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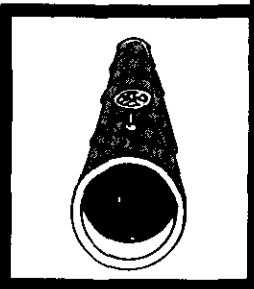
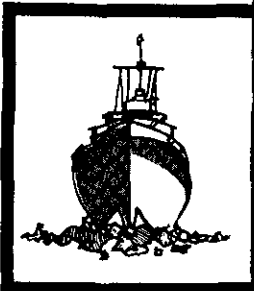
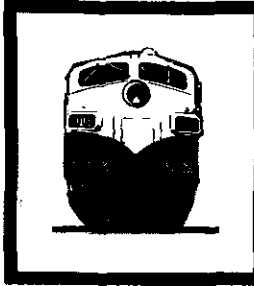
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RAILROAD ACCIDENT REPORT

DERAILMENT OF
AMTRAK PASSENGER TRAIN NO. 21
ON THE ILLINOIS CENTRAL GULF RAILROAD
SPRINGFIELD, ILLINOIS
OCTOBER 30, 1980

NTSB-RAR-81-5

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16. Abstract About 8:37 p.m., c.s.t., on October 30, 1980, two locomotive units and seven of eight cars of southbound Amtrak passenger train No. 21, the Inter-American, derailed while moving through a No. 10 main track turnout on the Illinois Central Gulf Railroad (ICG), at Springfield, Illinois. Of the 96 passengers and 12 train crewmembers on board, 4 passengers and 2 train crewmembers were injured. Both locomotive units and a sleeping car were overturned and incurred extensive damages. Total damage was estimated at \$593,000. The National Transportation Safety Board determines that the probable cause of this accident was the operation of Amtrak No. 21 into the No. 10 turnout at a speed significantly higher than the turnout's design speed, due to the failure of the train's engineer and fireman to perceive and comprehend that the color-light signal aspects displayed for their train indicated that it was to be routed through the 10-mph (No. 10) turnout. This failure resulted from the routine dispatching of passenger trains to avoid the turnout, the crew's lack of familiarity with the color-light type signal aspects, distraction of the enginemen, and the train speed exceeding the 25-mph restriction between the Springfield passenger station and Iles Tower. Contributing to the accident were ICG's poorly planned modifications to the signal and track systems at Iles and K.C. Junction, ICG's inadequate instruction of Alton District employees on the color-light signals, ICG's and Amtrak's failure to adequately monitor the performance of Alton District employees in passenger service, and the failure of the engineer of Amtrak No. 21 to wear eyeglasses as required.					
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**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594**

RAILROAD ACCIDENT REPORT

Adopted: April 28, 1981

**DERAILMENT OF AMTRAK TRAIN NO. 21
THE INTER-AMERICAN
ON THE ILLINOIS CENTRAL GULF RAILROAD
SPRINGFIELD, ILLINOIS
OCTOBER 30, 1980**

SYNOPSIS

About 8:37 p.m., c.s.t., on October 30, 1980, two locomotive units and seven of eight cars of southbound Amtrak passenger train No. 21, the Inter-American, derailed while moving through a No. 10 main track turnout on the Illinois Central Gulf Railroad (ICG), at Springfield, Illinois. Of the 96 passengers and 12 train crewmembers on board, 4 passengers and 2 train crewmembers were injured. Both locomotive units and a sleeping car were overturned and incurred extensive damages. Total damage was estimated at \$593,000.

The National Transportation Safety Board determines that the probable cause of this accident was the operation of Amtrak No. 21 into the No. 10 turnout at a speed significantly higher than the turnout's design speed, due to the failure of the train's engineer and fireman to perceive and comprehend that the color-light signal aspects displayed for their train indicated that it was to be routed through the 10-mph (No. 10) turnout. This failure resulted from the routine dispatching of passenger trains to avoid the turnout, the crew's lack of familiarity with the color-light type signal aspects, distraction of the enginemen and the train speed exceeding the 25-mph restriction between the Springfield passenger station and Iles Tower. Contributing to the accident were ICG's poorly planned modifications to the signal and track systems at Iles and K.C. Junction, ICG's inadequate instruction of Alton District employees on the color-light signals, ICG's and Amtrak's failure to adequately monitor the performance of Alton District employees in passenger service, and the failure of the engineer of Amtrak No. 21 to wear eyeglasses as required.

