SLACK ADJUSTERS:

Refer to Air Brake Handbook, pages 30-32

RELEASE VALVES, COUPLING COCKS, HOSES ETC.

Refer to Air Brake Handbook, pages 34-38

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## LIST OF QUESTIONS

The student is to study carefully the contents of this lesson BEFORE attempting to answer the questions.

1. Trace the passage of the air from the main reservoir to the brake cylinder when an application of the straight air brake is made.
2. Describe the three positions of the straight air brake valve.
3. What are the advantages of the straight air brake.
4. What damage can result from the mis-use of the straight air brake.
5. What is the function of the double check valve and how does it operate?
6. Describe how you would test for a defective double check valve.
7. Does the piston travel effect the efficiency of the brake?
8. Briefly describe one type of brake cylinder with which you are familiar and the most common defects found.
9. What is the minimum and maximum piston travel allowed on the following locomotives Class Ab, K and J
10. Can any advantage be gained by making over a 20 lb. brake pipe reduction? Give reason for your answer.
11. What effect will a leak have on the auxiliary reservoir side of the triple valve.
12. What are the most essential details to be observed when adjusting locomotive brakes.
13. Two coupling hoses are used between engine and tender of locomotives fitted with combined automatic and non automatic air brake. Are the hoses interchangeable?
14. What effect has brake pipe leakage on the operation of the train brakes.
15. What is the object of the slack adjuster as fitted to vehicles and how does it operate ?
16. What position is the handle of the coupling cock when the cock is open ?

Lesson 14

Very Good.
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1. When an application of the straight air brake is made main reservoir pressure is admitted to the brake cylinders to apply the brakes on the engine and tender but not on the rest of the train.
When the brake valve is placed in the application position the passage from the main reservoir to the brake cylinder is opened and the brake cylinder exhaust passage is closed.
Air from the main reservoir flows to the reducing valve which reduces the pressure to 45 pounds per square inch, the air then flows through the straight air brake valve to the double check valve. The double check valve receives air from main reservoir when the straight air brake is used and the air passes from it to the brake cylinder to apply the engine and tender brakes.

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2. There are three positions of the straight air brake valve — release, lap, service.
When the brake valve handle is in release position the passage from the main reservoir to the brake valve is closed, and the brake cylinder exhaust port is open to atmosphere.

Lap Position, all ports and passages are closed, that is, from the main reservoir to the brake cylinder, and from the brake cylinder to atmosphere. Service Position the passage from the main reservoir to the brake cylinder is open and the exhaust from the brake cylinder is closed.

3 There are several advantages of the straight air brake ——

(a) A rapid application of the brakes on the engine and tender, and also a quick release when shunting.

(b) The engine and tender straight air brake can be applied to hold a train at a station while the changing of the train pipe and auxiliary reservoirs is taking place.

(c) When braking long trains on grades the brake can be used to steady long trains while recharging the auxiliary reservoirs in readiness for more brake pipe reductions. train brakes.

(d) Engine brake can be released independantly of the

4 A judicious use of the straight air brake is essential. If used excessively the brake block and tyres will become overheated and the tyres may become slack on the wheels.

If used for braking a train the train

will run in violently and when released the train will run out quickly and receive a violent jolt and this may cause the train to part while running and may damage the goods in vehicles or guards van and would render the passengers position intolerable.

5 The double check valve which is situated between the straight air brake, and the automatic air brake systems ~~is~~ controls the communication between the main reservoir and the brake cylinder when the straight air brake is used, and when the automatic air brake is used the double check valve controls the communication between the auxiliary reservoir and the brake cylinder.

The double check valve has three connections and they are — from main reservoir from auxiliary reservoir, and to the brake cylinder.
Centred in the body directly facing the passage from the main reservoir is a piston and the passage from the auxiliary reservoir facing the opposite side of the piston.
When the straight air brake is applied, air from the main reservoir acting on the left of the piston forces it over to the right and closes the passage from the auxiliary reservoir. Air then flows from the main

reservoir to the brake cylinder and applies the brakes.
When an application of the automatic air brake is made air flowing from the auxiliary reservoir acting on the right of the piston forces it over to the left and closes the passage from the main reservoir. Air then flows from the auxiliary reservoir to the brake cylinder and applies the brakes.

