sleeper replacement.
- 10.3.3. It should be noted that some fastenings are rusted /broken into the sleepers. The reusable sleepers and sleepers that have reached the end of their life spans (scrap sleepers) will be required to be replaced. Also sleepers damaged to varying degrees in derailments will require replacement. Such derailment damaged sleepers are often broken into two or more pieces along the length.
- 10.3.4. The *Contractor* may also be required to manually load, or offload fastenings supplied by road either from the *Employer* Road trucks or any other road transport means for the fastenings supplied while the machine is already busy with the sleeper replacement occupations at the depot. The fastenings shall then be offloaded from road trucks and loaded onto DZ wagons, or any other wagons used behind the sleeper replacement machine. These shall be paid against the tendered rates.
- 10.3.5. The *Contractor* will only be required to use *Employer's* pre-approved designed sleepers and rail-to-sleeper fastening systems.
- 10.3.6. Provided that the manufacturing quality of the sleepers to be removed and the sleepers to be installed are in accordance with design specifications, the design of the sleeper replacement process shall be such that it does not damage the sleepers during handling or installation.
- 10.3.7. Based on the *Employer's* Infrastructure Life Cycle Management Plan good reusable concrete sleepers will be removed and replaced with new sleepers on higher trafficked lines. The good reusable released concrete sleepers will then as part of the Infrastructure Life Cycle Plan cascaded for re-use on lesser trafficked lines and in yards. The design of the sleeper replacement Machinery shall be such that it does not damage new sleepers during installation or the released sleepers during removal or handling such that they become unsuitable for re-

use.

- 10.3.8. A good reusable second-hand sleeper damaged beyond reuse by the Sleeper Replacement Machine shall be deemed to have the same value to the *Employer* as an equivalent new sleeper. The responsibility for the suitability of the design of the sleeper replacement machine and related processes shall rest solely with the *Contractor*.

10.4. Location of the Works

- 10.4.1. The contract area will be all track owned, or maintained, by Transnet Freight Rail country wide, in addition to neighbouring countries.
- 10.4.2. The Contractor may be required to work in areas where varying degrees and types of security situations are prevailing such as may occur in remote rural areas through to densely populated metropolitan areas.
- 10.4.3. TFR will make available to the *Contractor* lines where the machine may be commissioned and tested. Work done during the commissioning or testing period is not eligible for payment under the Contract.

10.5. Commencement and Duration of Contract

- 10.5.1. The commencement date will only be finalised after acceptance of tenders. The Contract will therefore commence on the date stipulated in the acceptance letter. The Contractor shall be able to commence with the service within 90 days of contract award.
- 10.5.2. Bidders shall also qualify their offers stating how soon after the award of the contract they will be able to start with the work. This shall include the provision and operation of any other on-track machines or support equipment. Where equipment offered may only be available at a later date, the date at which this will be available shall be indicated clearly upon submission of tender.
- 10.5.3. The duration of this contract is twelve (12) months. The expiry date will therefore depend on the starting date of each part. The work output required shall depend on *Site* conditions and is expected to be carried out over the full duration of the contract period of twelve (12) months. The Contractor shall Supply, Operate and Maintain the machine.
- 10.5.4. The Contract can be terminated by mutual agreement should technical or safety problems become evident during the execution of the works.

11. PROCUREMENT

11.1. Subcontracting

Sub-contracted part of the contract must be written approved by *Transnet Freight Rail (TFR)*.

12. ENGINEERING

12.1. Design Procedures

- 12.1.1. It is a specific requirement of this Contract that all wagons for use with the machine, including any modifications, shall be pre-approved at the design stage by TFR Train Design Department.
- 12.1.2. During commissioning and before putting any wagons into service, these shall be finally approved by TFR Train Design Department as being "Rail Worthy".
- 12.1.3. It is also a specific requirement that all wagons for use with the machine, including any modifications, shall comply with the requirements of the Rail Safety Regulator (RSR).
- 12.1.4. The *Employer* will test all on-track machines regularly for rail-worthiness before being permitted onto operational tracks. The *Employer's* approval in this regard shall under no circumstances mean to imply that the *Contractor* is released from his liability and/or responsibility for ensuring that all machinery is operationally safe and rail worthy. The *Contractor* shall remain ultimately responsible for the safety and condition of his machines and equipment. These tests will include:
 - Regular testing of braking efficiency. The minimum required braking is measured by Tarpley meter, for the service and emergency brakes respectively. Brake testing shall also include for checking for pressure loss on brake cylinders and circuits, wear and setting of brake shoes.
 - Maximum wheel-tread and rim wear, distance between wheel-flanges and ultrasonic testing for flaws in running axles all measured for compliance with the standards of the Employer.
 - Speedometer, sirens, drawbars and mechanical locks on hydraulic components to function properly.
- 12.1.5. Should a joint inspection of the Machinery by representatives of the *Employer* and the *Contractor* reveal that any on-track machine or wagon is not in a safe working condition, the Service Manager may order the temporary withdrawal of the machine from the service.

13. CONSTRUCTION

13.1. Works Specifications

The following additional specifications shall apply:

- TFR Trains Working Rules
- TFR Protection Manual
- TFR Electrical Safety Instructions
- TFR Infrastructure Safety Guidelines.
- TFR S410 Specification for Earthworks
- E10: Specification for Railway Trackwork.
- E10/1: Specification for laying of rails.
- E10/2: Laying of sleepers.
- E10/4: Ballasting and tamping.
- E10/5: Destressing of rails.

- E10/6: Building and Replacement of sets.
- E10/7: Field welding of rail joints.
- E10/9: Slewing and Alignment.
- E10/11: Surveying and setting out of track alignment and referencing.
- E10/12: Installation of insulated rail joints
- E4B (November 1996): Minimum Communal Health Requirements in areas outside the jurisdiction of Local Authority
- E4E SHE Specification for Contractors
- Addendum No 1 to Specification E7/1 (May 2011)
- Specification E7/1 (May 2011): Specification for works on, over, under or adjacent to railway lines and near high voltage
- Manual for Track Maintenance
- Track Welding Manual
- SANS 1921-1-2004 Part 1

13.2. Plant and Materials

- 13.2.1. The *Employer* will make available to the *Contractor* on specific request a limited number of rail freight wagons for transporting his Plant, Equipment and Materials from the Employer's Infrastructure Depot to Infrastructure Depot during execution of the work.
- 13.2.2. These wagons will be moved "free on rail" together with the relevant on-track machines in accordance with the requirements and processes applicable to normal train traffic.
- 13.2.3. The *Contractor* shall specify how many wagons and what type does he want for the usage of moving his Machinery and equipment as well for accommodating his employees during the course of the contract. The *Contractor* to return the *Employer* wagons at the end of the contracting period. These shall be in the similar condition as when the *Employer* gave them away to the *Contractor*. Supply of wagons will be limited to 40 wagons.
- 13.2.4. Arrival of these wagons at destinations during movement from depot to depot on *Employer's* network could be problematic and erratic in terms of predictability and no claims regarding delays or standing time resulting from the use of these wagons will be entertained by the *Employer*.

