GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
RAILWAY BOARD

No.2022/Track-III/TK/15 New Delhi, dated 03.10.2023.

The Principal Executive Director (Infra-I),
Research Design & Standards Organisation (RDSO),
Lucknow.

Sub:- Technical Specifications of Worksite Tampers (WST) for Broad Guage (1676 mm) - (Technical Specification No.TM/HM/WST/402 - Rev.02 of 2021) - reg.

Ref:- EDTK/RDSO letter No. TM/HM/WST Pt. IV, dated 22.09.2023.

In reference to above-referred letter of RDSO, the Corrigendum No.1 to technical specification of WST (Technical Specification No.TM/HM/WST/402 - Rev.02 of 2021) has been approved by Competent Authority, and copy of the same is enclosed herewith.

Vijay
03/10/2023

(VIJAY SINGH)
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Corrigendum no. 1 to Specification of Worksite Tamper (WST) (Specification no. TM/HM/WST/402- Rev. 02 of 2021)

E-Tender No.2023/TM/1 for Work site Tamper (WST) -Prebid Conference held on 05-09-2023

Manufacturing, Design, Manufacture, Supply, Testing & Commissioning of Work site Tamper (WST) on Indian Railways

<table>
<tr><th>S.No.</th><th>Clause No.</th><th>Existing Clause</th><th>Proposed Clause</th></tr>
<tr><td>1.</td><td>2.7</td><td>The machine shall have a desirable wheel diameter of 914 mm (new wheel profile). However, lesser diameter up to 763 mm for new wheel profile can also be permitted, provided it meets the condition laid down in clause 2.5 and 2.6 at its condemnation limit as per design and also rail wheel contact stresses for 72 UTS rails are within permissible limits. Forged wheels to Indian Railways profile shall be provided on the machine. It is desirable that 50 mm margin between new and permitted worn wheel diameter should be available, but this should not be less than 30 mm. The worn-out wheel diameter (condemning worn out diameter)based on the criteria of rail wheel contact stresses for various maximum axle loads are as under:
<table>
<tr><th>Maximum axle load (tonne)</th><th>Minimum worn out wheel diameter (mm)</th></tr>
<tr><td>22.82</td><td>908.00</td></tr>
<tr><td>22.00</td><td>878.00</td></tr>
<tr><td>21.50</td><td>860.00</td></tr>
<tr><td>21.00</td><td>841.00</td></tr>
<tr><td>20.32</td><td>816.00</td></tr>
<tr><td>20.00</td><td>805.00</td></tr>
<tr><td>19.50</td><td>787.00</td></tr>
</table></td><td>The maximum and minimum permitted diameter of new wheel is 1092 mm and 740 mm respectively. Minimum permitted diameter of worn wheel is 710 mm. ~~The machine shall have a desirable wheel diameter of 914 mm(new wheel profile).However, Lesser diameter up to 763 mm for new wheel profile can also be permitted, provided it meets the condition laid down in clause 2.5 and 2.6 at its condemnation limit as per design and also rail wheel contact stresses for 72 UTS rails are within permissible limits. Forged wheels to Indian Railways profile shall be provided on the machine.~~ It is desirable that 50 mm margin between new and permitted worn wheel diameter should be available, but this should not be less than 30 mm. ~~The worn-out wheel diameter (condemning worn out diameter)based on the criteria of rail wheel contact stresses for various maximum axle loads are as under:~~
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		19.00 | 768.00 18.50 | 750.00 18.00 | 732.00 17.50 | 713.00 Permitted worn out wheel diameter should be specified by the manufacturer. The diameter of wheel for assessment of permitted axle load will be the worn-out wheel diameter. The new wheel profile in the machine shall be as per Indian Railways standard drawing attached as Annexure-III which is titled as "WORN WHEEL PROFILE".	~~19.00 | 768.00~~ ~~18.50 | 750.00~~ ~~18.00 | 732.00~~ ~~17.50 | 713.00~~ Permitted worn out wheel diameter should be specified by the manufacturer. The diameter of wheel for assessment of permitted axle load will be the worn-out wheel diameter. The new wheel profile in the machine shall be as per Indian Railways standard drawing attached as Annexure-III which is titled as "WORN WHEEL PROFILE". Note: Annx-III 'WORN WHEEL PROFILE' is currently standard new wheel profile of IR.
2.	2.14	During transfer from one station to another, it shall be capable of traveling on its own at a speed of 80 kmph and at a speed of 100 kmph when hauled in a train formation as last vehicle. Since the machine is likely to cover long distances on its own power, the travel drive system shall be robust to sustain these requirements during the life of the machine without significant break down/failure. The machine shall be capable of hauling an 8-wheeler coach/wagon (gross weight 90 t approximately) should not be less than 50 kmph and as per conditions specified in clause 2.11.	During transfer from one station to another, it shall be capable of traveling on its own and when hauled in a train formation as last vehicle at a speed of ~~80 kmph~~ 70 kmph ~~and at a speed of 100 kmph train formation~~. Since the machine is likely to cover long distances on its own power, the travel drive system shall be robust to sustain these requirements during the life of the machine without significant break down/failure. The machine shall be capable ~~of~~ to haul~~ing~~ an 8-wheeler coach/wagon (maximum gross weight 90 t ~~approximately~~) ~~should not be~~ at speed not less than 50 kmph and as per conditions specified in clause 2.11.
3.	3.2	The machine shall be capable of carrying out automatic lifting, leveling, lining and tamping of 1500 sleepers in an hour of working on all type of track structures i.e. long welded, short welded or fish plated rails laid on concrete sleepers on 52 kg/60 kg rails with uniform sleeper spacing, which may vary from 550 mm to 650 mm and clear spacing between sleepers from 260 mm to 405 mm. However, the machine shall be capable of tamping at the peak rate of 2000 sleepers per hour over a period of not less than 10 minutes. The time of working shall be counted from start to finish of tamping work at work place. Stoppage of work not attributable to machine shall be discounted. The	The machine shall be capable of carrying out automatic lifting, leveling, lining and tamping of 1500 sleepers in an hour of working on all type of track structures i.e. long welded, short welded or fish plated rails laid on concrete sleepers on 52 kg/60 kg rails with uniform sleeper spacing, which may vary from 550 mm to 650 mm and clear spacing between sleepers from 260 mm to 405 mm. ~~However, the machine shall be capable of tamping at the peak rate of 2000 sleepers per hour over a period of not less than 10 minutes.~~ The time of working shall be counted from start to finish of tamping work at work place. Stoppage of work not attributable to machine shall be discounted. The setting up time and winding up time shall be measured and the total time taken by the two

