भारत सरकार **GOVERNMENT OF INDIA**
रेल मंत्रालय **MINISTRY OF RAILWAYS**
(रेलवे बोर्ड **RAILWAY BOARD)**

No.2009/M(C) /137/1 Vol (ii) New Delhi, dated 13.06.2017

The Chief Mechanical Engineer
All Indian Railways

ED/Carriage/RDSO

Sub: Brake binding in coaches

Ref: (i) CME/SR's D.O. letter No. M/CW/271/BB dated 11.5.2017
(ii) CME/SR's letter No. M/CW/271/BB Vol (II) dated 06.6.2017

CME/SR vide his letter dated 11.5.2017 (refr.(i)) has informed that certain actions have been taken by SR, in order to address the issue of Brake binding. Many of these actions were based on the suggestions arising out of Small Groups Activity. CME/SR vide his letter dated 6.6.17 (refr.(ii)) has given details of the Small Groups Activity, and has annexed the list of suggestions that were accepted for implementation. As informed by CME/SR, these actions have resulted in a reduction of 32% of brake binding cases during 2016-17.

Brake Binding continues to be a major source of Punctuality Loss on IR. Out of a total of 1439 cases of Punctuality loss in 2016-17, 372 cases (i.e. the more than 25%) cases were due to Brake Binding.

Therefore, other Railways are requested to examine the initiatives taken by SR, and initiate similar actions on their Railway, wherever considered feasible.

RDSO shall also review the steps taken by SR in this regard and standardize the same, wherever considered feasible.

The letters of SR at ref. (i) & (ii) are enclosed.

13/6/2017

(Dimpy Garg)
EDME(Chg)/RB

Copy to: PSO to MRS for the kind information of MRS
PPS to AM/ME for the kind information of AM/ME

SOUTHERN RAILWAY

Headquarters Office
Mechanical Branch,
Chennai -600 003

No.M/CW/271/B.B.Vol.II

Date: 06.06.2017

EDME/Chg
Railway Board,

Sub: Brake binding in ICF Type coach
Ref: Railway Board letter no. 2009/M(C)/137/1 Vol (II)
dated 01/06/2017

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During 2015-16, 70% of the punctuality loss cases were pertaining to air brake system. This trend was continuing in 2016-17 also. Hence, this item (brake binding in coaches) was taken as a mission area for improvement during July 2016. A Task Force comprising knowledgeable supervisors from workshop, coaching Depots and diesel sheds was proposed to be formed to study and analyse the various causes for brake binding and suggest remedial measures. 27 employees (26 supervisors and one technician) were identified and a brain storming session was held on 17.08.2016. The manufacturers of air brake equipment were also called and representatives from M/S Knorr Bremse participated. The brainstorming session highlighted the various problems and solutions. The improvement suggested by M/S Knorr Bremse were also noted.

As a follow up of the first meeting, a Review meeting was held on 27.10.2016 and it was decided to form small groups with a mentor to formulate and identify actionable points for improving systems to reduce brake binding. Accordingly 5 groups each with 4 to 5 supervisors headed by a Senior Scale Officer as mentor was formed on 01.11.2016.

Group - I – For POH of air brake equipment
Group - II – For pit line activities during Primary Maintenance
Group - III – For sickline / IOH activities.
Group - IV – For Air brake on Loco and platform activities
Group - V – For DV defect analysis.

The groups were advised to study the existing practices, possible improvements, training requirements, material deficiencies, etc and submit reports.

The group also attended a session on "Statistical Tools for problem Analysis" at DTTC/GOC for training the members on Statistical Analysis of the problems.

Based on the reports submitted by the groups, a presentation was organised at HQ, which was chaired by CME in the presence of Dr. Venkatesh Balasubramanian, Professor /IIT /Madras. The Professor evaluated the presentations and suggested certain improvements for finalising the findings.

The reports were scrutinized and the actionable points which can be readily implemented by workshops and coaching depots with target dates were advised (copies enclosed). These points are made as a checklist for auditing by HQ officers for inspecting the workshops and depots. The other points for implementation which are medium and long term will be advised after ensuring compliance of above points.

