



भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
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Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
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MC/CTRB/Defects

Date: 22.08.2019

**Chief Rolling Stock Engineer (Coaching),
Southern Railway,
Park Town,
Chennai – 600 003**

Sub: En-route detachment of coach No. SR 16802/C LWCBAC from Train No. 12625 TVC-NDLS (KERALA EXPRESS) at Itarsi (ET) Railway Station of West Central Railway on 30.06.2019.

Ref: (i). Southern Railway letter No. V/M.226/USF dated 21.08.2019.
(ii). West Central Railway letter No. WCR/M/C/02/404 Vol-V dated 24.07.2019.
(iii). This office letter No. MC/CTRB/Defects dated 29.03.2019.
(iv). This office letter No. SV.FIAT dated 03.04.2018 & 15.05.2018.

Vide letter under reference (ii), an en-route detachment of coach No. SR 16802/C LWCBAC from Train No. 12625 TVC-NDLS (KERALA EXPRESS) at Itarsi (ET) Railway Station of West Central Railway on 30.06.2019 has been reported. It has been concluded in the report that the wheels with heavy shelling might have been ignored during maintenance at KCVL which produced excessive vibrations in service resulting in primary vertical damper broken, control arm lower part dropped, upper control arm lug broken and axle end cover (R6) dropped in section. It is also mentioned in the report that control arm bolts of coach No. SR 16802/C LWCBAC were found loose against specified torque of 170 N-m.

Vide letter under reference (i), it is intimated that coach was marked sick on 21.05.2019 for R6, R7 control arm lug broken, R7 primary inner coil spring broken, R7 wheel shelled tread and the coach was made fit on 26.05.2019 with D3 attention/schedule given to coach at KCVL. It has also come to notice that R6 control arm was not replaced despite R6 control arm lug was found broken on 21.05.2019. D2 schedule of this coach was also due, D3 schedule given to this coach on 26.05.2019.

In view of above, the following may please be strictly complied with:

- i. Wheels with shelling beyond limit set by the letter under reference (iii) must be timely removed from service at Coaching Depots. Shelling in wheels must not be allowed to increase to levels of heavy shelling.**
- ii. Maintenance & fastening of control arms at Depot level must be ensured in terms of letter mentioned under reference (iv).**

DA: As above.


25-8-19

**(Shobhit Pratap Singh)
Jt. Director/VDG/Carriage
for Exe. Director (Stds.)/Carriage**

Copy to: for kind information please.

1. DME/Coaching, Railway Board, Rail Bhawan, New Delhi – 110 001

2. Chief Rolling Stock Engineer (Coaching),

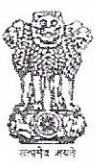
- i. Central Railway, Chhatrapati Shivaji Terminus, Mumbai - 400 001
- ii. Eastern Railway, Fairlie Place, Kolkata - 700 001
- iii. Northern Railway, Baroda House, New Delhi - 110 001
- iv. Western Railway, Churchgate, Mumbai - 400 020
- v. West Central Railway, Jabalpur - 482 008

- vi. North Central Railway, Allahabad - 211 001
- vii. North Western Railway, Jaipur - 302 006
- viii. North Eastern Railway, Gorakhpur - 273 001
- ix. Northeast Frontier Railway, Maligaon, Guwahati - 781 011
- x. South Central Railway, Rail Nilayam, Secunderabad - 500 071
- xi. South Eastern Railway, Garden Reach, Kolkata - 700 043
- xii. South Western Railway, Hubli - 580 023
- xiii. South East Central Railway, Bilaspur - 495 004
- xiv. East Coast Railway, Chandrasekharpur, Bhubaneswar - 751 016
- xv. East Central Railway, Hajipur - 844 101
- xvi. Konkan Railway Corp. Ltd. Corporate office Belapur Bhawan Nawi Mumbai - 400 614

DA: As above.