- 13.2.5. The *Contractor* will be allowed to effect modifications to these trucks to suit his requirements for work under the contract. Such modifications will be the *Contractor's* responsibility and for the *Contractors* account.
- 13.2.6. The *Contractor*, at his own cost shall have the trucks re-instate to their original condition and shall remove the modifications at the end of the contract.
- 13.2.7. Before the *Contractor* commences to carry out any alterations to the trucks, he shall provide the *Service Manager* with sufficient information of the alterations to enable him to approve that dimensional and structural tolerance will not be exceeded.
- 13.2.8. The *Contractor* shall clearly state in his tender the types and number of rail trucks required for the contract as well as the modifications he intend doing to the rail trucks
- 13.2.9. The Employer shall supply and control all flags and detonators for protection of the work sites.
- 13.2.10. The Employer will supply all permanent way materials required for the execution of the works. Materials will be provided in railway wagons or stacked at RTD's.
- 13.2.11. The following items of Plant will be provided by the Employer based on availability for the duration of the Contract:
- One set of locomotives will be allocated for shunting and for movement purposes. It will be advantageous should the process be able to move by itself without assistance of locomotives.
 - The locomotive set will be available (inclusive of fuel and driver crews and shunt crew) for the duration of the shunting work required.
 - NZ /NST Sleeper Wagons.
- 13.2.12. Care of Plant Supplied by the ~~Employer~~: The *Contractor* may have full use of the rail trucks associated with this contract, if he adheres to the structural, mechanical and safety limitations laid down by the Project Manager. The *Contractor* shall take all reasonable care to prevent damage to Plant supplied by the *Employer*. Any damage through neglect shall be made good, in accordance with the instructions of the *Supervisor*, to the cost of the *Contractor*.
- 13.2.13. Care of material Supplied by the *Employer*: Should lost or damaged material be replaced by the *Employer*, the value of the material plus the cost of transport, including re-railing at the normal tariffs applicable to the public, will be deducted from any moneys payable to the *Contractor*.

13.3. Construction Equipment

The Contractor shall in addition to what is stipulated, provide the following additional facilities and support for the contract:

- 13.3.1. The Contractor shall provide lighting to all workplaces in tunnels and other workplaces where work is to be taking place during the hours between 18:00 and 06:00. Transnet Freight Rail will notify the Contractor one-month prior of lighting arrangements to be made. The lighting shall be of intensity and spread to satisfy the Supervisor that work can proceed efficiently and safely.
- 13.3.2. All tools/equipment, perway, small plant, earthworks plant, cranes, lifting equipment and vehicles of every description necessary for the execution of the works shall be supplied by the Contractor complete with fuel, spares, maintenance, competent operators and legally compliant with all applicable safety legislation. All ancillary and associated equipment together with all transport, accommodations, fuel, lubricants, spare parts for maintenance and repairs and consumables and any other resources necessary for the complete and effective and safe functioning of all Machinery shall be included in this contract to consistently and sustainable

operate the machine safely in line with tendered production rates and within available occupation times.

- 13.3.3. Should Transnet Freight Rail require any ballast tamper or regulator for other work (eg. emergency work), arrangements for payment will be made by utilising the relevant item in the schedule of prices of this contract relevant to each individual machine.

13.4. Existing Services

- 13.4.1. The *Contractor* shall take note of all OHTE equipment, red and other electrical bonds on the work Site and shall not interfere, damage or work on them unless under direct supervision of a designated and competent Transnet Freight Rail (TFR) Electrical Officer.
- 13.4.2. The *Contractor* shall take note of all signalling equipment on the work Site e.g. signals, signal cables, block joints, signal bonds, axle counters, hotbox detectors etc and shall not interfere, damage or work on them unless under direct supervision of designated and competent Transnet Freight Rail (TFR) signal technicians.
- 13.4.3. Before doing excavation work anywhere on a work site the *Contractor* shall be sure to consult on the presence of existing electrical/signal/telecom cables, water pipes or other services with the *Employer's* Maintenance Manager (Track). Only on his specific and written authorization shall any excavation work be carried out.
- 13.4.4. In the event of contact or damage to any overhead or underground cable on the work Site, work shall be stopped and the work Site evacuated. The Electrical Officer Contracts shall be notified immediately. Only subject to him or other competent Transnet Freight Rail (TFR) Electrical Officer certifying the work Site safe, shall work be allowed to proceed again.
Transnet
- 13.4.5. Where existing water supply is available within the railway reserve and is deemed sufficient by the *Employer's* Depot Engineering Manager to also supply the construction process, this supply may be made available to the *Contractor* for use in the construction process. If not allowed by the *Employer's* Depot Engineering Manager or where not available, the *Contractor* shall make his own arrangements to obtain suitable supplies.
- 13.4.6. It is the responsibility of the *Contractor* to provide water to his staff and machine. It shall be noted that it is not the responsibility of the *Employer* to stage the machines in areas where water is available; it will be an advantage if such places are available, but it is not a requirement.

13.5. Site Access

- 13.5.1. All *Contractor's* personnel shall be inducted before any works commence. Site access certificates will only be issued after all inductions have taken place.
- 13.5.2. Site access will be denied to the *Contractor* should the site access certificate not be issued.

13.6. Site Establishment

- 13.6.1. Subject only to the discretion of the Depot Engineering Manager responsible for the area, yard lines within the railway reserve may be made available to the *Contractor* for staging the wagons making up the consist of the machine.
- 13.6.2. Subject only to the discretion of the *Employer's* Depot Engineering Manager, areas within the railway reserve may be made available to the *Contractor* for accommodation,

- offices/workshops or stores. Where not allowed, the *Contractor* shall make his own arrangements elsewhere, at the expense of the *Contractor*.
- 13.6.3. If the *Contractor* is allowed by the *Employer's* Depot Engineering Manager to utilize areas within railway reserve for his purposes of whatever nature, it shall be noted that normally electrical, water supply and sanitation will not be available. The *Contractor* shall be required to make his own provisions for electrical, water supply and sanitation. Additionally, the *Contractor* shall comply with Environmental Health and Safety legislation when utilizing areas within railway reserve. On vacating the site, the site shall be cleared up and re-instated to the acceptance of the *Employer's* Depot Engineering Manager.
- 13.6.4. Security of the *Contractor's* property, equipment, materials, vehicles, and workforce shall at all times during the course of the contract be his sole responsibility. No claims will be entertained by Transnet Freight Rail (TFR) in this regard.
- 13.6.5. The *Contractor* shall be required for each work Site to have available for his work force suitable sanitation in accordance with the Act 85 Regulations.
- 13.6.6. On some lines or for some yards of *Transnet Freight Rail (TFR)*, the *Contractor's* staff will be required to obtain security permits from *Transnet Freight Rail (TFR)* before being allowed to work there. These permits will be issued free of charge.
- 13.6.7. The *Contractor* shall note that not all the sites will be accessible via a service road in some instances and the service road might not be in a good condition.

