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Contributions

The Cost of Handling Locomotives at Terminals.

Portsmouth, Va., Feb. 27, 1904.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read the article on the cost of handling locomotives at terminals with much interest. Our method of keeping track of terminal expenses is the most effective and reliable that we know of, and has been used on railroads with which the writer has been connected for many years with very good results. But there are few places that can be expected to be run at the same cost per engine handled, and in comparing the performance of one road with another the figures mean nothing, unless full explanation is given as to just what is charged into these figures and what is excluded; also of the facilities at the different terminals and the class of service given.

For instance, the cost at a point where running repairs are mostly made should, naturally, be much higher than at a point where engines are turned around in the shortest possible time, and just enough done to bring the engine back to the main repair shop. A road so situated that it is compelled to have a considerable number of general running repair points is again at a disadvantage as compared with one whose lines radiate in such a way that they can concentrate and thus cheapen the general running repairs at one or a few main centers. The question as to whether any share of the foreman's time and other fixed expenses are included should be known.

In the case of hostlering, whether this cost is high or low depends a good deal on distance engines have to be moved between the roundhouse and terminal, and if the engines are so handled by hostlers or by engineers. Locally, this varies considerably on our own road. Also, the character of wiping and cleaning required for freight and passenger engines, as the wiping and cleaning will be greater where a large number of passenger engines are handled.

It seems to me this would be an interesting matter to be taken up and agitated and brought before the Master Mechanics' Association convention this summer, with a view to seeing whether the railroad companies could not get together and agree upon a uniform system of keeping this and other cost records so we could profit by one another's experience in such matters.

E. P. C. SANDERSON,
Sup't Motive Power, Seaboard Air Line.

Simplifying Night Signals and Shortening Block Sections.

TO THE EDITOR OF THE RAILROAD GAZETTE:

At a recent meeting of the Railway Club of Pittsburg an interesting paper on block signals was read by Mr. A. M. Schoyer, General Superintendent of the Northwest System of the Pennsylvania Lines West of Pittsburg, in which were many good things; but, if Mr. Schoyer will pardon me, I wish to call attention to one or two points which seem to call for comment and, I think, criticism. Those parts of the address which are commendable are equally worthy of notice, for he is a railroad officer of excellent reputation and long experience, and is a member of the Train Rules committee of the American Railway Association; but this more important part of his address is evidently intended for an audience not so well informed on these subjects as yours is.

After showing the disadvantages of white as a safety indication, Mr. Schoyer says:

There are serious objections to the use of green for safety, the principal one of which being that the safety signal on high-speed railroads should be given to the engineman as far in advance as possible, so that he may maintain high speed, and we all know that in the green signal a large number of the rays of light are absorbed, so that the signal cannot be seen for any great distance. There is also an objection to the use of yellow for a caution signal on railroads which use a permissive block, or on railroads which have but one signal to indicate the condition of two blocks in advance. It is very difficult to distinguish the yellow from the red where they are used in the same locality or on the same signal mast. . . . The possibility of mistaking a red signal for a yellow signal involves so many chances of accident that it would seem proper to pursue the investigation further as to whether, after all, something better than a colored light cannot be evolved to indicate night signals.

And he goes on to consider what has been done. He speaks of illuminated blades; blades with incandescent electric lights on their faces; blades made visible by having a bright light shining upon their faces, and electric headlights on locomotives. But the plan which he evidently most favors is to "erect one or two arc lights at every tower," thus making signal lights unnecessary.

Why should green be thus summarily dismissed? The principal objection to it is that it cannot be seen a great distance; but as against this we have the fact that signals perform their most useful function at times when distance does not count; in times of dense fog. When a fog prevails no signal light can be seen more than a few hundred feet. In other words, all signals should be so located as to provide for safety and speed in spite of the fact that they cannot be seen far off. An enormous amount of mental and financial energy has been wasted in this country in trying to make signals visible long distances. The only tangible return that we have got for this expenditure of energy is a class of engine runners who are less careful than they would be if they had not been encouraged to indulge in practices in fair weather which they must abandon in thick weather.

The Chicago & North Western and the New York, New Haven & Hartford have used green now for many years; what about their experience? The time is past when anybody should bring forward arguments against green lights unless he has experience to support his claims.

Next, Mr. Schoyer assumes that if green is used for the clear signal yellow must be used for caution (though the C. & N. W. succeeds without yellow), and he repeats the old objection of the likeness between red and yellow, and he mentions the possibility of mistaking red for yellow. In all of the discussions on this subject during the past five years I have never before come across this claim. It must be readily admitted that yellow may be mistaken for red, but the converse of this by no means follows. It might be said that after an engineman has convinced himself that the two colors are nearly alike he will then become reckless and always treat them alike; but no shred of evidence has ever been brought forward to substantiate this conjecture.

But all of these sophistications about the likeness of red and yellow have been predicated entirely on a single shade of yellow, that used on the New York, New Haven & Hartford. Why not use a lighter tint? In fact, I believe that the Erie Railroad has a lighter tint in use. No one will dispute the practicability of making a yellow glass which shall be light enough to be always easily distinguished from red (except, perhaps, in certain kinds of dense smoke—smoke which would vitiate a signal light of any color). It is perfectly practicable to use such a light. Take the most difficult condition imaginable, a three-indication signal, like Grafton's automatics on the Fort Wayne road; if green indicates all-clear and red indicates stop, surely a yellow can be produced to indicate caution which shall be always quickly distinguishable from either green or red. The only desideratum is to make your yellow glass light-colored enough. There is no danger of making it too light; if it should be made too light it would become like a common uncolored light, such as we now use to indicate "proceed," and erroneously call white. But white would then have no value as a signal indication and therefore no harm would be done.