The comparative figures for incidence of brake binding are given below.

Comparative position of brake binding cases for last 3 years					
Year	Total No. of cases	No. of Other Rly cases	No. of. SR cases	Avg. Coach holding (ICF)	No. of cases per 100 coach holding
2015-16	147	30	117	6352	1.84
2016-17	112	34	78	6270	1.24
2017-18 (April - May)	12	8	4	6239	0.38

However, there is need for constant vigil to sustain and to make continual improvement. Another review is being planned to take the initiative forward.

(R.Kuppan)
Chief Mechanical Engineer/SR

O/c

(2)

TASK FORCE INSTRUCTIONS - DIVISIONS

S. No.	Observations of Task Force Teams	Directions from HQ for implementation with immediate effect	
1	Braking takes place in a taper; BMBC fitment and level maintenance should be ensured during pit maintenance and single car test in depots & workshops	A drive should be carried to monitor the slackness of mounting bolts of BMBC and connecting level of brake rigging. The results should be advised to HQ by the target date	
2	Endurance test of BMBC should be conducted during IOH and endurance testing gadget as like CBE could be adopted	(a) Endurance test of BMBC should be conducted during IOH, (b) Endurance Test Gadget of CBE model should be implemented in all depots	
3	Overhauling of Dirt collectors should be done during scheduled maintenance and overhauling of Common Pipe Brackets of DV is to be compulsorily undertaken during IOH.	Overhauling of Dirt collectors should be done during scheduled maintenance and overhauling of Common Pipe Brackets of DV is to be compulsorily undertaken during IOH.	
4	New DVs are overhauled at Workshops after serving five years. Fitting a four and half year old DV is not advised during POH.	A drive should be carried out with immediate effect to identify the DVs serving beyond the expiry date of overhauling and changed with overhauled DV	
5	Stainless steel wire ropes of short and long are better for use as the material is user friendly for fitment and operation	Divisions shall replace existing mild steel release wires to stainless steel	
6	To detect the minor crack in Common Pipe Bracket of DVs, Soap solution testing, as practiced in WB depot of C.Rly during IOH, should be followed in SR also.	Soap Solution Test should be conducted to detect the minor crack in common pipe bracket of DVs cted and recorded during Single Car Test	
7	Availability of dowel pins in common pipe bracket of DVs should be ensured	Availability of dowel pins in common pipe bracket of DVs should be ensured and recorded during Single Car Test	
8	Release Chokes should not be removed in open line as the inherent inexhaustible feature of graduated release system of air from BC is affected	Removal of release chokes from DV in open line is not permitted. The availability of the same should be ensured during primary maintenance of coaches.	
9	To detect leakage in DVs, a test may be incorporated during rake testing in which the FP should be charged fully and pressure build up in BP line should be observed. Any build up of pressure indicates leak in DV.	To detect leakage in DVs, a test should be incorporated during rake testing in which the FP should be charged fully and pressure build up in BP line should be observed. Any build up of pressure indicates leak in DV.	

