Investigation report brake system

Document:

Date:

Organisation:

**Investigation report**

**Theme:** Investigation of the brake system of wagon:

(Type, model number (e.g. Shimmns 728)) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Owner / keeper: \_\_\_\_\_\_\_\_

Manufacturer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reason of Investigation (e.g. crack in the rim wheelset No. 2)

The investigation was carried out on YYYY/MM/DD at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Basis for the investigation of the braking system was the brake calculation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, edition \_\_\_ from YYYY/MM/DD and the drawing „brake rigging“ edition\_ \_\_ from YYYY/MM/DD \_\_\_\_

At the moment of realizing the investigation reason the vehicle was equipped with \_\_\_\_\_\_\_\_\_\_(e.g. IB116\*) brake blocks.

**Wagon No.:** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Manufacturing date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**State of revision: \_\_\_\_\_\_\_\_\_\_ on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_\_\_\_**

**Mileage since revision: \_\_\_\_\_\_\_\_\_\_\_\_km**

**Tare weight**

**marked on the vehicle:** **\_\_\_\_\_\_\_\_\_\_\_ kg** (as per brake calculation \_\_\_\_\_\_\_ kg)

**if**

**boogie-wagon**: **boogie 1: type \_\_\_\_\_, serial No. \_\_\_\_\_**

**Manufacturer\_\_\_\_\_\_**

**Manufacturing date\_\_\_\_\_\_\_, State of revision \_\_\_\_ on** YYYY/MM/DD **by \_\_\_\_\_**

**Rigging was stuck \_\_. drill boring according to the middle of vehicle**

**boogie 2: type \_\_\_\_\_, serial No. \_\_\_\_\_**

**Manufacturer\_\_\_\_\_\_**

**Manufacturing date \_\_\_\_\_\_\_, State of revision \_\_\_\_ on** YYYY/MM/DD **by \_\_\_\_\_**

**Rigging was stuck \_\_. drill boring according to the middle of vehicle**

**If vehicle is equipped boogie 3: type \_\_\_\_\_, serial No. \_\_\_\_\_**

**Manufacturer\_\_\_\_\_\_**

**Manufacturing date \_\_\_\_\_\_\_, State of revision \_\_\_\_ on** YYYY/MM/DD **by \_\_\_\_\_**

**Rigging was stuck \_\_. drill boring according to the middle of vehicle**

**Wheelset type:**  **WS 1, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**WS 2, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**WS 3, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**WS 4, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**WS 5, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**WS 6, type:\_\_\_\_\_ wheel: \_\_\_\_\_diameter: \_\_\_\_\_\_**

**Serial No: \_\_\_\_\_\_\_\_state of revision\_\_\_\_\_\_**

**on** YYYY/MM/DD **by\_\_\_\_\_\_\_\_**

**Brake system and equipment**

Type of brake control system **\_\_\_\_\_\_\_\_\_\_ (e.g. KE-GP-A)**

Brake cylinder **\_ x BG \_\_ “**

Slack adjuster **\_ x DRV \_\_\_\_\_\_\_\_\_**

Brake blocks **\_ x** **Bg \_\_\_ mm (Type:\_\_\_\_\_\_\_\_\_**)

Auxiliary reservoir volume **\_ x \_\_\_\_ l**

Distributor valve **\_ x \_\_\_\_\_\_\_\_\_\_, last overhauling** YYYY/MM/DD **by\_\_\_\_\_**

Relais valve **\_ x \_\_\_\_\_\_\_\_\_\_**

Weighing valve **\_ x \_\_\_\_\_\_ (Type \_\_\_: \_\_\_\_ bar / 10 kN)**

**Results of functional test of the brake system**

1. **Filling- und release time, emergency brake (B2.6.2 acc. UIC MB 543-1)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Filling time (s)  (to 95% max brake cylinder pressure C)  target actual | | Release time (s)  (to 0,4 bar rest pressure Cv)  target actual | |
| G | Empty | 18 - 30 |  | 45 – 60 |  |
| loaded |  |  |
| P | empty | 3 – 6  (with automatic load control) |  | 15 – 25  (max weight > 70 t) |  |
| loaded |  |  |

**2. max. brake cylinder pressure (full-service brake)**

|  |  |  |  |
| --- | --- | --- | --- |
| Pressure reduction in the main pipe  1,5 ± 0,1 bar | T-pressure  **bar** | Brake regime G  **C = bar** | Brake regime P  **C = bar** |