6 If a double check valve is faulty there could be at least two defects — the piston not making an air-tight seat on the main reservoir side, and not making an air-tight seat on the triple valve side. To test for these, apply the straight air brake and if there is a continual blow from the triple valve exhaust port the piston is not making an air-tight seat on the triple valve side.
With the automatic brake applied and the S.A brake in release position and there is a continual blow at the straight air brake exhaust port the piston is not making an air-tight seat on the main reservoir side.

7 The length of piston travel definitely affects the braking power. The longer the piston travel the lower the pressure in the brake cylinder will become for

9. The minimum piston travel for Engines only
Gb class 3½ inches
K " ~~six~~ 3½ "
~~J~~ J " six "
The maximum piston travel for
Gb class five inches
K " ~~nine~~ 5 "
J " nine "

Cars are generally equipped with long stroke brake cylinders.

10. No advantage can be gained by reducing the brake pipe pressure by more than 20 pounds as the brake cylinder and auxiliary reservoir pressure will be equalised and no further braking power can be obtained and any further reduction is only a waste of air.

11. If there is a leak on the auxiliary reservoir side of the triple piston an effect will be noticed while the brakes are released providing the leak is only slight. When the brakes are applied they may leak off again as the auxiliary reservoir pressure will fall below that of the brake pipe and the triple piston will be forced to the release position. If the leak is bad it will prevent the auxiliary reservoir from charging and the brakes on that vehicle will be useless.

12 Most essential detail to observe when adjusting locomotive brakes.—
Allow a reasonable brake piston travel to ensure that the piston moves out far enough to close the ~~feed~~ leakage groove and as near as possible the minimum travel.
See that the lock nuts are secured after the adjustment is made.
See that the brake rigging is in good order, also that the brake blocks are not too badly worn and that each block is the same distance from the wheels.
Make sure the brake rigging is not fouling, or that it is not fouling any other part of the engine.
See that all pins and split keys are secure.
Test the operation of the brake to see that it is in good working order.

13 The coupling hose between engine and tender with engines fitted with the combined automatic and straight air brakes are interchangable. The train pipe hose is of one inch diameter, and the brake cylinder hose is $\frac{3}{4}$ inch.
The hoses are interchangable.

14 With a leaking brake pipe, when an application is made the brake pipe pressure is reduced much lower than as intended and subsequently a lighter brake application is made.
When the brake valve handle is

returned to the lap position the brake pipe pressure will still fall and the brakes will go on much harder any will eventually stop the train if the brake is not released

15 The object of the slack adjuster is to maintain a constant length of brake cylinder piston travel as the brake blocks become worn.
The adjuster is fitted to the brake cylinder and consists of a small cylinder and piston with a pawl attached which engages a ratchet and turns it as adjustment is required. The cylinder is connected to the brake cylinder by a small air pipe. The distance from the brake cylinder head from the post leading to the air pipe represents the maximum distance allowed for the brake piston When the piston moves out to uncover this port (owing to brake block wear) air flows through the port and pipe to the slack adjuster cylinder, drives the piston down and the pawl then engages the ratchet wheel. When the brake are released the air in the adjuster cylinder exhausts back into the non-pressure head of the brake cylinder The spring in the adjuster cylinder forces the piston back and the pawl moveing back with it turn the ratchet wheel approximately one eighth

of a revolution and finally becomes disengaged. The ratchet works an adjusting screw which in turn operates a small crosshead and this crosshead when moved takes a lever with it and this lever [redacted] draws the brake rigging pull rods towards each other and this shortens the distance the brake cylinder piston has to move before applying the brakes.

16 The position of all air brake pipe coupling cocks when open is at right angle to the pipe.