



NORTH EASTERN RAILWAY

OFFICE OF THE
CHIEF ENGINEER
GORAKHPUR - 273 012

No.W/275/0/A/Pt-II/4A

Dated: 19-04-2000

The Sr.Divisional Engineers-I,
North Eastern Railway,
Izatnagar, Lucknow, Varanasi, Sonpur.

The Sr.Divisional Engineer,
North Eastern Railway,
Samastipur.

CE's P.Way Circular No. 82 of 2000. ✓

Sub: Summer Precautions - P.Way. ✓

- 1.0 High compressive forces develop in track due to rise in temperature during summer and therefore it is essential that all precautions are taken to prevent buckling of tracks. It is also essential that deficiencies in track, which can cause buckling, should be identified and made good. In this regard track should be inspected thoroughly at all Supervisor and Officers levels.
- 1.1 BUCKLING AND ITS INVESTIGATION. ✓
- i) Tendency towards buckling will usually manifest itself through kinks in the track. Kinks may also arise from incorrect slewing or lifting operations. By tapping sleepers for hollowness, it may be possible to notice if there is any tendency towards vertical buckling
 - ii) As soon as the tendency for buckling is detected, the traffic shall be suspended and the track protected. The track shall then be stabilised by heaping ballast on the shoulders upto the top of the web of the rail obtaining the ballast from inter-sleeper spaces between the rails. Thereafter full investigation shall be made to find out the cause of the tendency for buckling.
 - iii) Each case of buckling shall be investigated by AEN soon after its occurrence and a detailed report submitted to DEN/Sr.DEN.

1.2 Following instructions are being reiterated (from LWR and IRPW Manuals) for guidance/compliance .

2.0 BUCKLING OF TRACK.

Buckling or a tendency towards buckling may occur, among others, in the following circumstances :-

- i) Failure to adhere to the temperature ranges specified for operation on LWR/CWR
- ii) Inadequate resistance to the longitudinal, lateral and vertical movement of track due to deficiencies in ballast section or/and inadequate ballast consolidation.
- iii) Use of ineffective fastenings or missing fastenings resulting in loss of creep resistance and torsional resistance.
- iv) Excessive settlement of formation.
- v) Improper functioning of SEJ.
- vi) Existence of closure rails in LWR.
- vii) Inadequate expansion gaps in FP and SWP track.
- viii) Creep beyond permissible limits.
- ix) Carrying out special works such as deep screening, lifting, slewing etc. of track without adequate precautions.

3.0 PRECAUTION TO AVOID BUCKLING :-

- i) Operation which impair the lateral resistance of track should not be carried out when rail temperature is high.
- ii) The greasing of fish plates is done before the hot weather section.
- iii) Joint gaps should be adjusted before the hot weather after proper gap surveying.
- iv) Creep if any, should be adjusted.
- v) Over tightening of fish bolts should be avoided.
- vi) Particular attention should be paid to stretches of track, which are liable to creep. Jammed joints at such locations should be adjusted. Extra shoulder ballast should also be provided at such locations.

4.0 REGULAR TRACK MAINTENANCE :-

4.1 Regular track maintenance in LWR/CWR includes following operations :-

- i) Tamping/Packing
- ii) Lifting.
- iii) Aligning including minor realignment of curves.
- iv) Shallow screening /shoulder cleaning.
- v) Casual renewal of sleepers.
- vi) Renewal of fastenings.
- vii) Maintenance of SEJs/buffer rails.

Regular track maintenance in LWR/CWR and renewal of fastenings shall be confined to the hours when the rail temperature is between $t_d+10^{\circ}\text{C}$ and $t_d-30^{\circ}\text{C}$ and shall be completed well before on set of summer. If rail temperature after a maintenance operation exceeds $t_d+20^{\circ}\text{C}$, then during the period of consolidation, a speed restriction of 50 km/h on BG and 40 km/h on MG shall be imposed when shoulder and crib compaction has been done and 30 km/h and 20 km/h respectively when shoulder and crib compaction has not been done, in addition to posting of mobile watchman.

4.2 Period of Consolidation:-

Consolidation of track is the process of building up sleeper to sleeper ballast resistance either initially before laying LWR or making up subsequent loss of resistance by one of the following:-

- i) Passage of atleast 3,00,000 gross tonnes of traffic on BG or at least 1,00,000 gross tonnes of traffic on MG when compaction of ballast is done using operated compactors/consolidators or rammers.
- ii) Passage of atleast 50,000 gross tonnes of traffic on BG or at least 20,000 gross tonnes of traffic on MG or a period of 2 days, whichever is later, when compaction is done by means of mechanised shoulder and crib compactor.
- iii) At least one round of stabilisation by Dynamic Track Stabiliser (DTS).

