

Inevitable Accident?

To the Editor:

I have just read ICC Railroad Accident Investigation No. 3897, which reported on a head-end collision in centralized traffic control territory caused by a failure to line a proper route for opposing trains at a meeting point, and failure to control properly the speed of one of the trains.

This CTC system, as is often the case, has no track circuits on the sidings, hence it is possible to head two trains in against each other. The speed limit on the sidings and the signal indications for entering the sidings are vague. The turnouts are good for medium speed. This collision wasn't an accident! It, or one like it at some other place and time, was inevitable.

I think it is foolish to have medium speed turnouts for uncircuited sidings. The signal indication for such a siding should be: "Proceed at restricted speed." The rule (105) should further limit this to a speed low

enough to be able to stop in half the range of vision ("yard speed").

Of course, circuited sidings are better, but it would be unwise to require them and thus discourage the use of CTC. Interlocking the opposing signals without track circuits would also be costly. Interlocking the controls on the machine might give a false sense of security.

I would be interested in seeing comments on this problem from others in the field of railway signaling. (Name withheld as requested)

[Editor's Note: The writer of the above letter was formerly in the signal department of a large railroad. Later he did research of a broader scope for his railroad. He is now a transportation consultant, but maintains an active interest in signaling. We respectfully urge you, our readers, to send us your comments on this matter. We will print them over your name or anonymously.]

Should Sidings Have Circuits?

On August 22, 1960, there was a head-end collision between a freight train and a passenger train on the Chicago, Burlington & Quincy Railroad, which resulted in the injury of 12 persons. An abstract of the ICC's report, No. 3897, of its investigation follows.

In the vicinity of the point of accident, the railroad is a single-track line over which trains are operated by

the signal indications of a traffic control system. At Nodaway, Mo., a siding 2.1 miles in length parallels the main track. The accident occurred on the siding, which, along with the main track, is located on a one-degree "S" curve. The switches of the siding are power operated and are controlled from a traffic control machine by an operator under the jurisdiction of the train dispatcher. Colorlight signaling is employed, with the following aspect, indication and rules applicable to this investigation:

Aspect: Red over yellow with spacing of 7 ft 9 in. between units. Indication: Proceed at Reduced Speed to make any Reduced Speed movement. Name: Restricting.

The operating rules of this carrier read, in part, as follows:

Restricted Speed—Proceed prepared to stop short of train, obstruction, or switch not properly lined and to look out for broken rail.

Reduced Speed—Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

105: Trains using a siding must proceed at Reduced Speed.

530: Controlled sidings are not protected by signals between clearance points. Trains must move at Restricted Speed not exceeding speed authorized by timetable through turnouts and on sidings.

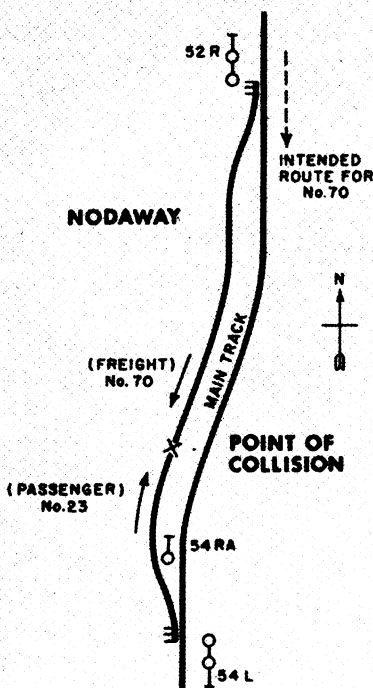
553: When more than one train in the same direction is put on a controlled siding, the following train or trains must be stopped at Stop signal

nearest the siding and notified by train dispatcher or operator of the situation: where two opposing trains are put on a controlled siding, both trains must be stopped at Stop signals nearest the siding and notified of the situation.