Transnet

14. MANAGEMENT

14.1. Planning

- 14.1.1. Monthly Project Meetings will be conducted to monitor progress and discuss contractual issues. These meetings shall be attended by *Contractor*, Supervisor and the Service Manager. A register will be kept of attendance and a minute of the proceedings will be recorded and distributed afterwards.
- 14.1.2. A concise maintenance programme showing the *Contractor's* planned programme for the following month and the order in which he intends to execute the daily operations shall be provided by the *Contractor* based on the work area required by *Transnet Freight Rail*. The detail program will be agreed upon between the *Supervisor* and the *Contractor*.
- 14.1.3. The *Contractor* shall provide a work breakdown structure of the sleeper replacement process from start to finish.
- 14.1.4. TFR will provide the plan of work sites to be covered. Furthermore, it is a specific requirement of this contract that the *Contractor* pre-plan the production of each month ahead. Monthly production shall be pre-planned directly with the *Supervisor* and be conducted on-site.
- 14.1.5. The Contractor is required to do inspection of each work site prior to the project and starting and when task orders are issued to execute appropriate preparation for the work focused on ensuring maximum production during occupation time by minimizing delays. Any issues requiring the Employer's inputs to avoid delays during the occupation time shall be brought timeously to the attention of the Supervisor. This include amongst other things: sleeper conditions, condition/ volume of ballast, gradient, radius, length of track segments, level crossings, negative returns, tunnels. The Contractor and Supervisor shall do all the required measurements of the above mentioned and draw up programme to meet the planned targets.
- 14.1.6. All sections requiring sleeper replacement are to be fully evaluated/inspected (by *Supervisor* or representative and the *Contractor*) in terms of estimating requirements and costs. Information such as sleeper spacing, sleeper type, etc. may be provided by the depot if already available.
- 14.1.7. The logistics surrounding the maximising of the use of sleeper wagons shall be discussed.
- 14.1.8. Should any preparation be required before the sleeper replacement process, the *Supervisor* and *Service Manager* shall be made aware in writing regarding this. The number of people required and hours should be stated and how much work was done. This shall be recorded on the site diaries.

14.2. Site Records

- 14.2.1. A *Site Instruction Book* with triplicate pages shall be provided by the *Contractor*. The format for written communication on *Site* shall be the *Site Instruction Book*. A new page shall be used for each *Site Instruction*. *Site Instructions* shall be deemed to have been noted by the other party at the end of each work day. For this purpose the *Site Instruction Book* shall be checked and new *Site Instructions* signed-off by both *Transnet Freight Rail (TFR)* and the *Contractor* at the end of each work day.
- 14.2.2. A *Site Diary* with triplicate pages shall be provided by the *Contractor* and be available on site at all times. The number of staff and plant on site for every day shall be recorded. The hours of actual work and the accurate amount of work measured per item as in the *Schedule of Quantities* completed for each day shall also be recorded and signed off by both by the *Employer* and the *Contractor* at the end of each day. The *Contractor* shall record following in the *Site dairy*:
- Occupation and Working time
 - Details of performance of the machines as well as the final number of sleepers replaced per day per track category (Track categories as in the *Schedule of quantities and prices*).
 - An accurate recording of all material received or purchased.
 - Details of plant, machinery and labour on *Site*, clearly indicating the staff used to perform various different functions.
 - Minutes of the *Site* meetings.
 - The *Site diary* shall be signed on a daily basis by both parties.
 - Information shall be reported as per the daily report, emailed electronically including train crossing numbers and minutes delayed, the following day before 08h30.
- 14.2.3. The information in the *Site Diary* shall be identical to the report generated by the machine. The *Employer* shall provide a template and it shall be the source document for monthly payment certificates.
- 14.2.4. The daily report e.g. travel to site, cut in, sleeper replacement, cut out, finalizing and travel return to staging sites times as well as production figures shall always be recorded and submitted to the Supervisor and Service Manager daily every morning for the previous day's occupation by email at 08:00.
- 14.2.5. A *Transnet Freight Rail (TFR)* Track Inspector shall on completion of each project inspect and measure for purposes of verifying quality for payment purposes. A formal handing over of the completed project shall be signed off by the Depot *Supervisor*, for the project to be eligible for payment.

14.3. Preparation Work

- 14.3.1. Since sleeper replacement requires preparation beforehand, some temporary works (eg. boxing-out ballast, oiling of rusted pings/springs, etc.) may be required to enable trains to pass over the track safely before the sleeper replacement work start, while the work is under way and before it is completed. The nature of these temporary works shall be such that it does not present a physical obstruction for the trains or result in delays for trains that are required to pass over the work site.
- 14.3.2. The *Contractor* shall have also ensured that preparatory work required to avoid damages to the replaced old sleepers which are normally used for the lesser traffic lines have been done to his satisfaction. A penalty shall be imposed on all sleepers damaged during the replacement due to negligence from the part of the *Contractor*. The price per sleeper shall be determined from the *Employer's* Supply Chain Department based on the value of the sleeper at the time of replacement and such shall be deducted from the *Contractor's* due payment for the same month in that particular depot. The *Employer* considers the value of the old sleepers as similar to the price of a new sleeper.
- 14.3.3. Any additional preparatory work required prior to the shutdowns shall be quoted at least one month in advance by the *Contractor* and submitted for approval by the *Service Manager* and

paid against the tendered rates. Only additional preparation under extreme track conditions that are viewed to impose production risks shall be entertained by *Employer*. This shall also have been agreed between the *Contractor* and the depot involved. This means that the requirement for additional preparation doesn't reside solely with the *Contractor*, but it shall be the agreement between both parties of the actual need to execute same.

