Use of composite brake blocks (CBB)

- Damage catalogue -

2nd edition

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To enable the cost-effective use of composite brake blocks on freight wagons the following images and descriptions aim to enable potential damage arising during operational use to be:

- correctly recognised and
- appropriately assessed as well as
- supporting decision-making relating to the necessary action.

Monitoring the development of damage is to enable an evaluation of the structural design and the frictional material properties and provide proof of their continued validity as well as identifying potential for necessary optimisation measures.

The basis for this damage catalogue for the assessment of composite brake blocks is formed by the relevant operational assessment criteria according to

- GCU, appendix 9, annex 1, code 3.2.2 and appendix 10, chapter A, point 3.8

For the assessment of the wheelsets and brake blocks the established criteria of the railways essentially remain valid.
For composite block braked vehicles the following specific points are also to be considered.

Index of damage images for composite brake blocks

Index of damage images for wheel treads

1.1 Cracked through to plate

Designation: Radial crack in friction material from the rubbing surface to the plate

Appearance:

Actions:

Block replacement necessary (see GCU, appendix 9, annex 1, code 3.2.2)

1.2 Shelling of the friction material

Designation: Shelling of the friction material along more than ¼ of the length of the block (correlates to total length > 63mm for 250mm brake blocks or total length > 80mm for 320mm brake blocks)

Appearance:

Actions:

Block replacement necessary (see GCU, appendix 9, annex 1, code 3.2.2)

1.3 Metal inclusions

Designation: Metal inclusions

Appearance:
Wheel surface usually shows wear marks (e.g. slots) or shiny metallic marks

Actions:

Block replacement necessary

2.1 Detachment from plate

Designation: Detachment from plate

Appearance:

Actions:

Block replacement if detachment > 25mm

2.2 Cracks in the direction of wheel circumference

Designation: Cracks in direction of wheel circumference

Appearance:

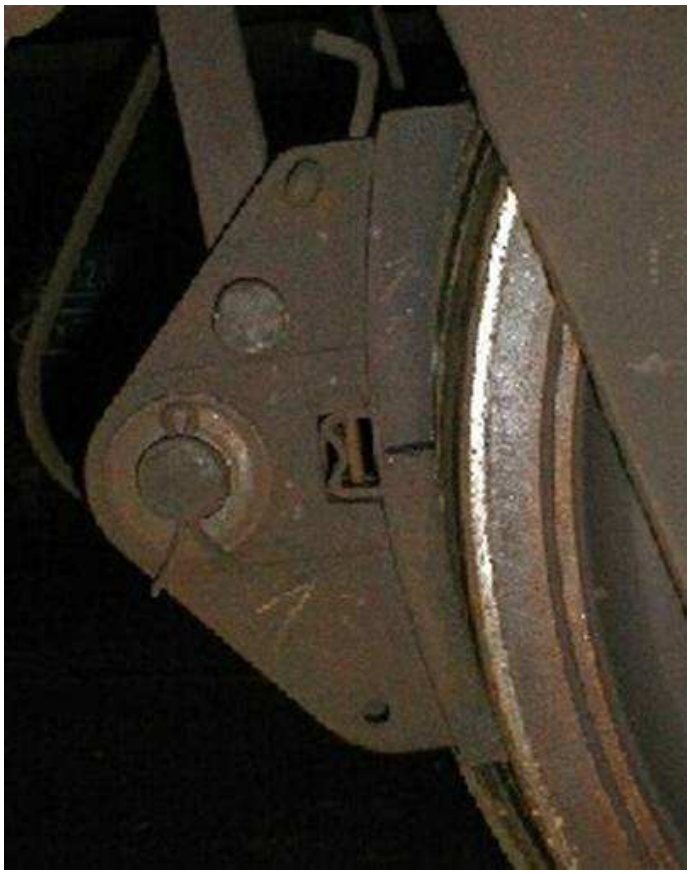
Actions:

Block replacement if crack > 25mm

2.3 One-sided wear

Designation: One-sided wear

Appearance:



Large difference in block thickness between the upper and lower block ends

Actions:
Block replacement required if the thinnest part is less than 10mm thick (see GCU, appendix 9, annex 1, code 3.2.2)

3.1 Cracked through at the predetermined breaking point

Designation: Cracked through at the predetermined breaking point

Appearance:

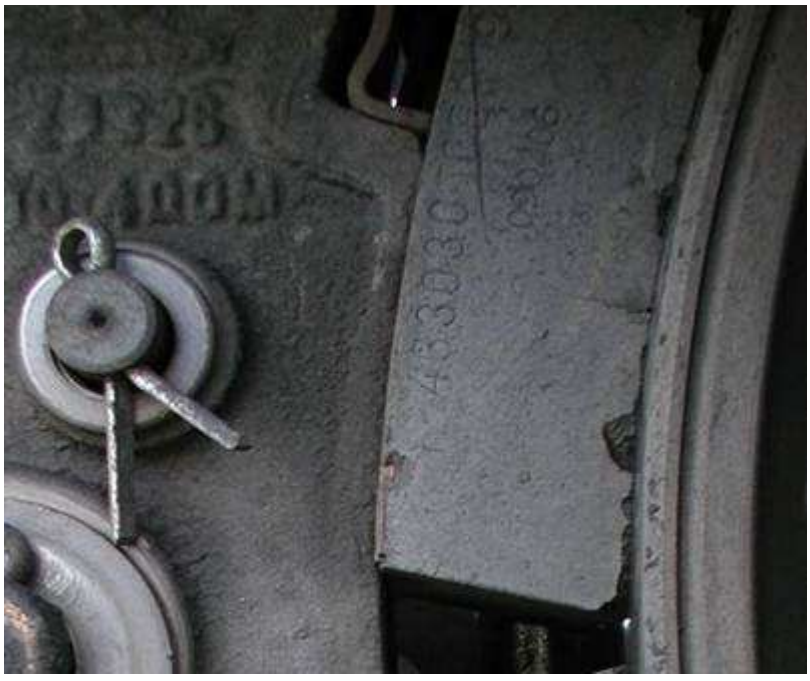
Actions:

No action necessary (see GCU, appendix 9, annex 1, code 3.2.2)

3.2 Radial cracks

Designation: Radial cracks in the block material

Appearance:



Actions:

No action necessary (see GCU, appendix 9, annex 1, code 3.2.2)

3.3 Signs of high thermal stress

Designation: Signs of high thermal stress (white layer, friction carbon deposits)

Appearance:

'white layer' in the rubbing surface near to the surface area, up to 10mm thick

Or

Extensive shelling from the rubbing surface, friction carbon deposits high

Actions:

No action necessary

3.4 Surface structure of the rubbing surface

Designation:

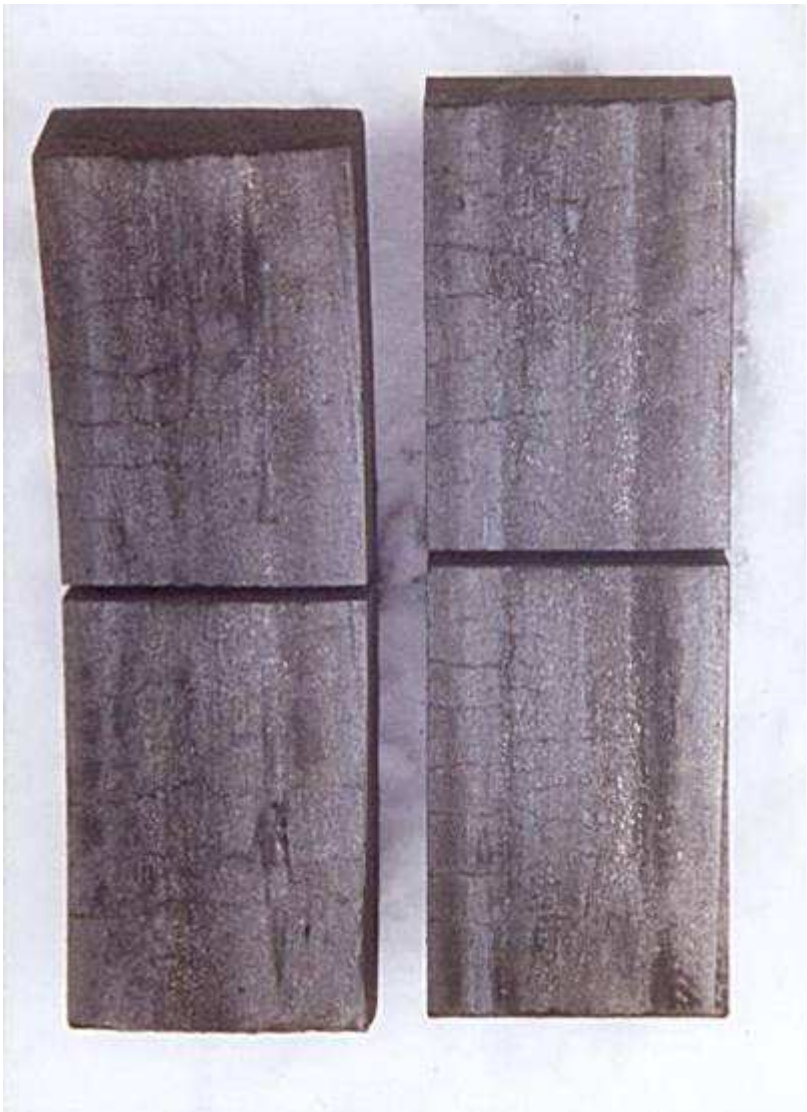
Surface structure of the rubbing surface

Appearance:

Various features possible:

- Heavily ramified structure of thermal cracks
- predominantly axial thermal crack structure
- no thermal cracks (see also vitrification)

friction carbon deposits present



Actions:

No action necessary

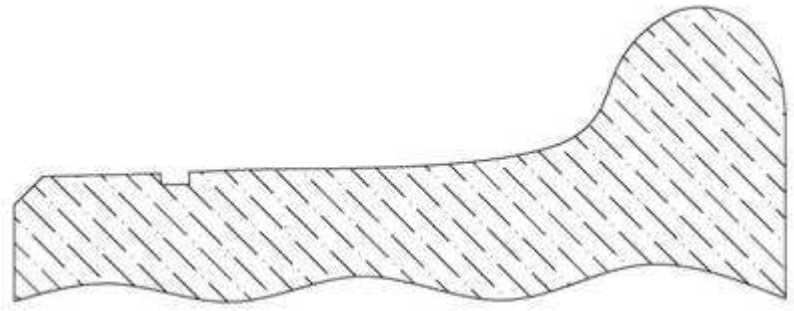
4. Index of damage images for wheel treads

4.1 Slot formation

Designation: Formation of slots on the wheel tread

Appearance:

Slots are characterised by sharp edges.
Slots usually occur along the wheel circumference and can be present across the whole width of the tread



Actions:

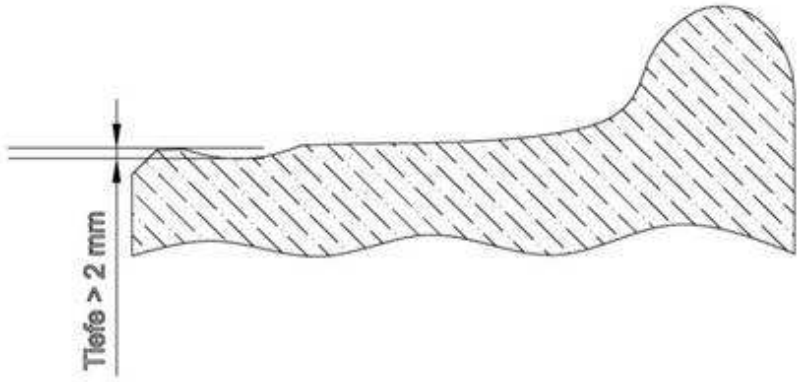
Reprofiling necessary

4.2 Groove formation

Designation: Formation of grooves in the wheel tread

Appearance:

Grooves are rounded in form and have no sharp edges.
Grooves occur over part of the width of the tread and are generally no more than 40 to 50 mm wide.



Criterion: Depth > 2mm

Actions:

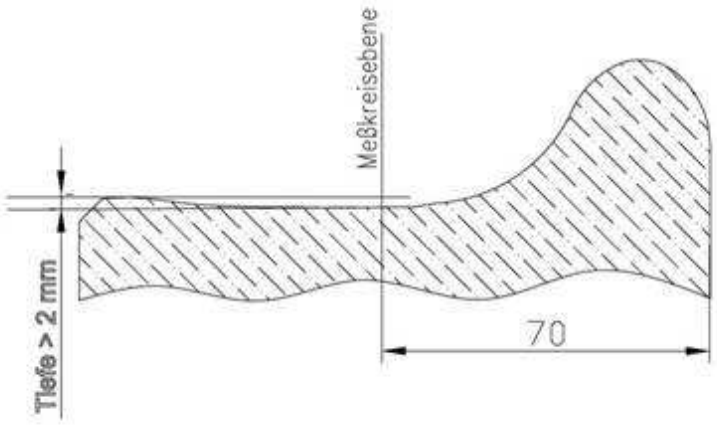
When maximum values are exceeded reprofiling necessary

4.3 Groove worn in tread

Designation: Groove worn in tread on the wheel tread

Appearance:

Groove worn in tread is formed by the removal of material over a large area of the wheel tread. Generally the area affected will have no surface irregularities and no sharp edges. A kind of flange ('raised area') forms towards the outer face of the wheel profile when the removal of material does not extend as far as the chamfered corner. This phenomenon may also occur on the flange side and create a second flange. The groove extends over the whole circumference of the wheel.



Criterion: Depth > 2mm

Actions:

When limit values are exceeded reprofiling necessary

4.4 Excessive thermal stress on wheelsets

Appearance

Paint becomes clearly burnt in the flange/disc transition radius. The paint in this area then becomes cracked and peeling. Build-ups of metal and colouring from overheating can be seen on the tread. The flange may also become a bluish colour.

Actions

Wheels which are not compliant with UIC Leaflet 510-5:

Dismantle wheelsets and perform wheelset maintenance.

Wheels compliant with UIC Leaflet 510-5:

Dismantle wheelsets and perform wheel maintenance if Becorit 929-1 brake blocks are installed or if or if the type of brake block is not clearly identifiable.

N.B.:

The wheelsets of wagons with Becorit 929-1 blocks do not obtain the marking with a discontinuous white strip for thermally stable wheels as per UIC Leaflet no. 510-2, appendix H

4.5 Wheel profile

Appearance

When evaluating the wheel profile, particular attention should be paid to flange thickness and height considering the permitted maximum and minimum values.

Actions

Wheelsets on which the flange thickness or height are too high or low must be changed and wheelset maintenance performed