The maximum authorized speed for all trains moving through the turnouts of the siding at Nodaway is 30 mph, and all trains on the siding are required to be operated at Reduced Speed. The signals governing movements over the switches leading to the siding display the aforementioned Restricting aspect when the switches are lined for the siding. No track circuits are provided on the siding between clearance points and, consequently, routes may be established for opposing movements on the siding. In the event that such routes are established, both signals governing entrance to the siding may simultaneously display Restricting aspects, regardless of occupancy of the siding.

Meet Arranged

At 1:30 a.m. on the day of the accident, the dispatcher instructed the operator to route No. 70, a southbound second class freight train with 31 cars, to the siding at Nodaway for a meet with No. 23, a northbound first class passenger train. At 1:40 a.m., after being informed that No. 23 would arrive first, the dispatcher asked the operator if he had established the previous route. The operator said he first checked the indication lights and then replied that the route had not been



established. The dispatcher then instructed him to route No. 23 to the siding at signal 54L, and to route No. 70 down the main track at signal 52R to 54RA. Although it is evident that the north siding switch was reversed, permitting No. 70 to enter the siding, the operator said that he did not at any time move the lever controlling this switch to reverse position for the movement of No. 70.

Shortly before the accident occurred, the operator observed the track occupancy light at signal 52R indicate the passing of No. 70. About the time the track occupancy light went out, he overheard the flagman of No. 70 reporting by radio to the engineer that the train was clear of the main track. The operator apparently did not realize the significance of this message, because he said he made no attempt to use the radio to warn the engineman of No. 70 of the opposing movements.

The operator said that shortly after hearing the radio message he noticed that the north switch indicator light indicated the switch was lined reverse, although the lever was normal. He said that he thought this occurred because No. 70 had derailed at the switch or had damaged the switch in some manner, and that he made an unsuccessful attempt to communicate by radio with the crew of No. 70. The operator said that he then moved the north switch lever to reverse position so that its position would coincide with the position of the switch as indicated by the indicator lights, and that he then depressed the pushbutton which would cause signal 52R to clear. He said that he did not move these levers again prior to an examination of the traffic control machine by a signal supervisor. However, the signal supervisor found that the switch lever had been moved to normal position after the accident occurred. The operator said that he was unaware that No. 70 had entered the siding and collided with No. 23 until some time after the accident occurred.

Collision Speed Higher Than 20

The engineer of No. 70 (the southbound freight) said that his train passed signal 52R, displaying a Restricting aspect, and entered the north switch of the siding at a speed of about 25 mph, and that the speed was further reduced to about 18–20 mph as the train proceeded southward to where the accident occurred. Both enginemen said they thought that the speed of the train at this time complied with the definition of "Reduced Speed," as defined in the operating rules, and that they thought the siding was unoccupied by any other move-

ment, since signal 52R had not displayed a Stop aspect and they had not been notified that another train was occupying the siding. When the front end of their train reached a point about 1,300 ft north of the point of accident, the enginemen simultaneously realized that the opposing train was on the same track and an emergency brake application was initiated. Although both men said that the speed had been materially reduced before the collision, the considerable damage indicated that No. 70 was moving somewhat faster than 20 mph at the time of the collision.

No. 23 (the northbound passenger) passed signal 54L, which was displaying a Restricting aspect, and entered the siding at Nodaway at a speed of approximately 25 mph. Immediately after the train cleared the main track the engineer reduced the speed to about 15 mph. He further reduced the speed to about 5 mph in the hope that he would avoid stopping at the far end of the siding. When the opposing train was about 150 ft away, the fireman warned the engineer, who applied the brakes in emergency. Both enginemen alighted from the locomotive before the collision occurred and said that their train had stopped immediately before being struck.

Signals Operated As Intended

No code wires were broken, nor signal equipment impaired, and a supervisor's check immediately after the accident and a comprehensive examination later, indicated that all elements of the signal system operated as in-

tended. Analysis of the train graph disclosed that after No. 70 cleared the main track at signal 52R, the signal was caused to display a proceed aspect, indicating the operator apparently moved the levers and pushed the code-start button.