14.4. Occupations

- 14.4.1. Although not guaranteed, the *Employer* will realistically arrange occupations according to the approved programme of typically 8 hours for any one occupation.
- 14.4.2. It may be possible to arrange extended occupations and even double shifts on some sections of the line, on certain days, during which the machines may remain in the section. It is a strict requirement for the machines to work double shifts as and when required by the *Employer*, therefore the *Contractor* shall allow in his rates for double shift working during shutdowns or during normal occupations as and when required. In these cases, occupation time will be calculated as the total period that all or any of the on-track machines actually worked.
- 14.4.3. Travel time from the staging site to the work site and back to staging site will be included in the Occupation Time (To).
- 14.4.4. During the occupation, the line will be closed to normal rail traffic over the section on which the *Contractor* is working. Protection of the site shall be as per the protection manual under direct control and supervision of the *Employer* Platelayer/Track Inspector.
- 14.4.5. The *Contractor* shall control and be responsible for the movements of all plant including that of the *Employer*, within the confines of the area of the occupation of the loading and off-loading operation and during its duration. At all times, the movement of plant will be undertaken as laid down by the *Supervisor*.
- 14.4.6. The *Contractor* shall however allow that:
 - Before midday during any shift the commencement time and duration of the following occupation will be advised in writing.
 - Occupations may commence at any hour of the day or night and on any day of the week. The *Employer* requires that all the on-track machines may work double shifts and therefore the *Contractor* is expected to price his tender based on similar requirement. The double shift will be paid against the tendered items.
- 14.4.7. Any adjacent track will run normal train services at normal section speed. The *Contractor* will be required to apply his Safety Procedure to safeguard his employees against the danger of normal rail traffic passing close by on the adjacent line.
- 14.4.8. Occupations shall be called for on any day of the week or month of the year. The *Contractor* shall allow in his tender for the normal builder's break from middle December to 2nd week in January every year with the specific provision that in the case of an emergency, the *Contractor* may be called from leave during the builder's break.
- 14.4.9. The *Contractor's* Track Master/Track Inspector shall take full charge of the *Contractor's* resources on the work Site. An employee/agent appointed by the *Contractor*, will not act as, or be allowed to take on any responsibility of *TFR Track Master/ Track Inspector*. The function of the *TFR Track Master/ Track Inspector* is restricted to competent *Transnet Freight Rail (TFR)* employees only.

14.4.10. The *TFR Track Master/ Track Inspector* shall be a competent *Transnet Freight Rail (TFR)* employee, reporting to the *Transnet Freight Rail (TFR)* Depot Engineering Manager. This *TFR Track Master/ Track Inspector* shall be responsible for the following on a work *Site*:

- Taking occupations
- Placing and controlling the flagmen
- Declaring the track safe for the passage of trains
- Cancelling the occupation and recalling the flagmen
- Communication with train traffic control with regard to occupation matters.
- The issue and control of all flags and detonators

14.4.11. All on-track machines shall be required to work on the finalising day to meet the target. The Contractor shall have a relief crew to carry on finalising and moving the machines to their staging points. The relief crew shall be deemed to be included in the tendered rates; no separate payment shall be submitted by the Contractor.

14.4.12. The Contractor shall provide a cell phone to the worksite for the exclusive use of Transnet Freight Rail (TFR) for logistical and operational arrangements.

14.5. Protection

14.5.1. The method of work shall be such that work may proceed either under “total occupation” or “between trains occupation” and shall at all times comply with *Transnet Freight Rail (TFR)* Specification E7/1.

14.5.2. Normal protection measures in accordance with the *Transnet Freight Rail (TFR)* Train Working Rules shall apply.

Transnet

14.5.3. All protection arrangements shall at all times remain under the supervision and responsibility of a *Transnet Freight Rail (TFR)* Track Master/ Track Inspector.

14.5.4. The Contractor shall supply at least two flagmen per work *Site* for protection duties. The cost for these flagmen will be deemed included in the rates tendered and no separate payment shall be made.

14.5.5. The Contractor will be required to supply six of his employees to be trained and certificated in performance of protection duties. The Contractor shall appoint at each work *Site* a person whose sole task shall be to be on the lookout for approaching rail traffic. This employee shall operate an audible warning device to timeously warn all people on the work *Site* of approaching rail traffic.

14.5.6. The Contractor shall not allow any persons on the work *Site* to venture within the structure gauge when this warning procedure is not operating effectively.

14.5.7. The warning device shall be such that its sound can be clearly and effectively heard above the noise on the work *Site* by all personnel within a radius of 100m around the centre of each work *Site*. The cost to the Contractor of providing the lookout as well as the warning device shall be deemed to be included in the rates tendered and no separate payment shall be made.

14.5.8. An effective safety procedure to be followed by all personnel on any work *Site* in the case of approaching rail traffic on adjacent lines shall be compiled by the Contractor and implemented before any work commences. This procedure shall be updated whenever the need arises and any changes shall be communicated to all employees on a works *Site* before work proceeds.

14.5.9. *Transnet Freight Rail (TFR)* shall make available a Track Master to oversee the protection arrangements on *Site* and to declare the track safe for the passage of trains during the work

and on completion of work. He may use flagmen provided either by *Transnet Freight Rail (TFR)* or the *Contractor*.

- 14.5.10. The *Transnet Freight Rail (TFR)* Depot Engineering Manager remains ultimately responsible in terms of the requirements of Act 85 for the safe working environment of his own personnel as well as *Contractor's* personnel within the track maintenance environment on his depot.
- 14.5.11. The Depot Engineering Manager is therefore also responsible for ensuring that any changes in the Protection Procedures that may occur over time are effectively communicated to any flagmen prior to them being used for Protection Duties

Transnet

14.6. Machine Movement

- 14.6.1. A free on rail facility will be made available to the *Contractor* for the conveyance of plant, equipment or material of the *Contractor*. This will apply to *Contractor's* items coupled to a train or loaded onto railway trucks. This arrangement will be valid for the duration of the Contract and apply to all items for use under the contract.
- 14.6.2. The *Contractor* may make use of this facility for transport from the *Contractor's* workshop or depot to the area of operation or vice versa, or from one area of operation to another, or, in the case of plant imported specifically for use on this contract, from the port of off-loading to the work-site. Prior approval for the movement of any machines shall be obtained from the *Service Manager* in writing.
- 14.6.3. The initial move of the Machinery from the *Contractor's* premises to the first RTD as well as the final move on completion of the contract from the last RTD back to the *Contractor's* premises shall not be paid for. A free on rail facility will however be available for this purpose.
- 14.6.4. Should the *Contractor* elect to transport any Machinery and equipment by road the *Contractor* shall not be entitled to separate payment. The cost of such road transport shall be deemed to be included in the rates tendered.
- 14.6.5. The *Contractor* will make all the arrangements directly with the Service Manager to move the Machinery by rail based on the programme agreed upon. Movements inside a depot area will be arranged by the *Supervisor* for the particular depot. Each application shall reflect all relevant and specific details of special conditions for the handling of the machine consist by *TFR* during each move. It is the responsibility of the *Contractor* to ensure that his machines are shunted and prepared for movement.
- 14.6.6. When required for productivity reasons, it will be necessary to move machines over an off-period. The *Contractor* will then be required to arrange for security and supervision to have the machines moved by rail over this off-period. The *Contractor* will be required as part of his tender to have an additional team available to facilitate the movement of the machines during the off periods. No overtime or additional move cost shall apply for such a move.
- 14.6.7. Included in the application for the move the *Contractor* shall provide name, identity number and grade of all employees travelling on the train. Specific details shall be given separately of the person in charge as well as staff required, to travel on machines.
- 14.6.8. Should *TFR* delay a move of the Machinery from one Depot to the next by not starting the move on the scheduled day, no payment of standing time shall apply.
- 14.6.9. The distance of moving the machine from the *Contractor's* premises at the commencement date to the first Depot will not be paid for, although the free on rail facility will be available to the *Contractor*.
- 14.6.10. The distance of moving the machine from the last Depot to the *Contractor's* premises on completion of the Contract will not be paid for, although the free on rail facility will be available to the *Contractor*.

