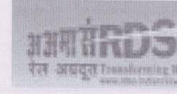




भारत सरकार, रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन,
मानक नगर, लखनऊ - 226011
Government of India, Ministry of Railways
Research, Designs & Standards Organisation
Manak Nagar, Lucknow - 226011

दूरभाष/Telephone:
वीएसएनएल/BSNL 91-522-246573 रेलवे/Railway:
42804
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संख्या/No. TI/OHE/ Thermo-vision Camera /2017

दिनांक/Dated, the 26th October, 2017

To,

The Principal Chief Electrical Engineer,

- | | |
|--|---|
| (i) Central Railway, Station Building, Mumbai CST - 400 001. | (ii) Eastern Railway, Fairlie Place, Kolkata-700 001. |
| (iii) East Central Railway, Hajipur-844 101. | (iv) East Coast Railway, Bhubaneshwar-751 023. |
| (v) Northern Railway, Baroda House, New Delhi - 110 001. | (vi) North Central Railway, Allahabad-211 015. |
| (vii) North Eastern Railway, Gorakhpur-273 012. | (viii) North Frontier Railway, Mailgaon - 781 011. |
| (ix) North Western Railway, Jaipur - 302 017. | (x) Southern Railway, Park Town, Chennai- 600 003. |
| (xii) South Central Railway, Railnilayam, Secunderabad-500371 | (xii) South Eastern Railway, Garden Reach, Kolkata-700 043. |
| (xiii) South East Central, Railway, Bilaspur-495 004. | (xiv) South West Railway, DRM's Office, Hubli-580 028. |
| (xv) Western Railway, Churchgate, Mumbai-400 020. | (xvi) West Central Railway, Jabalpur- 482 001. |
| (xvii) Central Organisation for Railway Electrification, Nawab Yusuf Road, Allahabad-211000. | |
| (xviii) Konkan Railway, Belapur Bhavan, Navi Mumbai - 400614 | |

Sub: Maintenance Instruction on "Identification of defects on traction installation using thermo vision camera and preventive action"

Ref: This office letter no. TI/OHE/Thermo-vision Camera/2017 dated 24.05.2017

Maintenance Instruction No. TI/MI/0055 titled "Identification of defects on traction installation using thermo vision camera and preventive action" is enclosed herewith for implementation.

This is issued with the approval of PED/TI, RDSO.

(नीरज कुमार वर्मा /Neeraj Kumar Verma)

निदेशक ओएचडी/ Director(OHE-D)

[कृते महानिदेशक (कर्षण संस्थापन)/For Director General(TI)]

Encl: As above

Copy to:

1. The Secretary (Electrical)/Railway Board, Rail Bhavan, New Delhi- 110001 for information please.
2. The Executive Director, M/s Rail vikas nigam limited, First Floor, August Kranti Bhawan, Bhikaji Cama Place, R. K. Puram, New Delhi - 110066
3. General Manager (Electrical), M/s IRCON International Limited, C-4, District Centre, Saket, New Delhi, Delhi 110017
4. M/s Power Grid, Qutub Institutional Area, Katwaria, sarai, New Delhi-110016

**Government of India, Ministry of Railways
Research Design & Standards Organisation, Manak Nagar, Lucknow – 226011.**

**MAINTENANCE INSTRUCTION FOR IDENTIFICATION OF DEFECTS ON TRACTION INSTALLATION
USING THERMO VISION CAMERA AND PREVENTIVE ACTION.**