22-8-19

(Shobhit Pratap Singh)
Jt. Director/VDG/Carriage
for Exe. Director (Stds.)/Carriage



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MC/CTRB/Defects

Date: 29.03.2019

Principal Chief Mechanical Engineers,

1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai - 400 001
2. Eastern Railway, Fairlie Place, Kolkata - 700 001
3. Northern Railway, Baroda House, New Delhi - 110 001
4. Southern Railway, Park Town, Chennai - 600 003
5. South Central Railway, Rail Nilayam, Secunderabad - 500 071
6. South Eastern Railway, Garden Reach, Kolkata - 700 043
7. North Eastern Railway, Gorakhpur - 273 001
8. Northeast Frontier Railway, Maligaon, Guwahati - 781 011
9. Western Railway, Churchgate, Mumbai - 400 020
10. East Central Railway, Hajipur - 844 101
11. East Coast Railway, Chandrasekharapur, Bhubaneswar - 751 016
12. North Central Railway, Allahabad - 211 001
13. North Western Railway, Jaipur - 302 006
14. West Central Railway, Jabalpur - 482 008
15. South East Central Railway, Bilaspur - 495 004
16. South Western Railway, Hubli - 580 023
17. Konkan Railway Corp. Ltd. Corporate office Belapur Bhawan, Navi Mumbai-400 614

Sub: Attention to Wheels and CTRBs of the LHB wheelsets observed with heavy wheel shelling.

Ref: (i) En-route detachment of LHB Coach No. SWR 17216/C LWSCN1 from Train No. 12291 YPR-MASExp. on 09.03.2019 due to hot axle at JTJ Railway Station of Southern Railway.
(ii) This office letter no.MC/WA/Genl. Dated 1.11.2017, reiterated on 10.01.2019.

Coach number SWR 17216/C LWSCN1 was detached en-route from train number 12291 YPR-MASExp. at JTJ(Jolarpettai) Railway Station of Southern Railway on 09.03.19 due to high temperature (235°C) of axle box no. R6 detected during rolling in examination. The coach was placed at JTJ Railway Station and affected wheelset was sent to Central Workshop, Mysore for failure investigation.

RDSO official has visited JTJ Railway Station, Southern Railway on 15.03.2019 and Central Workshop, Mysore, South Western Railway on 16.03.2019 for joint inspection of reported bearing (Annexure I).

The affected wheelset No. 171241 was received in Central Workshop, Mysore on 22.02.2019 from CDO/YPR for tyre turning due to deep wheel shelling. The dia. Reduced during tyre turning was 17 mm as per report of Central Workshop, South Western Railway, Mysore dated 09.03.2019. After tyre turning, the wheelset was put in Coach No. 17216/C LWSCN1 on 02.03.2019 & got involved in hot axle case on 9-3-2019.

The affected wheelset was tyre turned after deep wheel shelling i.e. much more than prescribed criteria issued by RDSO vide letter referred above at Ref. (ii). Heavy shelling leads to huge impact load getting transferred to various load bearing members of bogie, including CTRBs. Due to such impact load, internal mating parts of CTRBs may get damaged, leading to hot axle, as in this case.

Vide this office letter under ref (ii), following limits for wheel shelling were laid down:-

Turning of LHB wheels may be done as per following limits:

- i. *Depth of shelling marks has reached to 1.5mm.*
- ii. *Length of shelling marks has reached to 40mm.*
- iii. *Depth of hollow tyre reached to 3mm. This limit of 3mm is kept to study the effect of wheel shelling and service life of wheels. The rejectable limit of hollow tyre will continue as more than 5mm as specified in IRCA Part IV. During investigation, it has been noticed on many wheels that the formation of hollow tyre precedes the wheel shelling.*

In view of above, the following may pl. be strictly complied with:

1. Wheels with shelling beyond limit set by the letter under reference (ii) are timely removed from service at Coaching Depots. Shelling in wheels must not be allowed to increase to levels of heavy shelling, as happened in the wheelset mentioned above.
2. ***CTRBs of wheelsets requiring tyre-turning on account of shelling / flats beyond permissible limits must be dismantled from wheelset, irrespective of CTRB overhaul due date, & sent for overhaul. These wheelsets should be put-back in service only with overhauled / new CTRBs.***

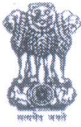
Necessary instructions in this regard may pl. be issued to depots and workshops.

DA: As above



(Samir Lohani)
Executive Director (Stds.)/Carriage

Copy to: EDME/Coaching, Railway Board, Rail Bhawan, New Delhi – 110 001



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No. SV. FIAT

Date: 15.05.2018

**Principal Chief Mechanical Engineer,
Eastern Railway, Fairly Place,
Kolkata- 700 001.**

Sub: Cases of failure of control arm of LHB coaches.

Ref: i. Railway Board's letter No. 2009/M(C)/137/1 Vol. (ii) dated 06.04.2018.
ii. This office letter of even nos. dated 03.04.2018 (copy enclosed).

