PO/CL 515

SUPERSEDES - PO/CL 508

JUSTIFICATION - INFORMATION

Director of Mechanical
& Electrical Engineering
British Railways Board
Railway Technical Centre
London Road
DERBY

Ref: TFR172-9-2(PDA)

Date: May 1988

USE OF HIGH (P30) AND LOW (P15) PHOSPHOROUS CAST IRON BRAKEBLOCKS

1. OBJECT

1.1 Define the method of application by Private Owners to BR in order to obtain acceptance for the use of P30 cast iron brakeblocks (approval for P15 NOT required).

1.2 Define the acceptable limit of cracking allowed in service for both high and low phosphorous cast iron brakeblocks.

1.3 Definition of Terms:-

Term	Definition
Defective	Any fault or faults in a component or assembly; eg. structural fractures or weld fractures, which may prevent the component or assembly from fulfilling its designed purpose.
Renew	Scrap the original part and provide a new part in its place.

2. APPLICATION, ACCEPTANCE AND IMPLEMENTATION OF USE OF P30 CAST IRON BRAKEBLOCKS

2.1 The details of each proposed usage must be submitted to DM & EE BRB for written acceptance before implementation.

Applications should be addressed to:-

DM & EE BRB
FAO. Freight Engineer
Trent House
Railway Technical Centre
London Road
DERBY
DE2 8UP

and should contain the following details:-

2.1.1 Registration numbers of vehicles concerned.

2.1.2 Traffic flows.

2.1.3 Maintenance Agent and location.

2.1.4 Any proposed modification to the vehicle (in accordance with PO/CL 434).

2.2 Implementation will be regulated by the BR Experiments procedure. This will involve the Owner/Repairing Agent who is fitting the P30 cast iron brakeblocks in carrying out:-

2.2.1 Identification of the vehicles as and when fitted, by lettering (approx 25 mm high):-

" EXPT FWXXX* P30 BRAKEBLOCKS "

towards the left hand end of each solebar, or if not possible on the type of vehicle concerned, in an adjacent location.

* BR will advise the experiment reference upon acceptance.

2.2.2 Advice, in writing, to the DM & EE BRB, FAO. Freight Engineer, details of fitting, ie:-

Vehicle Registration Number
Date fitted
Location fitted

(In addition BR will circulate internally to all concerned details of vehicles accepted for fitting).

2.2.3 Reporting to the DM & EE BRB, FAO. Freight Engineer, at periodic intervals details of performance. Sucessful results need only be reported in general terms, but cases of brakeblocks with defects beyond the limits (refer 4.2) should be reported in detail.

3. SUITABILITY OF VEHICLES FOR USE OF P30 CAST IRON BRAKEBLOCKS

Due to susceptability to cracking (refer 4.1) P30 cast iron brakeblocks can only be utilised on brakework which is free from excessive play in the brakeblock holder and rigging, and which presents the blocks squarely onto the wheel tread.

Double blockhanger suspension as commonly used on 3-piece bogies gave trouble in this respect during early trials. It will be necessary to consider these factors before proposing vehicles for P30 brakeblocks.

P30 cast iron brakeblocks are not permitted for vehicles with a maximum speed in excess of 75 mile/h.

4. ACCEPTABLE LIMITS OF CRACKING ALLOWED IN SERVICE FOR BOTH HIGH AND LOW PHOSPHOROUS CAST IRON BRAKEBLOCKS

4.1 GENERAL

P30 cast iron brakeblocks are more susceptible than P15 brakeblocks to cracking caused by the braking duty. Both are designed to retain their mechanical integrity. The following limits apply to both P15 and P30 brakeblocks:-

4.1.1 Through Cracks

Cracks normally develop from the braking surface radially towards the mounting face (or back), being termed 'through cracks' once having propogated through the full thickness of the block. The majority of through cracks develop after the block is half worn.

4.1.2 Open Cracks

Crack width tends to increase in service from 'hairline' to 'open' in which latter condition the adjacent parts of the block are held together solely by the steel insert.

4.1.3 Other Defects

Occasionally cracks develop along the length of the brakeblock between radial cracks, allowing portions of the block to break free.

4.2 LIMITS

The following are the limits of cracking which apply. Brakeblocks found with cracks in excess of the limits shall be renewed.