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- iv) For newly laid LWR/CWR, atleast three rounds of packing, last two of which should be with on- track tamping machines.

4.3 Standard Ballast section shall be properly maintained for LWR/CWR and SWP on BG and MG sections (enclosed as per annexure) specially on pedestrian and cattle crossings, curves and approaches to level crossings and bridges. Cess level should be correctly maintained. Dwarf walls may be provided on pedestrain and cattle crossings to prevent loss of ballast. Replenishment of ballast shall be completed before onset of summer.

4.4 DESTRESSING DURING MAINTENANCE:

(Destressing shall be undertaken). whenever abnormal behaviour of LWR/CWR gets manifested in one or more of the following:-

- i) When the gap observed at SEJ -
 - a) Differs beyond limits specified.
 - b) Exceeds the maximum designed gap of SEJ
 - c) When stock /tongue rail crosses the mean position.
- ii) After special maintenance operations.
- iii) After restoration of track following an unusual occurance.
- iv) If number of locations where temporary repairs have been done exceed three per km.

Destressing of CWR shall be done by cutting it into LWRs of about 1- km length which shall be joined after destressing.

4.5 OTHER SPECIAL MAINTENANCE:

- i) Other types of special track maintenance constitute jobs like lowering / major lifting of track, major realignment of curves, renewal of large number of sleepers or rehabilitation of formation/bridges causing disturbance to track. For carrying out such maintenance, the affected length of track may be isolated from LWR/CWR by introducing SEJs or buffer rails as needed.
- ii) Temperature records of the section shall be studied and action taken as perspecified temperature.
- iii) After completion of work, the affected length of track shall be destressed at the required destressing temperature and joined with rest of the LWR/CWR .

4.6 HOT WEATHER PATROLLING:-

Period for regular hot weather patrolling shall be from 1st May to 30th June each year and Patrolling shall be organized by Section Engineer/P.way accordingly. In addition, the Section Engineer/P.way /P.Way Supervisor, Gang Mate and Keyman shall be vigilant during summer and on hot days. Patrolling will also be introduced, when the rail temperature rises above $t_d + 20^{\circ}\text{C}$.

4.6.1 Hot weather patrolling will be carried out as follows :-

- i) On single line or where only one road in a double line section is having LWR/CWR - One patrolman for 2 km.
- ii) On double line section when LWR/ CWR exist on both roads -one patrolman for 1 km length of UP and DN road. The beats of each hot weather patrolman will thus be restricted to 2 km.

4.6.2 The hot weather patrolman should always carry the following equipment:-

H.S Flags- Red	2
Staff for Flags	1
Detonators	10
Canne-a-boule	1

4.6.3 Duties of hot weather patrolman :-

He will walk over his beat slowly over one rail in one direction and on the other rail in the return direction. On double lines, he will repeat this procedure alternately on UP and DN tracks. He will be vigilant and look out for kinks in the rail especially during the hottest part of the days. When a kink is observed, he shall immediately examine at least 100 sleepers ahead and in the rear of the kink for any floating condition of track. He should meticulously sound each and every sleeper, 100 sleepers on either side of the kink, to determine any floating condition. The sounding will be done by dropping a canne-a-boule on each end of the sleeper to determine the extent of void under the sleeper. Should the sounding reveal a 'floating' condition, under which a buckle may be anticipated or the patrolman has detected actual buckling of track, he will take immediate steps to protect the affected portion by display of hand signals as per rules in force. After protecting the track, the patrolman will arrange to advise the Gangmate, PWM, PWI of his apprehension of a buckle/actual buckle.

- 4.6.4 The Gangmate on receipt of advice of a danger of buckle, will proceed to the site quickly with all available men. On arrival at site, he will first ensure protection of affected portion. He should then inspect the condition of track 100 m on either side of this suspected zone and commence heaping of surplus ballast, if available,

on the shoulders and upto the rail head and keep on compacting the ballast with available tools. **No attempt should be made to slew or align the track or disturb the existing ballast section.** The mate should continue to remain at site till the arrival of P.Way Supervisor/Section Engineer(P.Way). The rail temperature will also be noted by one of these officials at the place of apprehended/actual buckle. The rail facing the sun will be covered upto the level of rail head on the outside by ballast or leaves, etc. to bring down the temperature of the rail.