		setting up time and winding up time shall be measured and the total time taken by the two operations of setting up and winding up of the machine together shall not exceed 10 minutes. The setting up time shall be counted from the time machine arrives at site to the time work is started. The winding up time will be counted from the time the work is stopped to the time machines starts moving away from the work site. Dimensions of sleepers are given in Annexure–IV.	operations of setting up and winding up of the machine together shall not exceed ~~10~~ 12 minutes. The setting up time shall be counted from the time machine arrives at site to the time work is started. The winding up time will be counted from the time the work is stopped to the time machines starts moving away from the work site. Dimensions of sleepers are given in Annexure–IV.
4.	3.23	The machine shall be equipped with a centralized computer-based control and monitoring system which shall monitor the health of machine working system such as engine (lubricant oil pressure, temperature, rpm with engine running hours etc.), hydraulics (hydraulic pressure in different units, temperature, oil level in tank etc), pneumatic (pressure of main reservoir, brake cylinder and others section), electrical (charging/discharging rate, voltage etc.). There shall be provision of recording and logging of machine working hours and such gauge shall also be displayed on the monitor of the computer installed in operator cabin. All these data shall be displayed on a monitor installed in working cabin and there shall be facility to store these data for 100 engine running hours. Minimum storage of 500 GB shall be available for this purpose. Arrangement for providing 3G/4G internet connection for sending data in soft format directly from the computer shall also be available for shall have recorded data. It shall also have facility to interface with Human Machine Interference (HMI)/Display and various other sensors. The data transfer unit shall be compatible with the Track Management System (TMS) of Indian Railways.	The machine shall be equipped with a centralized computer-based control and monitoring system which shall monitor the health of machine working system such as engine (lubricant oil pressure, temperature, rpm with engine running hours) ~~etc.~~) hydraulics (hydraulic pressure in different units, water temperature, oil level in tank ~~etc)~~, pneumatic (pneumatic pressure of main reservoir, brake cylinder ~~and others section)~~ electrical (charging/discharging rate, voltage) ~~etc.)~~. There shall be provision of recording and logging of machine working hours and such gauge shall also be displayed on the monitor of the computer installed in operator cabin. All these data shall be displayed on a monitor installed in working cabin and there shall be facility to store these data for 100 engine running hours. Minimum storage of 500 GB shall be available for this purpose. Arrangement for providing ~~3G/~~ 4G/5G internet connection for sending data in soft format directly from the computer shall also be available for recorded data. It shall also have facility to interface with Human Machine Interference (HMI)/Display and various other sensors. ~~The data transfer unit shall be compatible with the Track Management System (TMS) of Indian Railways.~~ The Dashboard shall ensure a comprehensive view of whole fleet and highlights machines requiring attention with alert. Data for required machine maintenance shall be possible to be entered via the Dashboard. In addition to local storage at machine in the hard disk, these whole data shall be stored in a cloud based software for further interlinking with Track