14.7. Stoppages

- 14.7.1. Temporary stoppage, which may result from a non-continuous flow of the work, as and when required and shall be allowed for in the tendered rate.

- 14.7.2. TFR will advise the *Contractor* of any temporary stoppage in the work, five days' notice will be given of such an impending stoppage. Five days (5 days) notice will also be given to commence work when the Machinery was standing due to a temporary stoppage.
- 14.7.3. No Payment for De-establishing from *Site* when temporary stoppage begin as well as Re-establishment on commencing of the work after a temporary stoppage will be made.
- 14.7.4. The *Contractor* shall allow that weather conditions may adversely affect his rate of progress and plan his progress as well as plant and labour capacity accordingly.
- 14.7.5. Should rain or snow falling during the period of occupation, make it impossible for the *Contractor* to make use of such occupation no claims for Standing Time will be entertained by *TFR*.
- 14.7.6. The *Contractor* shall not claim any Standing Time against *Employer* for any force majeure and no penalties shall be imposed by the *Employer* to the *Contractor* for the same

14.8. Traction and Signal Bonds

Transnet

- 14.8.1. All bonds shall be supplied by the *Employer*, but the *Contractor* shall remove and install bonds under supervision of the *Employer*. The *Contractor* shall have the necessary tools to install the bonds. The *Contractor* shall be aware that where maintenance of the signalling and electrical equipment machines or assets change, he shall keep up with the latest technologies.
- 14.8.2. The *Contractor* shall repair all bonds / cables removed or damaged or broken off during works during the period of the occupation.
- 14.8.3. The *Employer* shall supply all the material required for repairing of broken bonds and cables on a one to one exchange basis (used material for new material.)
- 14.8.4. The *Contractor* shall provide labour and equipment (inclusive of expanded collar fastening consumables and lugs) required to remove, repair new bonds where required and replace signals and electrical bonds.
- 14.8.5. If holes are required for bonds, a rail drill shall either be supplied by the *Employer* or the holes shall be drilled by *Employer*.
- 14.8.6. Where cables are required to be cut, the cut cable shall be cut to the correct lengths and be the crimping of lugs onto cables be done by the *Contractor*. No splices will be allowed in bonding cables.
- 14.8.7. This shall include track feeder bonds (painted red), which may only be worked upon under supervision of a Competent Electrical Officer. The *Employer* shall only provide the cable for bonding. All bonding shall be completed during the period of the occupation.
- 14.8.8. Bonding shall be performed by a bonder qualified to the Employer's standard manual for "Earthing and Bonding for 3kV DC, 25kV and 50kV AC bonding" B_023 Issue 3 and B_028 Issue and subsequent instructions which includes the steel wire standard in lieu of existing copper bonds, and the expanded collar fastening system. The cables shall be correctly buried in the ballast as per instruction.
- 14.8.9. Signalling bonds may not be removed without the consent of the *Employer* or the authorised *Employer's* Signalling representative. Where signalling bonds are damaged or removed, the *Contractor* shall provide the support labour to re instate the bonds. The *Employer* will however be responsible to ensure the correct method of re-connection so as to ensure the correct functioning of the signalling system.

14.9. Level Crossings and Obstacles

- 14.9.1. Concrete blocks and ballasted level crossings shall be opened and prepared by the *Contractor* prior to the occupation starting to ensure maximum production during work across the level crossing. Bitumen/tar level crossings are to be opened and repaired by the *Employer's* depot staff.
- 14.9.2. Arrangements with the road authorities for temporary closure of the level crossing shall be the *Employer's* Depot Engineering Manager/ Depot Engineer responsibility but shall be done according to and with the timeous direct inputs from the *Contractor*. For purpose of calculating the productivity factor, work across level crossings shall be expected to comply with the minimum production rate requirements.
- 14.9.3. When hidden obstacles e.g. pieces of rail, concrete, large rocks or other large foreign objects are encountered in the ballast during the work process the actual time taken to normalize the situation and return to normal production shall be recorded and for purposes of calculating productivity, the time shall be converted to the theoretical production that would have been possible in that time should normal production rate have been possible. The same shall apply to when rail breaks occur.

14.10. Recording of Activity Times

14.10.1. The mutually agreed time the machine shall be available at its staging point, shall be the start of the occupation time (T_o) for the task order, therefore arriving late shall be deemed as breakdown time (T_b).

14.10.2. During the work activity the productivity, availability and utilization of the machine shall be recorded.

14.10.3. The time shall continuously be recorded for all work performed. The following types of time activity shall continuously be recorded so as to clearly define what time is available for working.

T_o = Total Occupation time for the day.

T_s = Standing time because of *Employer* reasons, not related to any fault of the *Contractor*.

T_x = Standing time due to Train crossing time

T_t = Travel time from staging site to work site and back to staging site or to clear the section.

T_m = Time allowed to move from one staging area to another when machine is required to move to new depot or area.

T_p = Time required to for preparation of track to allow working. (Only preparation that is purely related to machine on site that could not be phased apart from machine can be recorded for this purpose. This item may not be used for any problem related to the machine or staff inefficiency)

T_b = Breakdown of machine

Daily production report shall be e-mailed to the *Service Manager* at 08:00 am in the morning of the next day after each shift and shall be in excel format.

T_w = Working time (As specified below)

Transnet

14.10.4. Monitoring of machine availability will be calculated as: Availability (A) =
$$\frac{T_o - T_b}{T_o}$$

14.10.5. Monitoring of machine utilization will be calculated as: Utilization (U) =
$$\frac{T_w}{T_o}$$

14.10.6. A productivity factor, P shall be calculated every month to continuously monitor whether the machine consistently produces at the rates of production tendered.

Monitoring of machine productivity will be calculated as: Productivity (P) =
$$\frac{AR}{TR}$$

AR = Actual Rate (sleepers per minute)

TR = Tendered Rate (sleepers per minute)

14.10.7. The tendered nominal production rate in sleepers per minute shall be maintained over a calendar month.

14.10.8. When there is any unavailability of the sleeper replacement machine, the actual T_b time shall be recorded and the time shall be converted to the number of theoretical sleepers that could have been replaced in that time should the normal production rate have been possible. These sleepers will count towards the contracted sleepers and shall be subtracted from the contract shortfall.

