

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

No. 2007/ M(C)/137/16/Vol (ix) Part

New Delhi dated 06.03.2017

Chief Mechanical Engineers (All Indian Railways)

Sub: Breakage of Springs of FIAT Bogies


Ref: 1. ED / Carriage / RDSO's letter No. SV.FIAT Spring dated 30.01.2017.
2. CQM / RCFK's letter No.MTQ/12004 dated 25.01.2017

CME/NR has reported an alarming number of cases of coil spring breakage of FIAT bogies. Similar failures have been reported by the other Railways too.

As per the analysis carried out by RCFK and RDSO, most of failed springs pertain to a specific manufacturer, i.e. M/s LPDN Germany. In this regard, RCF vide their letter at reference 2 have advised the Railways to replace the secondary outer springs of LPDN 2012 make as early as possible. The list of coaches / bogies fitted with these springs has been enclosed along with RCF's letter. A committee of CQM/RCFK, DME/Chg./RB, Director/Carriage/RDSO, Sr.DME/Chg/NDLS and Sr.CDO/BCT has also carried out investigation in this matter and their report is enclosed for information.

The Railways are advised to take necessary action of replacing the secondary outer springs of LPDN 2012 make as suggested by RCF and the Committee. RCFK shall supply additional springs to the Railways for carrying out the replacement. The released springs of LPDN 2012 make shall be returned to RCF by the Railways for taking up the matter with the supplier.

The Railways are also advised to scrupulously comply with the maintenance instructions for flexi coil springs in FIAT bogies of LHB coaches circulated vide RDSO's letter at reference 1.


(Shailendra Singh)
Executive Dir. Mech. Engg. (Chg.)
Railway Board

Copy to

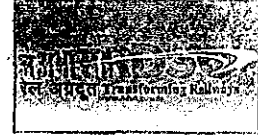
Chief Mechanical Engineer, RCFK : RCFK shall expeditiously supply additional springs for replacement to the Railways. They shall also raise this issue with M/s LPDN and take action, as deemed appropriate.

ED/Carriage/RDSO



भारत सरकार - रेल मंत्रालय
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Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
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No:SV.FIAT Spring

Dated:- 30.01.2017

CMEs,
All Indian Railways
& Production Units

Sub: - Maintenance instructions for flexi coil springs in FIAT bogies of LHB coaches.

Ref:- This office letters of even no. dated 08-12-14, 16-07-15 & 04-01-2017.

Zonal Railways have reported failure of flexi coil springs in FIAT bogies of LHB coaches. The trend in this reporting has suddenly shown a spurt in December 2016 and January 2017. Remedial measures have been suggested from time to time as indicated in the reference. In order to ensure that the latest preventive measures are to be taken into practice, efforts have been made to compile the maintenance instructions with the idea of making it at a single point reference for coil springs in FIAT bogies of LHB coaches. Copy of CMI is enclosed herewith for implementation in the field. It is requested that feedback and suggestion may be given for further improvement in CMI, based on the experience gained in field so that all possible preventive actions are taken to ensure the best maintenance practices implemented and failures in open line avoided.

DA: As above.


(Indrajit Singh)
Executive Director/Carriage

Copy to:

1. AM/PU, Railway Board, New Delhi
 2. AM/ME, Railway Board, New Delhi
 3. EDME/Coaching, Railway Board, New Delhi
 4. ED/CAMTECH, Gwalior : for incorporation in CAMTECH manual.
- for information please.

RAIL COACH FACTORY (KAPURTHALA)

Dated: 25/01/2017

No: MTQ/12004

Director Mech Engg (Coaching)
Railway Board
Rail Bhawan
New Delhi - 110 001

*send list to mech -
is put up in letter
B-213
2/11*

Sub: Breakage of springs of FIAT Bogies of Gatimaan/Rajdhani/Shatabdi trains.

Ref: 1) Your letter no. 2007/M(C)/137/16/Vol(ix)Part dated 03/01/2017.
2) This office letter no. MTQ/12004 dated 09/01/2017.

This is in continuation to our letter referred #2 above, wherein details of the coaches/bogies fitted with LPDN 2012 make secondary outer springs were advised in two annexures; Annexure-II containing coach number on which such springs were fitted and Annexure-III containing serial number of bogies whose coach numbers were not available at that time.

The details of the coaches/bogies fitted with LPDN 2012 make secondary outer springs have now been collected and the final list is enclosed. This list contains 317 records. Some bogies were given separately to Railway/PUs 'B' is mentioned with the bogie number given in 'Coach/Bogie number' column for such cases. The earlier figure of 331 coaches stands correct as some double and incorrect rows have been deleted.

As mentioned earlier, it is advisable to change secondary outer springs of LPDN 2012 make as early as possible.

B. Attri
(B. Attri)

Chief Quality Manager
For Chief Mechanical Engineer

Copy to:

1. All CMEs of Zonal Railways
2. CME/ICF/Chennai
3. CME/MCF/RBL

May kindly advise the concerned railways to whom the bogies mentioned in the attached list have been supplied for necessary action.