4.7 MOBILE WATCHMAN

- a) He shall be posted, till period of consolidation is over, on stretches where after maintenance operation, rail temprature has exceeded $t_d + 20^{\circ}\text{C}$ during the period of consolidation as mentioned in para 3.2 above.
- b) The mobile watchman would patrol such section /beat to look for prominent kinks, incipient buckles or tendency towards buckling, rail/weld frcture, and excessive gaps at SEJs.
- c) He shall protect the track at site if any of the situations as given in 4.5 (b) above occures and report the same to nearest Station Master /Section Engineer/P.Way/Gangmate

5.0 DUTIES

5.1 KEYMAN

Keyman shall watch for unusual features and on noticing any buckling tendency or damage to track, shall take necessary action to protect the track and report the same immediately to nearest Station Master /Section Engineer(P.Way)

5.2 GANGMATE/PERMANENT WAY SUPERVISOR:

- i) They shall ensure that hot weather patroman turn out on duty during the specified patrol period and carry out the patrolling duties correctly. They shall be vigilant during hot weather and order patrol if the temperature is likely to reach $t_d + 20^{\circ}\text{C}$ and report to their supervisors any unusual occurances which take place on the LWR/CWR in their beat.
- ii) They shall impose the specified speed restriction as mentioned in para and post watchman if the temperature exceeds $t_d + 20^{\circ}\text{C}$ during the period of consolidation after the maintenance work had been completed.

- iii) They shall make up the shortage of ballast at isolated/vulnerable location and report any ballst deficiency or disturbance of track to the Section Engineer /P.Way.
- iv) They shall inspect SEJ and LWR/CWR under their jurisdiction frequently, specially during the hottest part of the afternoon in summer and report any unusual occurances on LWR/CWR to Section Engineer/P.Way and obtain his order.
- v) They shall ensure that men working under them have knowledge of working on LWR/CWR.

5.3 SECTION ENGINEER/P.WAY(INCHARGE OF SECTION/SUB-SECTION)

- i) For making arrangements for patrolling of track in hot weather and post mobile watchman as and when required. They will ensure that patrolmen and mobile watchman are issued proper equipments for carrying out patrolling.
- ii) They shall inspect LWR/CWR under their jurisdiction frequently, specially during the hottest part of the afternoons in summer to look out for unusual features, tendency towards buckling and check patrolling.
- iii) They shall ensure that all maintenance staff under them are fully aware of their duties and responsibilities at all times with regard to maintenance of LWR/CWR.
- iv) They shall impose necessary speed restriction, in case the temperature exceeds $t_d + 20^{\circ}\text{C}$ after the maintenance work has been completed on LWR/CWR for the period of consolidation.
- v) They shall ensure proper maintenance of the ballast section of the track and shall arrange to complete replenishment of ballast before the onset of summer.
- vi) They shall invariably carry PCP set with them on trolly during their inspection during summer months.

5.4 ASSISTANT ENGINEER:

- i) He shall ensure that all remedial action for LWR/CWR's showing unsatisfactory behaviour are taken in time.
- ii) He shall give certificates that all the LWR/CWR in his jurisdiction are behaving satisfactory. He would arrange to send the LWR/CWR register for scrutiny of DEN/Sr.DEN once in a year before summer.

5.5 DIVISIONAL ENGINEER/SENIOR DIVISIONAL ENGINEER:

- i) He shall make arrangements for sufficient quantity of ballast required for LWR/CWR sections.
- ii) He shall scrutinize LWR/CWR registers of his jurisdiction every year in the month of February and record his certificate about satisfactory behavior of LWR/CWR in his jurisdiction. He shall refer the details of all LWR/CWR to territorial Chief Engineer where he requires his orders/decision.

6.0 REPAIRS TO BUCKLED TRACK.

EMERGENCY REPAIRS:-

If a buckling does occur or appears imminent, the track should be protected immediately with hand signal flags and detonators as per the protection rules laid down. Effort should be made to bring down the rail temperature by covering the rails with leaves or sprinkling the water etc. The buckled rails shall then preferably be cut adequately apart not less than 6.5 metres. The track shall then be slewed to the correct alignment and cut rails of the required length shall be inserted to close the gaps making due provision for welding of joints on both rails. The cut rails shall then be connected by use of special fish plates and screw clamps and the line opened to traffic with speed restriction of stop dead and 20 kmph for first train and subsequent train non stop 20 kmph.

Particular care must be taken to see that the factors which contributed to the buckling i.e. jammed joints, seized fishplates or shortage of ballast receive appropriate attention without delay.

PERMANENT REPAIRS:-

- i) As soon as possible the clamped joints shall be welded. Additional pair of cut rails and rail cutting equipment shall also be required to adjust the gaps in case they have been disturbed in the intervening period. The speed restriction shall be removed after welding.
- ii) The entire panel shall be destressed as soon as possible.

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