S. No.	Observations of Task Force Teams	Directions from HQ for implementation with immediate effect	
10	For easy identification of AC arch link (412 mm) from the group of non-AC link (405 mm) – yellow paint identification can be done as done in CBE depot	Yellow paint identification of AC brake link to distinguish from Non-AC should be done while stocking the material in depots to prevent inter-mixing.	
11	Fusing/Burning of nylon filter elements of dirt collector and nylon washer of flexible hoses was noticed due to welding working without proper earthing and non-use of correct size crocodile type electrodes.	Divisions should organize periodical training for welders to educate the correct welding practices.	
12	Dirt collector could not be opened from top due to want of space with the trough floor	A special drive should be conducted to all base coaches to identify dirt collectors touching the trough floors. This should be rectified during IOH.	
13	Releasing of air from AR should be meticulously followed after placement of rakes in pitline for primary maintenance as during this activity (a) moisture from AR is vented out and (b) no air from AR tank is the symptom of defective NRV	The vital activity of release of air from AR should be recorded in RS register by the duty supervisor indicating any symptom of defective NRV noticed.	
14	To prevent twisting of flexible rubber hoses, the swivel nut end should be connected only after connecting with the BC.	(a) During train examination it should be ensured that the flexible hoses connecting brake cylinder system are connected without any twist. (b) Whenever air hose flexible pipe lines are replaced at pitlines / sick lines / platforms / yards / midsections it is the responsibility of the supervisor / technician-in-charge to ensure that the swivel end of the pipe are connected only after connecting the other end with the BC.	
15	Presently low density white Teflon tape is used for air pipe lines but in outside industries it is used for water pipe lines. High density yellow Teflon tape of industrial standard should be used in place of white for better sealing of air pipe lines.	Yellow, Gas tapes, should be tried as a trial measure, for thread sealing. The results should be advised to HQ for permanent implementation.	
16	Soap solution testing in rigid BP/FP joints is followed in WB depot of CR during IOH	Soap Solution Test should be conducted to detect the minor crack/leak in joints of BP/FP steel pipe lines and recorded during Single Car Test	
17	To check NRV in pitline, BP pressure should be charged first and ensure 'no pressure' indication in FP gauge. Otherwise, any pressure build up in FP indicates leaky NRV.	To detect defective NRV, a test should be ensured during rake testing in which the BP pressure should be charged first and tested for 'nil pressure' indication in FP gauge.	

S. No.	Observations of Task Force Teams	Directions from HQ for implementation with immediate effect	
18	Though the general quality of K-type composite brake blocks are satisfactory, certain cases of brake block failures in the supply of M/s. Daulatram noticed in TPJ division.	It is the duty of the rake supervisor to monitor continuously the performance & quality of the brake blocks. Any deviation should be recorded in RS register for further analysis by depots.	
19	(a) Groove (step) formation on the bulb cotter of brake hanger pin during service makes the cotter removal difficult during en-route brake binding attention, since the step formation of the bulb cotter will entangle with hanger pin washer, (b) Gadget with back plate pushing attachment and holding jaw to push the hanger top pin from the head to release cotter was developed by the team of TVC division, (c) Same gadget can be used to remove the pin No.1 connecting truss beam and floating lever.	(a) Sr.DME/TVC should assist other divisions in development of similar gadget to be kept in platform depots. (b) Other divisions, should put in use in major platforms as an initial measure	
20	Crown clearances in SLR and GS coaches to be maintained strictly so that excessive downward movement of bogie frame can be prevented (to be recorded during Single Car Test)	During Single Car Test, the Crown clearances in SLR and GS coaches to be ensured strictly and recorded	
21	In Workshops and Open line depots, hand brake indication showing ON-OFF position should be provided in all SLRs below hand brake wheel in the lead screw housing box. This will show the applied/non-applied condition to be ensured from outside.	In addition to ON-OFF marking near the hand brake wheel of SLRs, additional marking below hand brake wheel in the screw housing should be done to indicate the applied/non-applied condition to be ensured from outside	
22	Gauges calibrated once in six months only to be provided in test rigs and in SLRs.	Date of calibration and due date to be marked in BP and FP pressure gauges provided in test rigs and in SLRs.	
23	Flexible hose to be coupled with test rigs shall have quick couplers for easy connection with the rig as like in CBE depot.	Flexible hoses utilized for connecting with test rigs shall have quick couplers of CBE model for easy connection with the rig	
24	Air dryers in compressors in yard/sickline should be in good working condition	Availability and working of air dryers in air compressors utilized in coaching depots is mandatory. Divisions should rectify the short comings and confirm 100% working of compressors before the target date	
25	At GSN, air compressor is at one end of the pit line and test rig is on the other end; to avoid moisture contamination in the lengthy pipe line, an additional air reservoir and air dryer is planned to provided near the test rig.	All the divisions should identify similar lengthy pipe line arrangement in depots for provision of additional air reservoir and dryer. The exercise should be completed before the target date and advised to HQ	