Investigation into the Increase in the failures of LHE Springs

1. Introduction

There has been an alarming increase in the failure of LHE Springs. As per the instructions of Railway Board, an investigation into the reasons for the same was carried out by a team comprising of COME/CFK, DME/Coaching/RB, Sr.DME/Coaching/NDLS, Director/Coaching/RDSO, Sr.DME/Coaching and Dy.COM/CFK at NDLS Sikk Line on 13.1.16 & 14.1.16. CRSE/Coaching, Dy.DME/Coaching & Sr.DME/NDLS were also occasionally present during the investigation.

2.0 Data of Spring failures

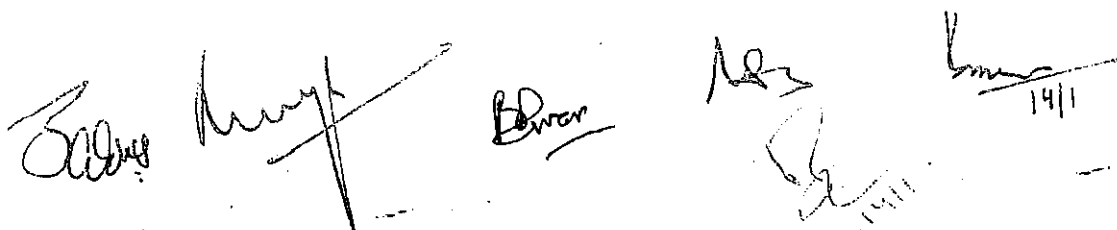
The data collected from the Railways is attached in Annexure A. As per data available with RDSO, most of the failures reported to them pertain to LFDH springs of 2012 batch. Many of these springs have been fitted by RCFK in coaches turned out in 2015 & 2016.

3.0 Observations of Coaches at NDLS Sikk line

A total of five coaches were inspected at NDLS Sikk line on 13.1.17 & 14.1.17. The detailed observations sheets are attached as Annexure B. The summary of coaches inspected and the main discrepancies noticed are summarized below:

- a. 153137 NR LWACCN : RCF New coach.
- b. 153877 NR LWSCZAC: Gatiman coach, RCF in which one spring had been replaced on 13.12.16).
- c. 153801 NR LWCBAC: RCF coach in which one spring had been replaced on 11.1.17. The height of the two Secondary springs on one bogie as indicated on the copper band were 509mm and 503mm. i.e. a difference of 6mm (which is more than the prescribed limit of 2mm).
- d. 153126 NR LWACCN: RBL coach. Copper band were not available in on one of the Secondary springs.
- e. By and large the pairing and orientation of the springs was as prescribed (except for a slight discrepancy in the height of the two secondary springs in coach No.153801 NR LWCBAC).
- f. Dust and Muck was observed on the springs.
- g. Shifting of one spring was noticed in the dome of bolster of Coach No.153877 (Bogie No. 156500). The spring had been replaced at Agra

4.0 Observations of failed Springs at NDLS Sikk line



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A total of 8 broken secondary springs and one primary spring available in the Sick line were inspected. The observations are attached as Annexure C. The main observations are summarized below:

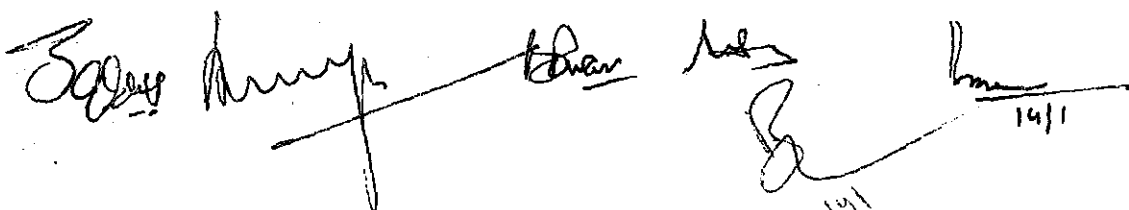
- a. Most of the springs had failed because of fatigue initiated from corrosion pitting.
- b. The springs has broken from the bottom portion. The location of failure was just before or just after the first coil (in four springs, it was after the completion of the first coil, and in two cases it was just before the completion of the first coil). The latter two cases shall be investigated in detail by RDSO, as breakage before the completion of the first coil is not normally seen.
- c. RDSO informed that ghost lines of austenite grains were found towards the core region of the spring cross section as against the requirement of tempered martensite in some of the failed springs of LPDN that were tested in RDSO. The increased failures of LPDN springs may also be due to phosphating not being done by LPDN.