14.10.9. The contractor will be penalised for any incomplete task order. Penalties will be dependent on the percentage task order completed.

14.11. Provision of Electronic Production Report to the Employer.

- 14.11.1. The Contractor shall provide the Employer with the daily production statistics of the work.
- 14.11.2. The production report shall be in an agreed-on format providing the following basic type of information:
- To, Tw, Tt, Ts, Tb, etc. of each machine applicable.
 - Length of work or number of sets completed for the day.
 - Start & final km tamped and GPS coordinates with the length and description of the rail line.
 - Reasons / comments on production shortfall including minutes per reason.
 - Train numbers and minutes delays per train number.
 - CTC names and CTC panel member details.
 - Graphical presentation of data as and where agreed on.
- 14.11.3. The report shall be e-mailed daily to the Service Manager, Supervisor and nominated Employer's representatives.
- 14.11.4. Where problems exist of transmitting the data, the Contractor shall state what measures shall be taken to ensure transmission of data as soon as possible.
- 14.11.5. All data shall be summarised per week and then per month. Data may be used as a preliminary indication of payment but shall not be used specifically for payment purposes. Final payment data shall be dealt with as specified elsewhere.

Transnet

14.12. Quality, Standards of Workmanship & Accuracy

- 14.12.1. At the end of each occupation on completion of the work the track shall be entirely normalized to the A-standard in terms of track geometry, ballast profile, sleeper spacing and rail-to-sleeper fastenings before the site will be accepted by the *Employer*.
- 14.12.2. The *Employer's* Track Inspector shall on completion of each project inspects and measures each completed project for the safe passage of trains.
- 14.12.3. Standards for acceptance of track shall be in accordance with the Manual for Track Maintenance:
- 14.12.3.1. "S_c" Means the minimum track standard to allow the track to be opened to traffic under a speed restriction of at least 30km/h, when a track stabiliser is not used.
- 14.12.3.2. "S_f" Means the standards, to which the track shall be finally handed over after full completion of the *works*, when a track stabiliser is not used.
- 14.12.3.3. "S_a" Means the A-standard to which the track shall be finally handed over after full completion of the *works*, when a track stabiliser is used.
- 14.12.3.4. Inspections for acceptance of the track when a dynamic track stabiliser is not used will take place as follows: Before the end of the occupation for S_c and again after a 72-hour period of train traffic for S_f.
- 14.12.3.5. The *Contractor* shall maintain the track on which he has worked, between inspections for S_c and S_f, to a standard not lower than S_c.

14.12.3.6. Inspections for acceptance of the track when a dynamic track stabiliser is used, will take place as follows:

- Before the end of the occupation and again after a 72-hour period of train traffic for Sa.
- The Contractor shall maintain the track on which he has worked, between inspections for Sc and Sf, to a standard not lower than Sc.

14.12.3.7. All track work shall be completed to comply with the A-standard. Should the Contractor observe conditions which may prohibit him from completing a project to the A-standard then he shall bring this timeously to the attention of the Supervisor prior to starting work on a specific project, unless the Supervisor is prepared to make a concession the A-standard shall still apply and the Contractor may then refuse to continue with the specific project if he deems it impossible to achieve the A-standard on final quality.

14.12.4. The changing rail temperature throughout the hours of the day shall also be given due regard to ensure the safety of rail traffic before, during and after the sleeper replacement work.

14.12.5. Vertical Alignment

14.12.5.1. The final elevation of the track shall not exceed the existing by more than 10mm except if otherwise directed by the Supervisor.

14.12.5.2. The rate of deviation of the running top of any rail from a straight line between any two points not more than 10 metres apart shall not exceed 1:1000 for Sf or Sa, and 1:250 for Sc.

14.12.5.3. The cant shall be the design cant to within a tolerance of $\pm 3\text{mm}$ for Sf (or Sa) and $+ 12\text{mm}$ for Sc.

14.12.5.4. The rate of change of cant on tangent ^{Transnet} track and on circular curves shall not exceed 1:1000 for Sf (or Sa), and 1:400 for Sc.

14.12.5.5. The rate of change of cant on transition curves shall not exceed: 1:500 for Sf (or Sa), and 1:400 for Sc.

14.12.6. Horizontal Alignment

14.12.6.1. The *Contractor* shall determine the horizontal alignment (position) of the track by taking reference measurements at all mast foundations. Where electrification masts do not exist, reference pegs at 50m centres shall be installed by the *Contractor*. The Supervisor will prescribe and supply all the necessary pegs, concrete or paint.

14.12.6.2. The position of the track centre line shall remain within 10mm of the existing position for Sf (or Sa), and 40mm for Sc.

14.12.6.3. The standards for structural gauge shall be adhered to. The *Contractor* shall verify the structural gauge parameters himself and adhere to the specified standards.

14.12.6.4. On straight track, the rate of deviation of the running edge of each rail from a straight line between two points not more than 10m apart, shall not exceed 1:2000 for Sf (or Sa), and 1:500 for Sc.

14.12.6.5. On curves, including transitions, the offset midway between any 2 points 10m apart shall not differ from the design offset by more than 2.5mm plus 5% of the design offset for Sf and 2.5mm plus 20% of the design offset for Sc.

14.12.7. Ballast Profile

- 14.12.7.1. The ballast profile shall be within a tolerance of 25mm for ballast height, and within 65 mm of ballast width, specified in Annexure 4 Sheet 1 of 4 of the Manual for Track Maintenance
- 14.12.7.2. Should the Supervisor permit, any excess ballast should be placed on the shoulders of the cross sectional profile. The ballast profile shall be formed to provide maximum protection against kick-outs. All available ballast shall be utilised to form part of the ballast profile. For curved track, excess ballast shall be placed and formed on the shoulder of the high leg. Where there is a shortage of ballast and the *Contractor* was required by *TFR* to continue work, any lift of track shall be restricted so as to ensure sufficient ballast both under the track and to the sides to ensure safe and proper compaction and safeguard against kick-out of track.
- 14.12.7.3. No material or ballast distributed by the *Contractor's* operations shall be left in the drains and no ballast shall remain beyond the toe of the ballast profile such that the depth of ballast stones remaining is more than 60mm, except where there is ballast in-fill between multiple tracks.
- 14.12.7.4. Additional ballast placed in the ballast profile as a result of any lowering of the track shall be shaped on to the shoulder of the ballast profile.