In terms of the direction given by Railway Board vide reference (i), RDSO official was deputed to C&W Workshop, Liluah from 24.04.2018 to 25.04.2018 for study in one of the cases of coach no. ER 05067/C LWACCW, detached from Train No. 12368 DN on 18.03.2018 at KIUL Junction due to failure of control arms. During the investigation at C&W Workshop, Liluah, following observations have been made:

- 1) The primary damper was found defective during testing on Damper Testing Machine available in the shop.
- 2) The Damper Testing Machine available in the shop was not calibrated while the machine is overdue for calibration. The Damper Testing Machine needs to be calibrated.
- 3) Plain washers were being used despite repeated instructions for use of self-locking washers in the fastening systems of control arms.
- 4) Torque wrench tester was not found available in the shop so as to regularly test the torque wrench before it is taken in the field.
- 5) Torque wrench calibration certificates were not available.

As per records available with Workshop, the detached coach no. ER 05067/C LWACCW was manufactured during 2005 and the control arm was fitted in 2012. Thus, it has been in service for about 6 years. The bolt holes in control arm were found elongated (Figure 1 of Annexure- I) showing that the bolt loosening has taken place. This is likely as it was fitted with plain washers. The damper is fitted on lower control arm, hence load sharing with upper control arm is only through bolts. Once it is loosened, heavier impact will be caused due to 'On-loading' & 'Off-loading' on run. Heavy shear stresses generated at the collar would cause it to shear (Figure 2 of Annexure- I). Once this happened, the full load will come on lower control arm causing heavy bending stresses in lower control arm which have exceeded the yield point limits causing failure (Figure 3 of Annexure- I). This appears to be the mechanism of failure in the present case. However, it will be confirmed only once the M&C report is available.

The deficiencies noticed in the maintenance of this coach were already taken note of while formulating maintenance instructions issued vide reference (ii). A copy of these maintenance instructions is being enclosed herewith again as Annexure- II. It is requested that these instructions may be implemented in the right earnest to avoid such failures.

DA: As above.

(Samir Lohani)
Executive Director/Carriage

Copy to: (i) For kind information and similar necessary action please.

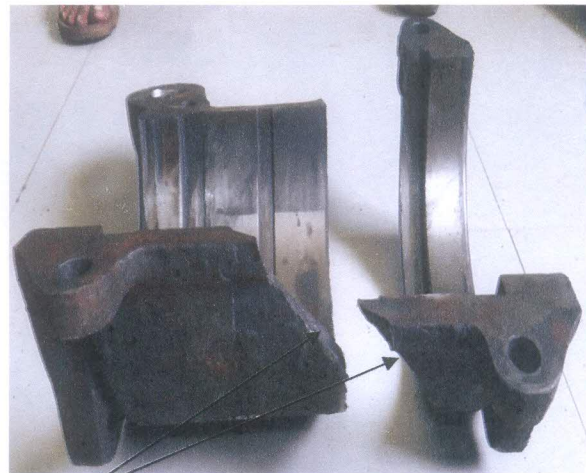
Principal Chief Mechanical Engineer,

1. Northern Railway, Baroda House, New Delhi-110 001.
2. Western Railway, Churchgate, Mumbai-400020.
3. Central Railway, CSTM, Mumbai - 400 001.
4. Southern Railway, Park Town, Chennai - 600 003
5. North East Frontier Railway, Maligaon, Guwahati- 781 011.
6. North Eastern Railway, Gorakhpur-273 001.
7. South Eastern Railway, Garden Reach, Kolkata-700 043.
8. South Central Railway, Secunderabad-500 071.
9. West Central Railway, Jabalpur- 482 001.
10. South East Central Railway, Bilaspur- 495 004.
11. South Western Railway, Hubli- 580023.
12. East Coast Railway, Railway Complex, Bhubaneshwar- 751 023.
13. East Central Railway, Hazipur-844 101.
14. North Western Railway, Jaipur-302 006.
15. North Central Railway, Allahabad-211 001.
16. Konkan Railway Corporation Ltd., Corporate office, Belapur Bhawan, Navi Mumbai – 400 614
17. Integral Coach Factory, Chennai- 600 .38.
18. Rail Coach Factory, Hussainpur, Kapurthala, Punjab – 144 602.
19. Modern Coach Factory, Rae Bareilly – 229120.

(ii) EDME (Coaching), Railway Board, New Delhi – 110 001 – For kind information please.