- 1.0 SCOPE:** This instruction stipulates the guidelines for prediction/identification of defects on Traction Installation Equipments using Thermo-vision Camera.
- 2.0 APPLICATION:** All Traction Installations of OHE, PSI, RC, Stations etc.
- 3.0 OBJECTIVE:** To predict/identify defects and to rectify the same by carrying out Preventive Maintenance before in-service failure of equipment.
- 4.0 DETAILS OF SPECIAL MAINTENANCE INSTRUCTIONS:**
- 4.1 Periodicity of Inspection:** Half-yearly or any other guideline issued by Railway Board and RDSO. However, PCEE may decide more intensive periodicity based on local condition of installations, load, pollution level etc.
- 4.2 Recording of the Image:**
- The image of the complete assembly should be taken and not of individual sub components since the analysis is based on relative temperature of sub-components and not on ambient temperature. For example: if a G Jumper needs to be analysed then complete G Jumper and PG clamps are to be recorded in one picture.
 - The focus of the image should be best possible for better analysis.
 - It is to be ensured that the images are to be saved sequentially in BMT/IS2 format or any other heat pictures format only and not as JPEG. Necessary settings should be made in the camera before starting the imaging.
 - Night time is the best to record the images as the temperature difference is clearly seen.
 - For bridging interrupters at SP and BM/Isolators in normally open condition, recording is to be done after closing the equipment. For standby AT at station/TSS, recording is to be done after connecting it to the load.
 - The checking should preferably be carried out when there is load in the concerned component.
 - Zonal Railways may standardize system of components for better identification.
 - One spare memory card and battery should be kept with Thermo vision camera while capturing the image in the sections.
 - Emissivity (ratio of the energy radiated from a material's surface to that radiated from a blackbody at the same temperature and wavelength and under the same viewing conditions) should be kept between 0.88 to 0.95.
- 4.3 Maintenance of Records and Analysis for identifying defective components:**
- Trained Supervisor/Technician will note the details (recommended format given below, however railway may adopt better format and recommend to RDSO) in a register as well as in computer excel sheet or other program suitable for filtering and analysis but uniformly in the zonal railway. The memory card of thermal image camera along with the register is used to compile data and scrutiny. The images should be stored in the computer/External memory so that these can be retrieved in future. The details should be filled without spelling mistakes for future filtering and analysis.

DEPOT	SECTION	SUB-SECTION	LOCATION	NAME OF SUBCOMPONENT & NUMBER	IMAGE NO	DATE OF IMAGING

Page 2 of 2	Effective from 26.10.2017	Maintenance Instruction No. TI/MI/0055
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MAX. TEMP OF SUB-COMPONENT	MIN. TEMP. OF SUB-COMPONENT	TEMP DIFFERENCE	PRIORITY OF RECTIFICATION	CAUSE OF DEFECT NOTED DURING PREVENTIVE MAINTENANCE	RECTIFICATION DONE
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- b) In each image the temperature of different similar sub components are to be marked using the marking tool in the camera software. Correct marking over the sub-component is to be ensured by hovering the mouse-pointer over the sub-component to get the maximum temperature.
- c) After marking the points the temperatures are recorded and displayed in the image.
- d) In the software it should be possible to change the image into different palettes by which the image could be analysed more accurately.
- e) It is also possible to change the maximum and minimum temperature-range-scale to get the hot spot more clearly if the temperature difference is not substantial.

4.4 RECTIFICATION: After all the images have been analysed, following points are to be noted:

NOTE: Any defect identified during thermos-vision camera imaging at site, requiring immediate attention, should be reported to Depot-In charge, TPC, Officer-In charge and immediate rectification should be ensured.

- a) The records, as per 4.3 above, should be filtered on the basis of temperature difference of 5 degrees and above.
- b) A copy of the data made by the nominated Supervisor/Technician is also given to the TPC to note day to day progress.
- c) Defective PG clamp, catenary wire and jumpers should be attended on priority.
- d) Priority of rectification shall be based on temperature difference as below:

Variation of temperature Compare with adjacent/ nearby similar components	Duration for attending
a- > 20 °C	a. 24 hours
b- 10°C-20°C	b. 5 Days
c- 5°C-10°C	c. 10 Days
d- <5°C	d. Normal

- e) Images of the rectified component should also be taken.

5.0 Agency for Implementation: Railways, Construction Organizations and Railway Electrification agencies (for Measurements defect identification during erection and commissioning).

6.0 References: Railways Feedback was taken for preparing the SMI.

DEPT. SECTION	SUB-SECTION	LOCATION	NAME OF SUB-COMPONENT & NUMBER	IMAGE NO	DATE OF IMAGING
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