INVESTIGATION

The Accident

About 7:32 p.m., October 30, 1980, southbound Amtrak passenger train No. 21, consisting of two locomotive units and eight cars, arrived at Bloomington, Illinois, on the tracks of the Illinois Central Gulf Railroad (ICG). The arriving engineer informed the relieving engineer that the only problem with the train was that the locomotive's crew alerter device was not functioning. No. 21 departed Bloomington at 7:34 p.m., 4 minutes behind schedule, en route to St. Louis, Missouri, and Laredo, Texas. When the train's speed reached 55 miles per hour (mph), the engineer made a running test application of the brakes and was satisfied that they functioned properly. The engineer also stated that

he made a speed indicator check at the maximum authorized speed of 79 mph at a location about 11 miles south of Bloomington. According to the engineer, the check showed that the indicated speed was about 3 mph greater than the actual speed.

Except at Lincoln, Illinois, which is a scheduled stop, and at two locations where a general order restricted speed to 60 mph for short distances, passenger trains were allowed a maximum speed of 79 mph in the 56.3 miles between Bloomington and Ridgely Yard, located 2 1/2 miles north of the passenger station at Springfield, Illinois. Other than when accelerating or decelerating, No. 21 was operated at speeds between 80 and 88 mph over this section of track. The train's speed was reduced to about 60 mph for the first general order restriction and to about 50 mph for the second restriction. When No. 21 arrived at the Springfield passenger station (see appendix G) at 8:28 p.m., it was "on time."

ICG Extra 8002 South (SGV3-29), a 74-car southbound freight train, departed Ridgely Yard at 8:09 p.m., 14 minutes before No. 21 reached that location. Extra 8002 South passed Iles Tower, 2.15 miles south of the Springfield passenger station, at 8:24 p.m. The engineer used his radio to call out the "clear" aspect displayed by the train order signal board at Iles, and this transmission was heard by his conductor and the fireman of Amtrak No. 21. The engineer of No. 21 stated that he did not hear the transmission and was unaware that Extra 8002 South had departed from Springfield ahead of his train.

Shortly after Amtrak No. 21 left the Springfield station, the conductor learned that a passenger who had wished to get off failed to do so. The conductor transmitted a "stop-at-once" indication over the train communicating signal to which the engineer responded by applying the train brakes. The head end of Amtrak No. 21 stopped about 0.6 mile south of the station and about one-half mile north of the next intermediate block signal at South Grand Avenue, which displayed a "clear" aspect. After the conductor signalled the engineer to proceed at about 8:34 p.m., the engineer used full throttle to rapidly accelerate the train, which passed the signal at South Grand Avenue at a speed of about 45 mph.

The dispatcher stated that he intended to have No. 21 overtake Extra 8002 South after it departed Springfield on a 1.7-mile section of double track between K. C. Junction and Hazel Dell. He encoded the Centralized Traffic Control (CTC) machine to route Extra 8002 South on track No. 1, to hold the train at Hazel Dell, and to reverse the turnout at the north end of the double track at K. C. Junction to track No. 2 after Extra 8002 South passed. According to the engineer of Extra 8002 South, the home signals at Iles and K. C. Junction displayed "clear" and "approach" aspects, respectively, for his train, and his conductor stated that the K. C. Junction home signal displayed a "stop" aspect when his caboose passed it. When Extra 8002 South stopped short of the "stop" aspect displayed by the home signal at Hazel Dell, the rear end of the train was about 3,600 feet south of the north end of the double track section at K. C. Junction. After Extra 8002 South cleared the turnout at K. C. Junction, the switch automatically reversed as encoded so that it was aligned to track No. 2 for train No. 21. The dispatcher stated that he had given Extra 8002 South the straight route since moving this relatively long train through the 10-mph turnout at K. C. Junction would have taken so much time that No. 21 was sure to have been stopped and delayed as a result. The decision to route No. 21 through the 10-mph turnout was made before No. 21 was delayed while discharging the passenger south of the Springfield station.

Iles Tower is a two-story structure located west of the ICG main track and between the ICG's crossings of the Norfolk & Western Railway (N&W) and Iles Avenue. Iles Avenue is a two-lane east-west thoroughfare and its crossing of the ICG is protected by automatic flasher lights and a bell alarm. Due to track curvature, the engineer's view of the Iles Avenue grade crossing was partially masked by Iles Tower and foliage on the inside of the curve until the locomotive of No. 21 was about 700 feet from the grade crossing. According to the engineer, the home signal at Iles and the train order signal at Iles Tower displayed "clear" aspects. The engineer used the radio to report the train order signal aspect to the conductor and flagman who were in the middle of the train at the time. The engineer stated that an auto was on the crossing, but after continuous blowing of the locomotive whistle, the auto was backed off the track. The engineer of No. 21 did not initiate braking, and the train was still accelerating as it passed Iles Tower at 57 mph.