5.0 Action by RCFK:

- a. RCF shall issue a list of the 351 coaches that have been fitted with LPDN make springs of 2012 batch to the Railways. RCF shall supply replacement springs to the depots. The Depots shall replace the LPDN 2012 springs fitted in coaches. RCFK may also consider providing manpower assistance to the extent feasible, especially for the Depots that have a large holding of such coaches. COM/RCF informed that letter and email has been sent to all concerned railways giving details of 192 coaches fitted with these springs. Information regarding balance 139 coaches shall be given soon.
- b. RCF shall take up the matter with LPDN, who shall be asked to replace the springs of 2012 batch free of cost. RCF shall also take other action as deemed necessary against this vendor.
- c. RCFK shall look into the reasons for using these springs after many years of supply and address the systemic deficiencies.
- d. RCFK shall take necessary action to ensure that springs conforming to the specifications are accepted.

6.0 Action by RDSO

- a. RDSO shall issue the consolidated list of instructions for Depot & Workshops which shall also be included in the CAMTECH Manual by issue of Correction Slips.
- b. RDSO wide letter dated 9/12/14 had stated that the direction of alignment deviation in new springs of Griesber and LPDN was 180 degree apart. This is likely to introduce error in fitment. Though RCF have reported that the issue was resolved with LPDN after 2014, this needs to be checked during joint testing in


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the workshops and the alignment hand is to be provided normally. Uniform instructions on fitment of springs, irrespective of make, need to be issued to the Depots.

CRSE has pointed out that washing of springs/bogie with high pressure water jet and subsequent drying as advised by RDSO is not feasible in the D-1 / D-2 or D-3 Schedules carried out at pit line. RDSO shall examine if alternate method of cleaning of springs such as air blowing is feasible. For this, compressor / pipe line with tapping at each coach location shall have to be provided on the pit lines.

- d. A significant No. of failures have been reported of RSK springs also. ED Criage RDSO may issue a specification for the indigenous make springs (including RSK) and ED QA Mechanical RDSO should carryout purchase inspection of both raw material as well as finished springs for LHE coaches, that are purchased from indigenous sources (including RSK).
- e. Based on the data received from the Railways, RDSO shall upload an analysis of spring failure cases, every month on RDSO website. The format for data collection shall include the make of inner / outer springs, lateral and longitudinal bump stop clearances, issues of fatigue, investigation carried out by Railway, etc.
- f. RDSO shall investigate if there is a correlation between the spring failures and cold weather.
- g. The issue of quality of paint was discussed. The existing specification prescribed by RDSO (IS 12744:1988) for primer and IS 8862:2004 for top coat) may not be leading till the next stop schedule after which re-painting has been prescribed. A few leading paint manufacturers may be asked to suggest the proper painting scheme for the springs conforming to the broad requirements given in the FIAT specification No. 17.240. Trials with these paints should be carried out in the new springs manufactured at RSK. Simultaneously, M&C Div. of RDSO shall develop a proper specification for the paint of springs so that it can last between successive stop schedules.

7.0 Action by Depots & Workshops

- a. As per practice at TTDK pit line, LHE coaches are being lifted from one side which may also lead to excessive loading of the springs & rubber pads. Simultaneous lifting of coaches from both sides as prescribed in LHE manual should be ensured.
- b. The practices of spring handling also need to be improved. Proper handling, storage and transportation of springs needs to be ensured, avoid to ground contact during spring handling, lifting, rolling of springs on the ground, etc. may result in paint peeling off, which may lead to failures.

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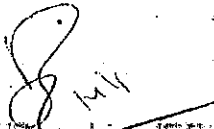
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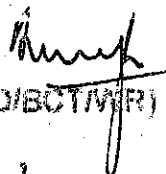
- c. The hardware (nuts) used in bogie assembly should be renewed once they are opened due to any reason as they are prevailing torque type meant for single use.
- d. Depots have reported that it is not feasible to carry out and attend the springs as per Para C(i) of RDSO's letter dated 16/7/2015 in the pit lines, and that coaches may have to be detached for proper spring attention / repair. In order to get an idea as to the extent of the problem, a 15 days drive shall be carried out in the Depots as per format included as Annexure D. Spring fitment issues shall also be looked into during the drive.
- e. Whenever every coach is detached in the Depots for out of course repairs that require coach lifting, the springs shall mandatorily be attended and paint damage attended as per Para C (i) of RDSO's letter dated 16/7/2015 (only paint touch work, particularly in the contact zone, is to be done in the Depots. In case complete spring painting is required, the same shall be done in the Workshops).
- f. Records for the springs fitted in coaches shall be maintained and monitored by the Depots.
- g. It has been reported that the load testing machines are not operational/ available at some of the Workshops. This needs to be ensured. RDSO shall audit the maintenance practices of LHB springs at a few W/s and give a report that the attention as per RDSO's letter dated 16/7/2015, reiterated on 4.1.15, is being given. The workshops shall take corrective / preventive actions based on these audits.
- h. As per data maintained by BCT depot (Annexure E), there is an increase in the rate of spring failure after a life of 6 years. Therefore, the feasibility of replacing springs in the SS3 Schedule (6 years / 24 Lac Km, whichever is earlier) may be examined by RDSO.


(CQM/RCFK)


(DME/Coaching/RB)


Sr. DME/Coaching/RB


(Director Coaching RDSO)


(Sr. CDO/BCT/WR)


(Dy. CQM/RCFK)