			Management System (TMS) by Indian Railways. Weekly reports per machine shall summarize performance data and shall provide information about tamping work performed eg. Tamping distance, incomplete vibration, incomplete levelling and incomplete penetration counts along with machine position. The Software shall be made available for min.10 years incl. all required maintenance activities and updates The SIM for data transfer will be provided by Railways to manufacturer of the machine prior to commencement of machine commissioning.
5.	3.27	To monitor the working of machines, closely from any location in the country, suitable number of IP based cameras shall be installed. The cameras shall be fixed on machine at such location that the live video of the important working units of machine which are working on track, location of worksite and post-work track can be seen by the authorized person with commonly used browsers in India over the internet. Cameras shall be password protected, decentralized and IP based. They shall have built-in function for recording and thus can record directly to any standard storage media, such as SD cards. Internal memory space of 500 GB shall also be available.	~~To monitor the working of machines, closely from any location in the country, suitable number of IP based cameras shall be installed. The cameras shall be fixed on machine at such location that the live video of the important working units of machine which are working on track, location of worksite and post-work track can be seen by the authorized person with commonly used browsers in India over the internet. Cameras shall be password protected, decentralized and IP based. They shall have built-in function for recording and thus can record directly to any standard storage media, such as SD cards. Internal memory space of 500 GB shall also be available.~~ Sufficient No. of CCTV cameras shall be provided to assist the operator carry out the tamping operations shall be provided. Besides this additional cameras shall be fixed on the machine so that video of the important working units of machine which are working on track, location of worksite and post-work track can be recorded. They shall have built-in function for recording and thus can record directly to any standard storage media, such as SD cards. Sufficient internal memory space of shall also be available to record CCTV footage for at least 30 days.
6.	3.29	The machine shall be capable to work in manual mode also in case of failure of computer/software/display units along with provision of manual feeding of required data. Necessary calculation chart shall be provided with each machine	The machine shall be capable to work in manual mode also in case of failure of computer/software/display units of ALC (Automatic Guiding Computer) system along with provision of manual feeding of required data. Necessary calculation chart shall be provided with each machine.

7.	5.8	The machine shall be equipped with hot axle sensor for each axle and also adequate safety circuit such that any unit/part which may endanger the safety is unlocked and the air pressure in brake circuit is less than 5 bars, the machine shall not move during run drive. The indication of hot axle, locking and unlocking of all units shall be displayed in the cabin	The machine shall be equipped with ~~hot axle sensor for each axle and also~~ adequate safety circuit such that any unit/part which may endanger the safety is unlocked and the air pressure in brake circuit is less than 5 bars, the machine shall not move during run drive. The indication of ~~hot axle,~~ locking and unlocking of all units shall be displayed in the cabin~~.~~
8.	7.4	The spring-loaded electro-pneumatic parking brake shall be provided as per RDSO specification no. C-K 408 with latest amendments. Mechanical brakes shall also be provided in addition for use as parking	~~The spring-loaded electro-pneumatic parking brake shall be provided as per RDSO specification no. C-K 408 with latest amendments.~~ The pneumatic parking brake should also be spring loaded so that in case of drop in pneumatic pressure below certain value the brake will be automatically be applied. The brakes shall be protected from ingress of water, grease, oil or other substances, which may have an adverse effect on them. Mechanical brakes shall also be provided in addition for use as parking.
9.	11.3	The suitable capacity of jack along with hydraulic pumps, aluminum beams, and other accessories shall be provided for lifting and side slewing for re-railing of the machine in case of derailment.	~~The suitable capacity of jack along with hydraulic pumps, aluminum beams, and other accessories shall be provided for lifting and side slewing for re-railing of the machine in case of derailment~~. Two nos. 50 t manually operated hydraulic lifting jack, with more than 300 mm traversing facility suitable to lift the machine frame at lifting point, should be made provided to meet out the urgency. Also a hydraulic hand pump unit should also be provided to operate any other emergent operation of hydraulic cylinders.
10.	13.9.3	High safety fire survival cables for fire-prone areas are designed to sustain high temperatures for a defined minimum period of time under direct fire. They find applications in hazard-prone areas where people and equipment are exposed to the threat of fire with qualities that will prevent them from overheating; they can withstand temperatures of up to 650°C, 750°C, and 950°C as per various conditions of operation and applications.	~~High safety fire survival cables for fire-prone areas are designed to sustain high temperatures for a defined minimum period of time under direct fire. They find applications in hazard-prone areas where people and equipment are exposed to the threat of fire with qualities that will prevent them from overheating; they can withstand temperatures of up to 650°C, 750°C, and 950°C as per various conditions of operation and applications.~~
11.	13.9.7	All non-metallic and furnishing materials such as	All non-metallic and furnishing materials such as artificial

		artificial leather seat covering, flooring material, vestibule material, GFRP paneling, cushioning material etc. shall satisfy the requirements of resistance to spread of flame and deterioration in visibility due to smoke etc. as per UIC 564-2 OR Class A or superior international standard.	leather seat covering, flooring material, vestibule material, GFRP paneling, cushioning material etc. shall satisfy the requirements of resistance to spread of flame and deterioration in visibility due to smoke etc. as per UIC 564-2 or ~~Class A or superior international standard~~ EN 45545 HL-2
12.	13.10.2	In the event of detection of a smoke/fire, the air conditioning system shall be controlled to minimize the spread of fire to promote the escape of machine operators and staffs	~~In the event of detection of a smoke/fire, the air conditioning system shall be controlled to minimize the spread of fire to promote the escape of machine operators and staffs~~

(S.K.Singh)
Executive Director/TM/RDSO