— Elongated hole in Lower C/Arm Part
(Figure: 1)



— Control Arm Lower Part fresh broken
(Figure: 2)



Control Arm Upper Part – Bolt mounting bracket fresh broken
(Figure: 3)



— Damper Testing on M/C
(Figure: 4)



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No. SV. FIAT

Date: 03.04.2018

Principal Chief Mechanical Engineer,

1. Northern Railway, Baroda House, New Delhi-110 001.
2. Western Railway, Churchgate, Mumbai-400020.
3. Central Railway, CSTM, Mumbai - 400 001.
4. Eastern Railway, Fairly Place, Kolkata- 700 001.
5. Southern Railway, Park Town, Chennai - 600 003
6. North East Frontier Railway, Maligaon, Guwahati- 781 011.
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17. Konkan Railway Corporation Ltd., Corporate office, Belapur Bhawan, Navi Mumbai - 400 614
18. Integral Coach Factory, Chennai- 600 .38.
19. Rail Coach Factory, Hussainpur, Kapurthala, Punjab - 144 602.
20. Modern Coach Factory, Rae Bareilly - 229120.

Sub: Preventive measures for failure of control arm in LHB coaches.

Ref: i. CRSE/WCR's letter No. WCR/M/C/02/404 Vol-V dated 27.03.2018.

ii. This office letter of even no. dated 17.11.2017.

Vide letter under reference (ii) detailed instructions on maintenance of control arm based on the investigations carried out in cases of Control arm bolt loosening were issued to Zonal Railways to overcome the problem of failure of control arm in LHB coaches. Recently, few cases of enroute detachment of LHB coaches due to control arm failure have been reported by WCR vide their letter under reference (i). The instructions on the prevention of such cases are being reiterated below for implementation in the field without any exception.

1. The fasteners used in the control arm shall be of property class 10.9 purchased from the RCF recommended sources only. (RCF letter no. MD44121 dated 21.06.2012).
2. Self locking washers shall be provided in these fastening systems. Plain washers should not be used. Railways shall switch over to Disc lock washers from self-locking washers in shortest possible time.
3. The fasteners should be tightened to a torque of 170 N-m with a calibrated torque wrench. After tightening, a paint mark (permanent marker may also be used) should be made for visual indication in case of loosening of the bolt. This paint marking should be examined in every schedule.
4. The fasteners shall be checked for proper torque in D3 schedule and after checking, a proper paint marking shall be made. In case the paint marking is lost before D3 schedule, the torque should be checked with a properly calibrated torque wrench and a fresh paint marking should be made.
5. The orientation and grouping of inner and outer primary springs should be ensured as per RDSO maintenance instructions CMI no. RDSO/2017/CG/CMI-01 issued in January 2017.
6. The dampers should be checked visually in D1/D2/D3 schedules and in case of any oil leakage, the same should be replaced.

7. All the dampers of the bogie should be tested during SS1 schedule and defective dampers should not be allowed in service. (Instructions for testing of dampers in SS1 were already issued vide this office letter No. SV.FIAT Springs dated 04.01.2017).
8. The control arm should be purchased and replaced as a set only.
9. All the depots should have torque wrench of appropriate capacities alongwith torque wrench tester. The torque wrench should be checked on the torque wrench tester by the concerned employee before it is taken for use in the field. The torque wrench and torque wrench testers should be calibrated as per the periodicities prescribed by OEM/calibrating agencies.
10. Staff should be extensively trained for proper maintenance of these assemblies and use of torque wrench.

In addition to above, maintenance of Control Arm as per Para 4.3.2.12.1 and fitment as per Para 4.6.7 of CAMTECH maintenance manual shall be ensured in workshops and also in depots whenever it is maintained in depots. It may also be ensured that damaged rubber bushes of control arm are not allowed in service.

The failure reports for control arm being received at RDSO do not contain all the relevant details so as to arrive at the root cause of failure. Specifically, failure reports do not provide details on fasteners in other control arms, tightening torque, type of washer etc. which may give a fairly accurate indication of whether proper maintenance was done in last D3 schedule. Accordingly, a standard format for control arm failure data is developed and enclosed herewith as Annexure- I. Zonal Railways are requested to provide the control arm failure data in this format whenever any failure is reported.

It is requested that these instructions may be implemented in the right earnest to avoid such cases of control arm failure in the field.

A drive may be immediately launched at Primary Maintenance depots of all Zonal Railways to comply with these instructions.

DA: As above.



(Samir Lohani)
Executive Director/Carriage

Copy to:

1. EDME (Coaching),
Railway Board, Rail Bhawan,
New Delhi – 110 001. } For kind information please.
2. Executive Director,
CAMTECH, Maharajpur,
Gwalior- 474 005. } For kind information and necessary action please.