**3. max. brake cylinder pressure (emergency brake) (B2.6.2 acc. UIC MB 543-1)**

|  |  |  |  |
| --- | --- | --- | --- |
| Target value (bar)  (tolerance: T=±0,2 bar  Cv = ± 0,1 bar) | actual value (bar) | | |
| T-pressure | C / Cv-pressure | |
| G | P |
| T-empty = \_\_\_\_ bar  C-empty = \_\_\_\_bar  (control device position T-2 acc. UIC MB 543-1) | **\_\_\_\_\_ bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar** |
| Point of first max c-pressure  T = \_\_\_\_ bar  C = \_\_\_\_bar  (with simulation, control device position T-1-2 acc. UIC MB 543-1) | **\_\_\_\_\_ bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar** |
| T-loaded = \_\_\_\_ bar  C-loaded = \_\_\_\_bar  (with simulation, control device position T-1-2 acc. UIC MB 543-1)  R-pressure 0,3 bar greater than C-pressure | **\_\_\_\_\_bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar** | **C = \_\_\_\_ bar**  **Cv = \_\_\_\_ bar**  **R = \_\_\_\_\_bar** |

**4. Sensitivity / Unsensitivity (B2.3 und B2.4 acc. UIC MB 543-1)**

**Sensitivity:** Pressure reduction of 0,6 bar in the brake pipe within 6 sec. starting from the normal working pressure. Brake must be applied

**Unsensitivity:** Pressure reduction in the brake pipe of 0,3 bar within 60 sec starting from the normal working pressure. Brake must stay released

**5. Tightness of the brake pipe (B2.1 acc. UIC MB 543-1)**

requirement: max loss of pressure 0,3 bar in 5 Minutes,

actual result: \_\_\_\_ bar in 5 Minutes

**6. Tightness of the brake system if the brake is applied (BP = 0 bar, C= 3,8 ± 0,1 bar) (B2.2 acc. UIC MB 543-1)**

requirement: max. loss of pressure within 3 Minutes in the auxiliary reservoir: max. 0,25 bar

actual result: \_\_\_ bar in 3 Minutes

**7. further pressure and function testing of the brake system**

* Manual releasing of the brake by applying the remote release device
* Test of graduated brake cylinder pressure (C-pressure) behavior during braking and releasing in case of changing the brake pipe pressure in steps of 0,1 bar
* Complete releasing of the brake system if the pressure in the brake pipe is 0,15 bar below the normal working pressure.

**8. Function of the slack adjuster**

Extending the slack adjuster by hand (1 round), 3 times pneumatic braking:

Piston stroke is correct again   
contracting the slack adjuster by hand (1 round), 3 times pneumatic braking:

Piston stroke is correct again

**9. Clearance of the brake rigging**

Brake rigging have clearance also in worn conditions (wheel, block and rigging), investigation by measuring of all relevant installation spaces or by simulation

**10. Handbrake**

All components of the handbrake (number of teeth, lever, diameter of handbrake wheel, etc) comply with the brake calculation

**11. Piston stroke**

Target value (according brake calculation): \_\_\_\_ +- \_\_ mm (at 3,8 bar brake cylinder pressure for the loaded wagon);

measured = \_\_\_\_\_ **mm**

**12. Brake rigging**

**12.1 central brake rigging**

Lever Proportion of the cylinder and fixed-point lever:

dimension target value ( mm ) actual value ( mm )

a \_\_\_\_ **/ mm**

b \_\_\_\_ **/ mm**

**12.2 length of the connecting rods,**

According to the drawing „brake rigging“ – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Measurement grove to middle of boring of the drawbar

(Vehicle) target value: \_\_\_\_\_ mm actual value: \_\_\_\_\_

**12.3 brake rigging around the axels/within the boogies**

All brake riggings around the axels / within the boogie are complying to the drawings

**13. continuity check of the brake pipe**

Testing with a steel ball (20 mm diameter)

**14. markings of the brake type and braked weight**

All markings are correct?

**15. further investigations (B 1 acc. UIC MB 543-1)**

At all wheelsets no indication of thermal overload is distinguished

The wagon is equipped with a diagonal 1 ¼“ main pipe and endcocks in accordance with EN 14601

All changeover devices and the brake release remote control rigging (both sides) are working correct

The changeover devices (G-P, on-off) were equipped with a spring to keep the device safely in the end positions

The catching loops were mounted with shock absorbing rubber underlayer

The moisture isolating underlayer at the auxiliary reservoir are available

The brake blocks are secured with a locking bar, the locking bar are secured with a bolt and splint

The brake block holder hangers are equipped on the upper and lower side with stud bold and self securing nuts.

The draw bar is equipped with convex head

How is the lubrication status of the rigging?

Inner distance between the brake block holder measured at the brake triangle \_\_\_\_\_\_\_\_mm, subsequent grinding of the brake blocks?

**16. Remarks**

**17. conclusion**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**annex1: photo documentation**