4.2.1 The number of through cracks permitted in service is limited to six (refer Fig 2).

4.2.2 Open cracks are not permitted.

4.2.3 Broken brakeblocks are not permitted.

Refer to BR 11888, Regulations for Repairing Privately Owned Wagons Running on British Railways, for limits of wear.

4.3 ACTION WHEN DEFECTS ARE FOUND

If a brakeblock, either in service, or on removal because it is fully worn, is found to be broken or with an open through crack the following checks shall be carried out:-

4.3.1 Check brakeblock carrier for defects (eg. loose, missing, worn, damaged parts).

4.3.2 Check brake rigging for defects (eg. loose, missing, worn, damaged parts).

4.3.3 Check brake cylinder pressure in accordance with the specified limits.

4.3.4 If any component/assembly is found to be defective then appropriate remedial action shall be taken.

4.3.5 Note

If brakeblocks are found to exceed the limits of cracking, but no faults can be ascribed to 4.3.1 to 4.3.4 above, it may be necessary to submit the defective brakeblocks to metallurgical examination and/or chemical analysis. The Freight Engineer, DM & EE BRB, will advise the owner if this is required.

5. GENERAL INFORMATION

5.1 The following details those cast iron brakeblocks used on BR, appertaining to Privately Owned Wagons, following the introduction of high Phosphorous cast iron brakeblocks and an exercise in rationalisation. The blocks are designed, incorporating a strengthened steel insert to minimise the occurence of broken blocks.

5.1.1 Identification

In order to assist the user, identification markings are cast on the rear face of the brakeblock. At one end indicating the manufacturer's code, whilst at the other end the block identity code.

5.1.2 Identity Code

The code consists of a character followed by a digit. The character identifies the type of brakeblock, whilst the digit indicates the particular block.

5.1.3 Code Character

R denotes a removable cast iron brakeblock which is secured into its holder by means of a key.

S denotes a solid cast iron brakeblock which has a trunnion hole.

K denotes a brakeblock of composition material which is secured into its holder by means of a key (composition blocks not to be used in lieu of non-availablity of cast iron blocks and vice-versa without prior reference to DM & EE BRB, FAO. Freight Engineer and modification to vehicle brake system).

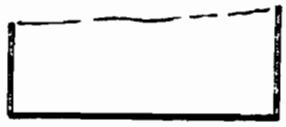
5.1.4 Code Digit

The digit(s) which follows the character, denotes the particular brakeblocks by relating them to a drawing numbers (and catalogue numbers in the case of BR).

Each type of brakeblock has its own series of numbers, ie, R1, R2 etc, S1, S2 etc.

5.1.5 Visual Identification

Removable cast iron brakeblock having a Phosphorous content of 1.2 - 1.5% (P15); square ends without any recesses. Code digit is in the odd number range, ie, R1, R3, etc.



Removable cast iron brakeblock having a Phosphorous content of 2.75 - 3.5% (P30); square ends with a single recess from front to rear at both ends. Code digit is in the even number range, ie, R2, R4, etc.