PROFARMA FOR REPORTING CONTROL ARM BOLT FAILURES

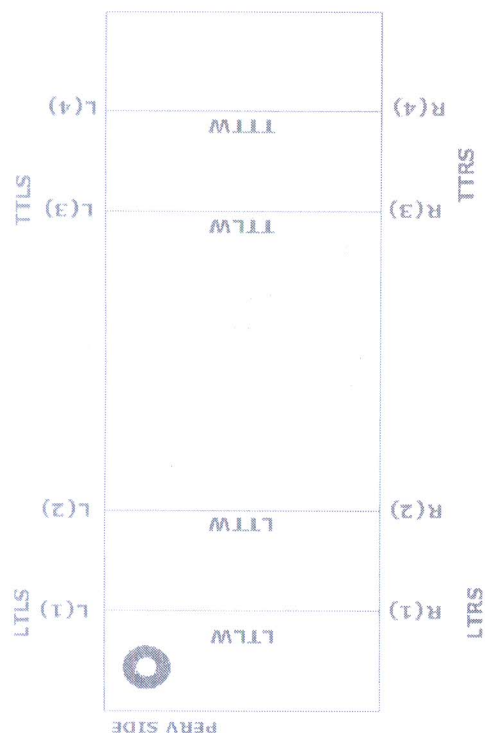
Date of Failure	Train No. & Coach No.	Type of Coach e.g. II AC/III AC etc.	Primary Depot	Location of Control Arm	Make & Class of bolts, Tightening Torque of bolts & type of washer at all locations of Control Arms												Condition of damper at the location of failure	Reason of failure	Remarks or any other information relevant to the failure
					1		2		3		4								
					Bolt	Washer	Torque	Bolt	Washer	Torque	Bolt	Washer	Torque						
				L1															
				L2															
				L3															
				L4															
				R1															
				R2															
				R3															
				R4															

Note: 1) Damper may be working, locked, leaky, free moving etc.

2) Each control arm has 4 nos. of control arm bolts therefore, values of tightening torques, type of washer and make & class of bolt should be indicated for all locations on control arm. Locations of control arms are shown in Figure 'A' & 'B' and locations of bolts are shown in Figure 'C'.

3) Washer may be a self-locking or disc lock washer etc.

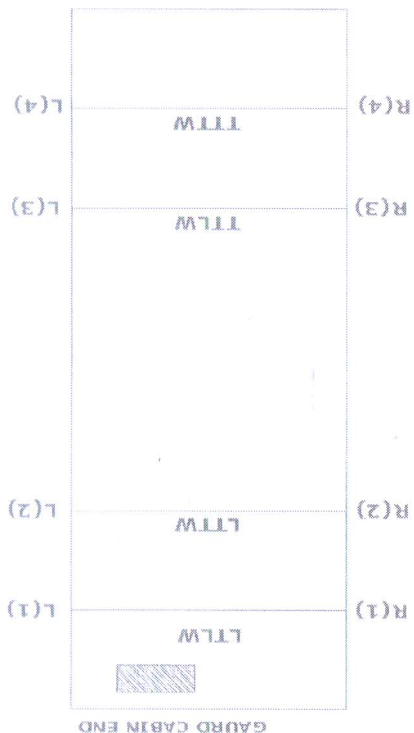
Convention for Locations of Control Arm Bolts



Note: LRTLW(L) will always be counted from Passenger Emergency Relay Valve (PERV) fitment side.

Figure-A: For all type of LHB coaches other than power cars

- LTLS- Leading Trolley Left Side
- TTRS- Trailing Trolley Left Side
- LRTLW-Leading Trolley Leading Wheel
- LRTLW- Leading Trolley Trailing Wheel



Note: LRTLW(L) will always be counted from Gaurd Compartment End & Looking towards generator cabin side.

Figure-B: For LHB power cars

- LTRS- Leading Trolley Right Side
- TTRS- Trailing Trolley Right Side
- TTLW- Trailing Trolley Leading Wheel
- TTLW- Trailing Trolley Trailing Wheel

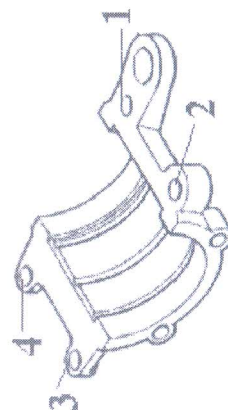


Figure – C: Locations of Control Arm Bolts