

A shoe of this kind would have a long life, be effective for braking power; also wear all the other portions on the tire than the tread. We would have a brake shoe that would be, I am satisfied, universally used, but it would have to be manufactured at a reasonable price without extortion of royalty on the pattern if it is to compete with our present cheap and efficient grey iron brake shoe.

Mr. Markey,--

This subject of brake shoes is a very broad one, and is surrounded with so many conditions that it is really a subject which should be studied very carefully.

I have had some little experience with three types of brake shoes, viz., the common grey iron shoe, which is known in street car service and in railway service; then there is the solid shoe; also the composite shoe, which consists of steel or cast iron (chilled) inserts surrounded by cast iron and reinforced by steel backs.

We made a test some time ago of chilled cast iron inserts surrounded by common grey iron and reinforced steel back. This shoe was gotten up by the American Brake Shoe Co. and put on test with the common grey iron shoe, with the result its efficiency was $2\frac{1}{2}$ to 1 over the latter. In passenger car service, where they have the cast iron wheels with steel tires, it was not as efficient, as the results shown on the locomotive; it being only as $1\frac{1}{2}$ to 1 as against the grey iron shoe. I might say that the difference in cost at the time was as about $2\frac{1}{2}$ to 1.

Mr. Harkom fully explained the difficulty of making the composite shoe in a unit. For instance if you take a grey iron shoe and support at both ends to test its strength; and then take the steel back shoe with the inserts and subject it to the same strain, it would break more easily than would the grey iron shoe, due to the fact that the metals in the same were not fused together. I do not know of any process which will help us to do this.

The same applies to the reinforced back. There is no added strength to the shoe whatever through the use of the steel back, its use being only to hold the fragments together after the shoe has become broken. We made a test of these shoes on a train running between Battle Creek and Chicago, and owing to the numerous stops and slow-ups that were necessary between these points the shoes necessarily heated up considerably beyond the normal conditions and the cracks which Mr. Harkom spoke of showed up very plainly. At the same time these cracks work through from the face of the shoe to the back, and as the steel back was only held to the shoe by three or four openings some of the broken parts all away from the back, and in one instance nearly derailed