14.12.8. Measurements

- 14.12.8.1. The *Supervisor* shall on completion of each project inspect and measure each completed project for purposes of verifying quality for payment purposes.
- 14.12.8.2. Track geometry shall be finalised to the *TFR A-Standard*.
- 14.12.8.3. The *Contractor* shall, over the total length of finalised track, take and record all measurements required to determine the standard in both phases (that is for Sc and Sf) and hand it to the Supervisor for checking. Measurements may be taken manually and/or by electronic means.
- 14.12.8.4. Measurements taken manually for the vertical alignment shall be made with a level similar to the Geismar type. Or other approved means of ensuring quality.
- 14.12.8.5. Deviation from a straight line (slack): Determine positions by visual means and quantifies by Geismar type level. Measurements shall be taken along the top of the rail before and after the points of deviation.
- 14.12.8.6. Cant and rate of change of cant: Measure cross level every five metres.
- 14.12.8.7. Measurement for the horizontal alignment shall be made with a nylon line on the running side of the reference rail at two points 10 metres apart and a feeler gauge calibrated in 1mm intervals.
- 14.12.8.8. Each deviation between the two points on straight track, 10 metres apart, shall be measured by inserting a feeler gauge between the nylon line and the rail at the centre of the deviation. The number of sleepers between the beginning and end of the deviation shall be recorded as instructed by the Supervisor. All unacceptable measurements caused by permanent defects in the rail, that are impossible to eliminate, and as notified to the Supervisor, shall be excluded. These measurements shall be recorded in the *Site* diary.

14.12.8.9. Curved track shall be marked out at 5-metre intervals and each mark shall become a measuring station. Track standard shall be determined by measuring and recording the offset at each station from the 10-metre chord strung between adjacent measuring stations. All unacceptable measurements caused by permanent defects in the rail, that are impossible to eliminate, and as notified to the Supervisor, shall be excluded. These measurements shall be recorded in the *Site* diary.

14.12.8.10. Compliance with the standards of workmanship and accuracy will be calculated from these measurements.

14.12.9. Measurement of Contact Wire Height & Stagger

14.12.9.1. The standards for structural gauge shall be adhered to. The *Contractor* shall verify the structural gauge parameters himself and adhere to the specified standards.

14.12.9.2. The height of the contact wire shall be measured after the final tamp at both sides of all overhead bridges, as well as level crossings. Heights below or above the allowable limit quoted will not be acceptable.

14.12.9.3. The stagger of the contact wire, (offset from the perpendicular on the track centre line) shall be measured after the final tamp at all support structures, pull-off and knuckle points, as well as at mid-span on all curves. Where more than one contact wire exists, the stagger of the innermost wire shall be measured. The stagger on both the through and turnout lines of sets of points shall be checked, when turnouts are tamped.

14.12.9.4. Contact wire height and stagger measurements shall be reported to the Supervisor in writing (or computer printout) at the end of each shift. Measurements exceeding the allowable limits specified shall be immediately reported to *Transnet Freight Rail* for rectification. Each measurement shall indicate the mast location number as well as the relevant track section number. Transnet

14.12.9.5. Alignment and height of OHTE shall be continuously measured. The accuracy of contact wire height measurements shall be $\pm 10\text{mm}$ and the contact wire stagger measurements shall be $\pm 20\text{mm}$.

14.12.9.6. All overhead clearance and stagger measurements are to be done electronically with a Rail rod. The rail rod should be calibrated once every 12 months unless found to be inaccurate. A calibration certificate shall be available on *Site* at all times. Random checks by *TFR* electrical measuring staff will be carried out by *TFR* to ensure the accuracy of measurements

15. HEALTH AND SAFETY

15.1. The *Contractor* shall comply with all applicable legislation as well as Transnet Safety requirements. The cost for such compliance shall be borne by the *Contractor* and shall be deemed to have been allowed for in the rates and prices of the Contract. Specifically important in this regard is compliance with:

- TFR Safety Guidelines for Infrastructure (Latest Edition).
- The Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993).
- The Occupational Health and Safety Act (Act 85 of 1993).
- TFR Specification E.4E, SHE Specification for Contractors
- Basic Conditions of Employment Act as well as all other relevant labour legislation.
- TFR Specification for Work on, under or adjacent to Railway Lines and near high Voltage Equipment – E7/1.

15.2. The *Contractor* shall also comply with all other safety requirements, regulations and guidelines

of Transnet applicable to the nature of work carried out under the Contract and shall obtain the particulars thereof from the Service Manager.

- 15.3.** A formal risk assessment on the entire sleeper replacement process has been conducted by *TFR* and the under mentioned safety critical risks have been identified. The *Contractor* shall conduct his own formal risk assessment on the entire sleeper replacement process offered by him and add any additional risks identified by him, to this list.
- 15.4.** The *Contractor* is required to prepare and submit with his tender a comprehensive safety case in accordance with the requirements of Act 85 and the Construction Regulations.
- 15.5.** The *Contractor* shall specify in his safety case the list of all risks identified by *TFR* together with any additional risks identified by his own risk assessment and indicated specific rules, processes, methods and designs of how he intends to mitigate these risks should he be awarded the contract.
- 15.6.** Safety Critical Risks identified by *TFR* for the sleeper replacement machine and associated works and activities are:
- Occupation - double line occupation
 - Executing work on one line while a normal train service is running on adjacent line/s
 - Excessive Working hours
 - Working at night
 - Emergency procedure – to stop process due to wagon or equipment failure
 - Material handling and working near or under live OHTE equipment: 50kV, 25 kV and 3.3kV
 - Staging the accommodation units of workers in yards in proximity of live OHTE and lines on which rail traffic runs continuously.
 - Danger area
 - Competent operators
 - Train driver/operator/ interaction/competency
 - Site conditions
 - Infrastructure equipment damage
 - Machine working on sharp curves and steep gradients
 - Machine working on embankments and in cuttings
 - Machine working on fouled ballast
 - Clearances
 - Maximum and minimum temperatures
 - Precipitation
 - Integrity, i.e. Rolling stock structure, drawgear, brakes, wheels; and machine structural integrity
 - Unauthorised access
 - Use of various petrol and electrically driven small plant within team context i.e. disk cutters, MP12 and MC2 rail grinders, rail drills, hand held tampers, generators and associated electric equipment, joggle plates and joggle clamps etc.
 - Environmental pollution/damage
- 15.7.** The *Contractor* shall report all the incidents to the *Service Manager*, the type of injuries sustained as well as quantifying delays or impact on production per incident in minutes. The production loss due to injuries to *Contractor's* staff shall be compensated to the *Employer's* equivalent to the sleepers lost.

15.8. Safety Compliance

- 7.7.1** The *Contractor* shall prepare and implement a comprehensive health and safety plan covering all relevant legal safety aspects for their work teams. It shall include details of the *Site* management structures, all safety legal appointments as well as the written safe working

procedures for all equipment used on *Site* taking into account the above risk assessments.