The investigation disclosed that, although no signal protection is provided, it is apparent that it has been the practice to permit a train moving on the siding at Nodaway to be operated at any speed which, in the judgment of the engineman, will enable it to be stopped short of another train or obstruction. In this case, the freight train was erroneously routed to the siding, which was occupied by the opposing passenger train. As a result of the error, the operator did not comply with the requirements of Rule 553. The engineer of the freight train apparently assumed that as the signal did not display a Stop aspect and he had not been informed otherwise, that the siding was clear. However, if the freight train had been operated at reduced speed as required by the rules, it is probable that the accident would have been averted.

Cause: "This accident was caused by failure to line a proper route for opposing trains at a meeting point, and failure to control properly the speed of the freight train."

Recommendation: "It is recommended that the carrier take the necessary action to enforce its rules and instructions requiring trains on sidings to proceed at Reduced Speed, prepared to stop short of another train or obstruction, or anything that may require the speed of a train to be reduced."

Accident #2: Similar Conditions

Even as we were preparing for publication an abstract of the ICC report of the accident referred to in our correspondent's letter, an ICC report of a second, similar accident reached us. We are therefore publishing abstracts of both of these reports.

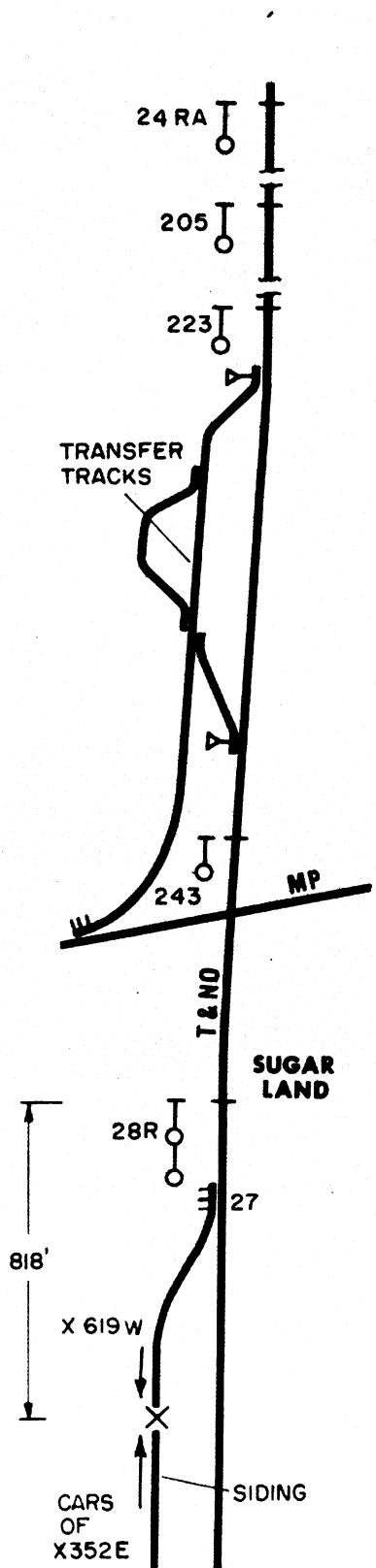
On December 28, 1960, at Sugar Land, Texas, there was a collision between a freight train of the Texas & New Orleans and the rear portion of another freight train, which resulted in the injury of three train service employees. An abstract of the ICC's report, No. 3904, of its investigation follows.

In the vicinity of the point of accident this is a single-track line over which trains are operated by the signal indications of a traffic control system. The switches at both ends of the siding at Sugar Land are powered by

dual control electric switch machines. The controlling circuits are so arranged that when the route is established for a westward movement to enter the siding at switch 27, signal 243 will display a yellow aspect and signal 28R will display a red over yellow aspect. No track circuits are provided on the siding between the clearance points. Consequently, the route may be established for a train or engine to enter the siding regardless of whether the siding is occupied.