Unless there is some error in the foregoing, the conclusion is irresistible that the possibility of mistaking red for yellow does not "involve many chances of accident," as Mr. Schoyer claims. His suggestion to use arc lights at every tower is quite superficial as a remedy, for it makes no provision for distant signals, or for any signals which are sufficiently isolated to forbid the expense of an arc light.

The other point which I wish to criticize is that concerning the length of block sections. On this Mr. Schoyer says:

A few years ago it was thought that signals could not be placed too close together, and the consequence was that in the adoption of any up-to-date block signal system the signal stations were placed at intervals of from one-quarter to one-half mile. It has been found that with very fast trains the enginemen must be under a strain constantly on account of the frequency of these signals, and that they really react on the speed of the trains. The tendency today, therefore, is to place the signals as far apart as is consistent with the number of trains which must be moved over the territory in a given time.

But if the number of trains is large the only "consistent" arrangement is to make your blocks as short as possible; say, 800 ft. or even 500 ft. It is not the shortness of the block that reacts on the speed of trains, it is the shortness of the distance between the home and the distant signal; and this distance need not be limited by the length of the block. Mr. Schoyer himself mentions the automatic signals which are in use on the Pennsylvania between Gallitzin and Altoona, where each home signal has a distant signal two sections in the rear. What is to hinder having the distant signal three sections in the rear, or four? Or five? It may be well enough, on the score of convenience and simplicity, or on account of expense, to call a halt in the process of shortening block sections, but from a strictly scientific standpoint there would seem to be no rational basis for the view set forth by Mr. Schoyer. He is not, of course, the only one who has given expression to this idea.

In England some effort is made to have distant signals fixed at one uniform distance from the home signal, or within small variations from such uniform distance. It would be well if we in this country should give more attention to this idea. If our distant signals were fixed at a uniform distance from the corresponding stop signal of, say, 3,000 or 3,500 ft., an engineman would then always know how much room was available to stop in and it would make no difference whether he did or did not encounter another signal between the home and the distant, or whether there were two or three such other signals.

Mr. Schoyer is fortified in his views, no doubt, by actual practice; by what has been done by prominent signal engineers and manufacturers; but in our efforts to provide a thoroughly scientific and practical arrangement of signals we need to be on our guard against accepting the practice, even of the best roads, as exemplifying the best principles; for when it comes to spending good money for real signals nearly every railroad manager seems to be ready to compromise with his principles, however sound may be his views when he is giving instructions about signals in the drafting room.

E. C. B.

Rubber Insulation.

The efforts of signal engineers and other users of insulated wires to secure high grade insulation, usually specified as 30 per cent. para, are as praiseworthy as they are futile. The larger users have already learned that the best guarantee is the reputation of the manufacturer for turning out wires and cables that stand the practical test of service, and that iron-clad specifications are as unavailing to hold dishonest manufacturers as they are annoying to honest ones. The users of signal cables are now in the throes of the transition period and are vainly endeavoring to draw their specifications, so as to eliminate all possibility of fraud. Details of the specifications are often suggested by certain favored manufacturers who are shrewd enough to make the specifications favor their particular brand. They often succeed in convincing signal engineers that qualities peculiar to their own brand are the true test of good insulating properties, whereas the opposite may be the truth.

This does not mean that definite specifications are altogether useless, but that too much importance should not be attached to them. Let us consider for a moment some of the usual tests and their value. The ash test will determine the percentage of mineral matter but will not show the quality of the insulating material with which the mineral matter is compounded. Specific gravity is almost valueless in determining the quality of the insulation, as a compound containing little or no rubber can be made to give the same specific gravity as a high grade para compound. Chemical analysis is of more value, but is by no means a sure method of determining either the dielectric qualities or the life of a compound. Extraction by acetone is the usual form of chemical analysis, the extractive matter being resinous. Of this the cheaper grades of rubber usually contain a higher percentage than the paras. There is a decided variation, however, in the extractive matter obtained from vulcanized para compounds, the cause of which it is not necessary to dwell on here. Carl Otto Weber's work, "The Chemistry of India Rubber," goes fully into this matter. A point entirely overlooked by those basing their opinion of a vulcanized rubber compound on chemical analysis is this: A 30 per cent. compound should show 70 per cent. mineral matter. Now mineral matter is an adulterant and has little or no dielectric qualities; and a compound showing a large decrease in mineral matter, even if the extractive matter is slightly increased, would indicate a better and longer lived dielectric. The writer has known a compound to be accepted showing 70 per cent. of mineral matter and 30 per cent. of rubber gum, while another compound was rejected that showed only 57 per cent. of mineral matter and 43 per cent. of gum, because the gum showed an increase of about 3 per cent. in extractive matter. The rejected compound was undoubtedly a better and longer lived dielectric.

Some engineers who have been in the habit of using a soft, extremely elastic compound which adheres very firmly to the wire and gives very high insulation, have been persuaded by the manufacturer that these qualities are the only ones by which the dielectric value of a compound can be determined and that any compound not exactly like theirs is inferior. Let us consider this statement.

It is well known that by the use of certain adulterants a much higher resistance can be obtained than by a pure 30 per cent. para mixture. The only way an honest manufacturer can meet these excessive resistance tests is by the use of a tubing machine, with which the com-