- 7.7.2 The *Contractor* shall be responsible to ensure the use of only technically competent trained staff on all types of work.
- 7.7.3 The Health and Safety plan together with all supporting documentation shall at all times be available in a health and safety file on site for compliance audit.
- 7.7.4 The *Contractor* shall ensure that all *Site* staff are trained and inducted in the written safe working procedures for all equipment used on *Site*.
- 7.7.5 The *Contractor* shall ensure that all workers are appropriately equipped and wearing Personal Protective Equipment (PPE) and that Safety Talks are conducted and noted in the *Site* Diary before the start of every shift.
- 7.7.6 The *Contractor* shall be responsible to ensure that *Site* staff is always competently trained with regards to Electrical Awareness Training and such training material should be acknowledged and approved by the Employer's School of Rail.
- 7.7.7 The *Contractor* shall be responsible to ensure that workers working on machines (high risk areas), operators, machine fitters, area supervisors and contract supervisor's *Site* staff are always competently trained with regards to PWC Electrical Educational Training.
- 7.7.8 The *Contractor* shall also be responsible to ensure that contract managers in charge of *Sites* are always competently trained with regards to COM Competency Electrical Training (to follow onto PWC Training).
- 7.7.9 Non-compliance with safety requirements will result in an immediate suspension of work without payment.
- 7.7.10 Non-compliance with environmental requirements such as oil spillages, waste, will result in penalties being levied against the *Contractor*. The *Employer* will appoint a private company to make the situation good and claim compensation from the *Contractor*.

16. TRAINING

- 16.1. The *Contractor* shall ensure that all staff working on or with the contract is adequately trained, so as to comply with any relevant safety and quality requirements.
- 16.2. It is the *Contractor's* responsibility to ensure that his staff is trained. At the commencement of the contract, *Transnet Freight Rail (TFR)* shall assist the *Contractor* with the initial on-the-job training for the staff as specified below, so as to assist the *Contractor* to qualify the worker's / staff. The *Contractor* shall ensure that he has a core group of workers with sufficient previous experience to take the lead in undertaking maintenance tasks.
- 16.3. Where training is required by the *Contractor* and *Transnet Freight Rail (TFR)* is committed to provide training, the *Contractor* shall qualify his tender as to what and how many staff, training will be required for. After award of the contract, the *Contractor* shall then arrange with the appropriate *Transnet Freight Rail (TFR)* Perway Production manager, through the *Supervisor*, for this training / testing.
- 16.4. Training of Track Workers: At the commencement of the contract, assistance with the training, to qualify the *Contractors* workers to perform the following tasks shall be given:
 - Track work (Level crossing blocks, cattle guards, sleeper & clip replacement / fastening, lubricators, flagmen, ballast boxing etc.).
 - Quality measurements as required for track work.

16.5. Training of Track Inspectors, Track Masters and or Trade hands (Perway): This training shall be solely the responsibility of the *Contractor*. Only fully qualified people shall be used by the *Contractor* for these positions. The *Contractor* shall ensure that staff used, do comply with requirements for the industry.

16.6. Training of Flagmen

16.6.1. The appropriate training for the flagmen provided by the *Contractor* can be provided by *Transnet Freight Rail (TFR)* at the start of the contract.

16.6.2. *Transnet Freight Rail (TFR)* requires flagmen, and the pre-requisites for such persons to qualify to be trained, shall be basic literacy skills and Basic English language ability.

16.6.3. *Flagmen* shall be officially trained, evaluated and certified competent, (*Transnet Freight Rail (TFR)* 407 – Item Number 37/270451 - "Certificate of Competency") by a designated competent person, before being used on protection duties. This certificate of competency shall remain valid for one (1) year only after, which re-testing and re-certification of competency will be required.

16.6.4. In cases where a person was not performing flagmen duties for a period of 6 months or longer, he shall be re-tested and again be re-certified competent, before he may be re-used for Protection Duties.

16.7. Training of Bonders

16.7.1. Bonders removing, replacing or repairing ^{Transnet} damaged bonds, shall be trained to ensure that only work, which they are trained and allowed to do, is done by them.

16.7.2. The initial training of bonders for this contract can be arranged for with the Employer's accredited electrical trainer, through the Supervisor as specified above in this clause.

16.7.3. Bonders shall be required to be trained for Electrical Permanent Way Competency and be trained to do WHAM bonding and bonding according to electrical specifications, instructions and drawings manual CEE 0059.84 and CEE0060.84, where applicable.

16.7.4. Follow up training of bonders shall be responsibility of the Contractor

16.8. Electrical Awareness, Educational and Competency Training

16.8.1. The electrical awareness training shall be arranged for before any work commences.

16.8.2. In order to mitigate the risk of workers coming in contact with live OHTE, all SRM crew who have to work on the train in close proximity of OHTE shall be trained and qualified.

16.8.3. The electrical educational and competency training may be arranged for at either a depot's lecture room (*Transnet Freight Rail (TFR)* property), or at a venue of the *Contractors* choice (*Contractors* cost).

16.8.4. The Accredited Electrical trainer from *Transnet Freight Rail (TFR)* will be provided by *Transnet Freight Rail (TFR)* at *Contractors* cost, an arrangement for the training session required, is done beforehand and will fit in with the trainers training program for the year.

The Contractor will not be allowed to commence any work before going through the training below: The contractor will be liable for all the cost of the training.

Type of Training	Staff required to undergo training	Estimated duration of training	Location of training	Trainer to conduct training at start of contract	Alternative trainer to conduct training at contract start	Future Refreshment training
Induction	All contract staff including new entrants. Start of work at any new depot	+/- 2 hours	Depot where work starts	<i>Employer's Service Manager or Track inspector</i>	New recruits: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.
Electrical awareness	All contract staff including new entrants	+/- 2 hours	Depot where work starts	<i>Employer's Depot's electrical officer or accredited trainer</i>	New recruits: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.
PWC (Electrical)	<i>Service Managers, Operators, fitters, Technicians & Workers supporting fitters, working in risky OHTE areas.</i>	2 days	Depot where work starts	<i>Employer's, Esselen Park or Depot accredited trainer, or Employer's hired accredited trainer: By appointment at depot*</i>	Replacement/ new staff: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.
Competency (Electrical)	<i>Service Managers (Follow up training in PWC)</i>	1 day	Depot where work starts	<i>Employer's accredited trainer, or Employer's hired accredited trainer: By appointment at depot*</i>	Replacement/ new staff: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.
Flagmen Training	Flagmen and standby flagmen	5 days		<i>Employer's accredited trainer, or Employer's hired accredited trainer: By appointment at depot</i>	Replacement/ new staff: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.
Bonder Training	Bonder	5 days		<i>Employer's accredited trainer, or Employer's hired accredited trainer: by appointment at depot*</i>	Replacement/ new staff: <i>Contractors</i> accredited representative	<i>Contractors</i> accredited representative.

16.9. The crew time, transport and accommodation cost related to training will be for the Contractor's account. The crew members proposed to for this training shall as minimum requirement be literate in terms of reading, writing and speaking of Basic English.