According to the engineer of Amtrak No. 21, the home signal at K. C. Junction, 2,903 feet south of Iles Tower, displayed a yellow-over-green-over-red "approach limited" aspect, indicating that his train was to be routed over the straight route to Hazel Dell, then through the 30-mph turnout at the end of the double track section. Although the fireman later corroborated the engineer's statement regarding the signal aspects, he was at first uncertain as to the aspects displayed for No. 21, and he admitted that he did not call out the aspects as required by ICG rule 34. (See appendix C.) Further, the fireman's statements indicated that neither he nor the engineer were aware of the impending accident until their locomotive entered the turnout to track No. 2. Still accelerating, Amtrak No. 21 was moving at 63 mph when it derailed in the turnout at 8:37 p.m.

Injuries to Persons

<u>Injuries</u>	<u>Passengers</u>	<u>Crewmembers and Service Personnel</u>	<u>Total</u>
Fatal	0	0	0
Nonfatal	4	2	6
None	92	10	102
Total	96	12	108

Damage

After derailling, the lead locomotive unit traveled about 400 feet south before turning into a level cornfield east of the track. When nearly perpendicular to the track, the unit turned over on the right side with the carbody separated from the trucks. The right side wall and the right side of the roof of the operator compartment were crushed inward, both halves of the windshield and the right side window were broken out, the fireman's seat was pulled out of the floor, and the right side door was unhinged and driven inward. The unit also had frame damage and most of the panel doors on the right side were caved in. The trailing locomotive unit, which also stopped in the cornfield perpendicular to the tracks and immediately north of the lead unit, turned over on its side with the carbody separated from the trucks. The operator compartment roof was crushed inward when it struck the rear truck of the lead unit. Both couplers were sheared off, the fuel tank was ruptured, and there was extensive damage to the frame, side panel doors, and the pilot. The first three cars of No. 21, a baggage car, sleeper, and a cafe car, respectively, became separated from each other and the rest of the train. The baggage car followed the locomotive into the cornfield and stopped nearly parallel to the tracks

and east of the locomotive units. It remained upright and was not untrucked. The sleeper carbody came to rest on its left side diagonally across both tracks immediately north of the trailing locomotive unit. The left carside, trucks, couplers, and underfloor apparatus were damaged. The cafe car remained upright but also straddled the tracks diagonally immediately north of the sleeper. The remaining five cars remained coupled together and in line on track No. 2 alignment. All but the last car were derailed, but as with the cafe car, damage was confined to the wheels and other truck components.

About 450 feet of track No. 2 and 150 feet of track No. 1 were destroyed, and it was necessary to replace the frog in the turnout where the derailment occurred. The northbound home signal for track No. 2 and some underground power cables for the signal system were also destroyed.

Damage was estimated as follows:

Locomotive units	\$500,000
Passenger cars	58,000
Track	20,000
Signal apparatus	5,000
Total	<u>\$593,000</u>

Crewmember Information

The engineer and fireman were regularly assigned to Amtrak No. 21 and northbound Amtrak No. 22 between St. Louis, Missouri, and Bloomington, Illinois, and had shared the assignment for about 2 months prior to the accident. (See appendix B.) Neither man could recall any time during that period when he had not worked the assignment. Their usual tour of duty lasted 3 to 3 1/2 hours and the schedules of the trains were so arranged that they could sleep and eat their meals at conventional times. Their normal time off duty when at their home terminal of Bloomington was about 36 hours. On October 29, 1980, the engineer and fireman had left St. Louis on No. 22 about 8:45 a.m., and arrived at Bloomington at 1:30 p.m., 1 hour 53 minutes late. Both stated they had a normal bed rest of 8 to 9 hours during the night and arose at about 7:00 a.m. on the 30th. The engineer recalled that he had done some banking and shopping during the day; the fireman said he had spent the day visiting a friend and his mother. Both men ate supper before reporting for duty at 7:25 p.m. The conductor and flagman reported at the same time and had been off duty the previous 23 1/2 hours.

It was the regular practice of the enginemen to have the engineer operate No. 21 for the 97 miles from Bloomington to Carlinville, Illinois, and for the fireman who was a qualified engineer, to operate the train the remaining 60 miles to St. Louis. The men reversed the procedure on the return run to Bloomington.

At the time of the accident, the ICG required that the engineer wear corrective bifocal eyeglasses at all times when on duty to correct a deficiency in his ability to see at a distance. (See appendix B.) The engineer also stated that he needed to wear the glasses to read and had difficulty making out the numbers on the speed indicator without his glasses. He also said he had only one pair of bifocals which he obtained at the time he was restricted by the railroad. Shortly after the accident, the engineer stated that he could recall wearing the glasses to read the clearance, train orders, and the general order given to him when he reported for duty at Bloomington, but was uncertain whether or not

he had worn them after that time. The engineer later insisted that he was wearing the glasses at the time of the accident and that, as a result, the glasses had been nicked and scuffed.