5.2 BR BRAKEBLOCKS

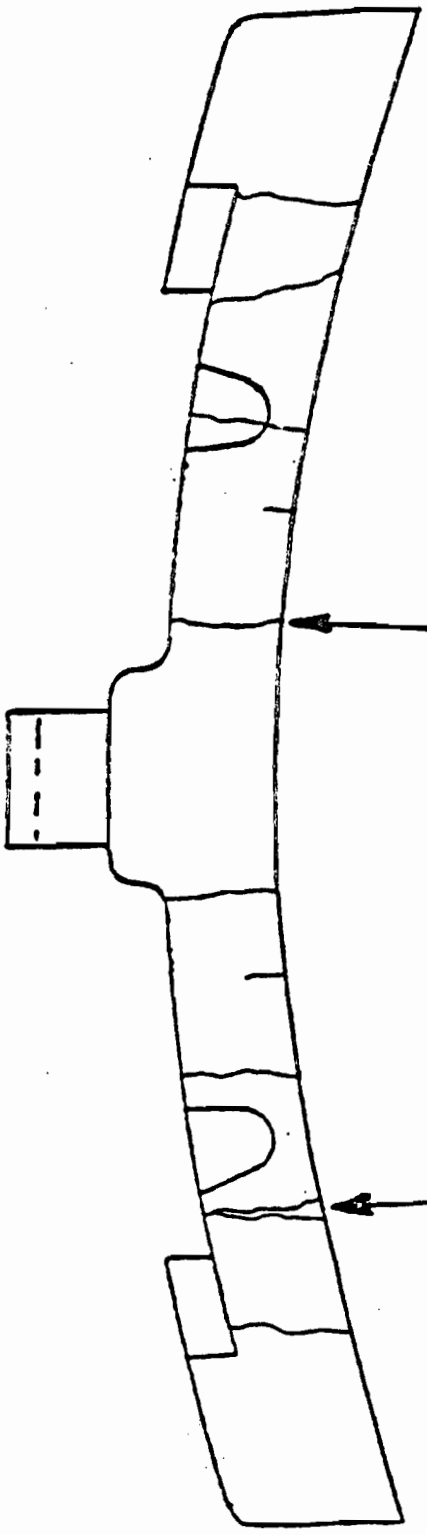
Brakeblock Code	BR Drawing No.	Comments
R1	C-A0-17951/01	P15
R2	C-A0-17951/02	P30
R3	C-A0-17950/01	P15, carflats converted from SR Steam Hauled Coaching Stock.

5.3 UIC BRAKEBLOCKS

UIC Drawing No.	BR Drawing No.	Comments
100 M 3350 0001	F-A1-19432	UIC single block arrangement
	F-A3-19591	(parts list)
100 M 3350 0003	F-A1-19434	UIC double block arrangement
	F-A3-19593	(parts list)

A. J. Humphries

for D C Blake
Director of Mechanical & Electrical Engineering



A 'through crack' spans the full thickness of the brakeblock. This diagram shows **7** such cracks and is therefore unacceptable.

An 'open crack' is where two or more sections of the brakeblock have parted leaving a gap, but are still attached to the block. This diagram shows one open crack and is therefore unacceptable.

Example of UNACCEPTABLE cracking Fig 1

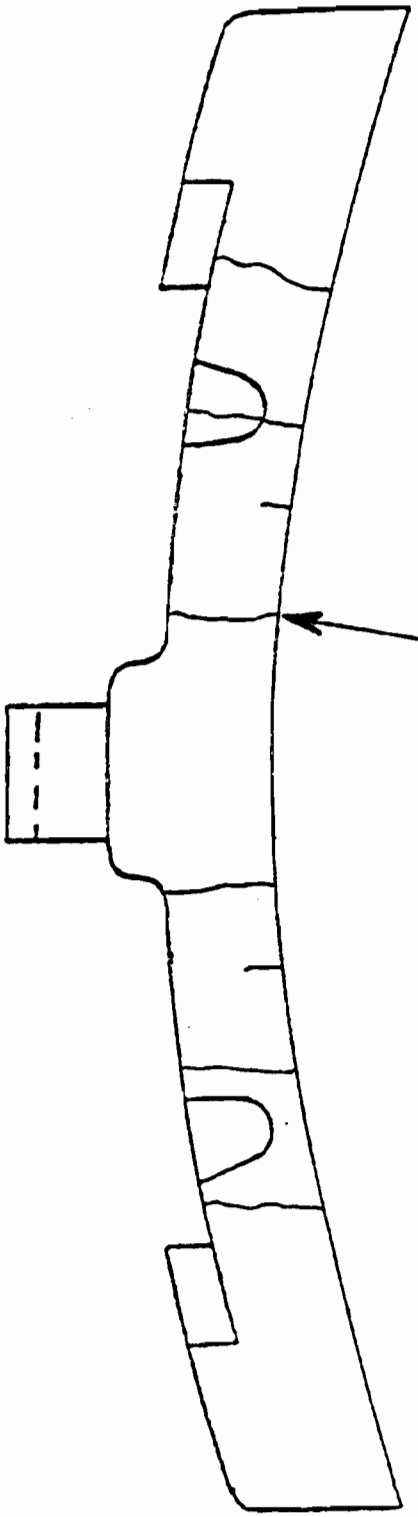


Diagram shows the maximum allowable condition for a brakeblock to be in service.
(i.e. 6 through cracks)

Example of ACCEPTABLE cracking

Fig 2