TASK FORCE INSTRUCTIONS - WORKSHOPS

S.No.	Observations of Task Force Teams	Directions from HQ for implementation with immediate effect	
1	Braking takes place in a taper; BMBC fitment and level maintenance should be ensured during pit maintenance and single car test in depots & workshops	(a) During Single Car Test, the movement of brake piston in level with the brake rigging should be checked and recorded (b) If required, the level of brake rigging should be adjusted with suitable shim at BMBC seat (c) The mounting bolts of BMBC should be tightened fully and ensured	
2	Overhauling of Dirt collectors and Common Pipe Brackets of DV is to be compulsorily undertaken during POH	Dirt collectors and Common Pipe Brackets of DV should be overhauled with fresh kit mandatorily during POH. Difficulties if any should be communicated to HQ before 15.03.17	
3	New DVs are overhauled at Workshops after serving five years. Fitting a four and half year old DV is not advised during POH.	Fitment of DVs during POH should be planned in such a way that the date of overhauling should not expire during the field service.	
4	Stainless steel wire ropes of short and long are better for use as the material is user friendly for fitment and operation	Workshops shall replace existing mild steel release wires to stainless steel during POH	
5	Availability of dowel pins in common pipe bracket of DVs should be ensured	Availability of dowel pins in common pipe bracket of DVs should be ensured during POH and recorded.	
6	Release Chokes should not be removed in open line as the inherent inexhaustible feature of graduated release system of air from BC is affected	Removal of release chokes from DV in open line is not permitted. The availability of the same should be ensured during POH also.	
7	For easy identification of AC arch link (412 mm) from the group of non-AC link (405 mm) – yellow paint identification can be done as done in CBE depot	Yellow paint identification of AC brake link from Non-AC should be done while stocking the material in workshops to prevent inter-mixing.	
8	Fusing/Burning of nylon filter elements of dirt collector was noticed due to welding working without proper earthing and non-use of correct size crocodile type electrodes.	Workshops should organize one day crash course, periodically, exclusively for welders to educate the correct welding practices.	

S.No.	Observations of Task Force Teams	Directions from HQ for implementation with immediate effect	
9	Dirt collector could not be opened from top due to want of space with the trough floor	Workshop should include in their inspection check sheet regarding the availability of working space between the top end of dirt collector and trough floor and corrective action taken during POH	
10	Flexible hose pipes shall be made as a 'must change item' during POH.	All the flexible hoses in air brake system should be dismantled during POH, tested and renewed	
11	To prevent twisting of flexible rubber hoses, the swivel nut end should be connected only after connecting with the BC.	During POH it should be ensured that the flexible hoses connecting brake cylinder system are connected without any twist. The supervisor / technician-in-charge to ensure that the swivel end of the pipe are connected only after connecting the other end with the BC.	
12	Presently low density white Teflon tape is used for air pipe lines but in outside industries it is used for water pipe lines. High density yellow Teflon tape of industrial standard should be used in place of white for better sealing of air pipe lines.	Yellow, Gas tapes, should be tried as a trial measure, for thread sealing. The painted number of trial coaches should be advised to HQ for monitoring in the open line.	
13	Soap solution testing in rigid BP/FP joints is followed in WB depot of CR during IOH	During POH, Soap Solution Test should be conducted to detect the minor crack/leak in joints of BP/FP steel pipe lines should be conducted and recorded during Single Car Test	
14	Crown clearances in SLR and GS coaches to be maintained strictly so that excessive downward movement of bogie frame can be prevented (to be recorded during Single Car Test)	During Single Car Test, the Crown clearances in SLR and GS coaches to be ensured strictly and recorded during POH	
15	In Workshops and Open line depots, hand brake indication showing ON-OFF position should be provided in all SLRs below hand brake wheel in the lead screw housing box. This will show the applied/non-applied condition to be ensured from outside.	In addition to ON-OFF marking near the hand brake wheel of SLRs, additional marking below hand brake wheel in the screw housing should be done during POH to indicate the applied/non-applied condition to be ensured from outside	

The reports were scrutinized and the actionable points which can be readily implemented by workshops and coaching depots with target dates were advised (copies enclosed). These points are made as a checklist for auditing by HQ officers for inspecting the workshops and depots. The other points for implementation which are medium and long term will be advised after ensuring compliance of above points.

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