The control machine, located at Houston, is of conventional design, with three-position signal levers and two-position switch levers. A train graph is provided. Signal indications and operating rules which pertain to this investigation are:

Aspect: *Red over yellow.* Indication: *Proceed on diverging route at restricted speed.*



Restricted Speed: *Proceed prepared to stop short of a train, obstruction, or switch not properly lined and to look out for broken rail, not exceeding 20 mph.* Timetables: *Special instructions in a timetable supersede any rule or regulation of the book of rules with which they conflict.* Special instruction in the timetable: *Movements through centralized traffic control sidings and turnouts at . . . Sugar Land . . . must not exceed 25 mph.*

Timetables: *All movement on controlled sidings must be made with caution.* With Caution: *To run at reduced speed, according to conditions, prepared to stop short of a train, engine, car . . . or other obstruction, or before reaching a stop signal.*

Extra 352 East was routed by the dispatcher into the siding at Sugar Land, where the locomotive was cut off. The dispatcher then lined a route for the locomotive to leave the siding and proceed across the Missouri Pacific crossing, where it was to pick up cars from the transfer tracks. The turnouts leading to the transfer tracks are provided with electrically locked switches. The crew performed switching operations, and then told the dispatcher they were ready to return to their train.

Clear At Transfer Track

The dispatcher then lined a route to the siding at signal 28R through switch 27 reversed. However, some delay ensued, and the train crew radioed the dispatcher that they would get into the clear at the transfer track for Extra 619 West. Accordingly, the locomotive and cars were moved clear of the main track and the crew lined and locked the transfer track switch for the main track.

The dispatcher then restored the number 28R signal lever normal and transmitted the code in preparation for lining a route down the main track at signal 28R for train X619W. Upon setting the signal to normal, the circuits were locked for a five-minute interval by a time relay.

Two minutes after the time locking was released, the dispatcher again cleared signal 28R. Although he intended to route X619W down the main track, he inadvertently left the route lined to the siding.

Extra 619 West consisted of five diesel-electric units, 164 cars, and caboose. As X619W approached Sugar Land, signal 243 was yellow, indicating approach, and the engineman made an independent brake application to reduce the speed of his train. The en-

gine crew next observed signal 28R indicating Proceed on Diverging Route at Restricted Speed, and this indication was called between the members of the engine crew. The engineman said that he assumed from this indication that the rear portion of X352E, whose locomotive he had seen on the transfer track, was occupying the main track and that the dispatcher had routed his train onto the siding to permit it to pass. He said that he continued to apply the independent brake as the train entered the siding, and that the speed was reduced to 27 mph. He said that he was unaware that the siding was occupied until the locomotive had traversed the turnout and the headlight beam shone upon the cars at a distance of about 350 ft. He initiated an emergency application of the brakes, but the collision occurred before the speed was materially reduced.

Signal System OK

After the accident occurred, an inspection of the portion of the signal system involved, including the traffic control machine, disclosed no defect which could have contributed to or caused the accident. Although the graph of the traffic control machine does not record the positions of switches, it is evident from an analysis of the graph, however, that the train dispatcher inadvertently re-established the route for a westward movement onto the siding, instead of on the main track while switch 27 was locked in the reverse position.

By timetable special instruction this carrier modified a signal rule to permit trains to enter the siding at this point at 25 mph, which is higher than the maximum permitted under restricted speed. In the instant case the train involved passed the signal at a speed of 27 mph and it was then required, under the rules, to be operated in such manner that it could be stopped short of cars standing at any point on the siding.

It is apparent the dispatcher inadvertently established the route for X619W to enter the siding, instead of to proceed on the main track. It is also apparent the engineer of X619W was under the impression that his train was being routed onto an unoccupied siding to pass the rear portion of X352E, which he assumed was occupying the main track.

Cause: "This accident was caused by improperly routing a train to an occupied siding, and failure to control properly the speed of this train on the siding."