After the accident an assistant superintendent searched the cab for the crewmembers' personal effects. He found only the fireman's timebook and the unopened and relatively undamaged grips belonging to the enginemen. These items were taken to the division offices at Bloomington for safekeeping. The clearance form, train orders, and a general order issued to the engineer at Bloomington, wrapped together around a carrying case holding a pair of undamaged bifocal glasses, were found inside a compartment in the engineer's grip. The glasses and case were returned to the engineer the day after the accident. On November 2, 1980, Safety Board investigators examined the glasses in the presence of the engineer and found them to be free of damage.

When questioned after the accident, the engineer of Amtrak No. 21 stated that a passenger train engineer was primarily responsible for operating his train on schedule and that to do so he might have to exceed authorized speed. He also complained that the numbers on the speed indicator ought to be larger so that he could read them without wearing his eyeglasses. In his sworn testimony to Safety Board investigators, the engineer of Amtrak No. 21 was unable to correctly state the color-light aspect which was displayed at K. C. Junction for a train routed to track No. 2, and he was confused as to which aspects would be displayed at Iles for trains routed through the diverging routes at K. C. Junction. He also stated that 35 mph was the permissible speed through the 30-mph turnout at Hazel Dell.

During a videotaped interview by a Champaign, Illinois, television station the day after the accident, the engineer of Amtrak No. 21 twice stated that had he known his train was routed through the turnout at K. C. Junction, he would have had the train moving at 30 mph instead of 60 mph. The same statement was later accredited to the engineer by the Bloomington newspaper. The engineer later denied making the statements.

Train Information

Amtrak No. 21 was assembled on October 30, 1980, at Chicago, Illinois, and consisted of two locomotive units and eight cars. The lead locomotive unit and all of the cars except the baggage car had been used the previous day between Temple, Texas, and Chicago in train No. 22. Before leaving Chicago Union Station at 5:20 p.m., No. 21 had received the required inspection and initial terminal brake test. No exceptions were taken during the inspection and testing.

The locomotive of No. 21 consisted of two General Motors model F40PH 3,000-horsepower units delivered to Amtrak in 1978. The units were equipped with 4-wheel trucks, type-F couplers, type-26L air brake equipment, radio, speed indicator, speed recorder, overspeed control, and an electronic crew alerter device. The alerter device in the lead unit was inoperative from the time No. 21 left Chicago.

The train consisted of a baggage car, sleeper, cafe car, coach, cafe car, and three coaches, respectively from the head end. The sleeper had 6 bedroom compartments on one end and 10 roomette compartments, arranged 5 on each side of a center aisle, on the other end. This car had been upgraded at Amtrak's Beech Grove, Indiana shop in

July 1980. The cafe cars and coaches were of the new "Amfleet" design. All cars in the train had 4-wheel trucks, type-H "tight-lock" couplers, and self-contained emergency lighting systems. A communicating signal line was connected and functional throughout the train. In addition, the flagman had been furnished a small portable radio for communications with the engine crew.

Method of Operation

The line involved in the accident was the north-south Alton District of ICG's St. Louis-Missouri Division. Prior to August 1972, this was the main line of the Gulf, Mobile and Ohio Railroad (GM&O). Trains are operated over the Alton District by the signal indications of a Centralized Traffic Control system operated by a dispatcher at Bloomington. Train crews are also directed in their duties by radio-transmitted instructions from the dispatcher.

ICG St. Louis-Missouri Division Timetable No. 4, dated August 3, 1980, was in effect at the time of the accident. At the time, three Amtrak passenger trains operated over the Alton District each way daily. The timetable authorized 79 mph and 50 mph as the maximum permissible speeds for passenger and freight trains, respectively, except at locations where other speed restrictions were in effect. The following speed restrictions were in effect for passenger trains at the time of the accident: 15 mph from the Springfield passenger station to Capitol Avenue, 1/ (about 0.2 mile); 25 mph from Capitol Avenue to Laurel Street (slightly over 1 mile); 60 mph over the N&W crossing at Iles; 10 mph through diverging turnouts at K. C. Junction; and 30 mph through all other diverging remotely-controlled CTC turnouts between Bloomington and Carlinville. When the engineer and conductor of Amtrak No. 21 reported for duty at Bloomington, they were given a general order which covered five speed restrictions and four train orders, two of which covered temporary speed restrictions and one which annulled one of the speed restrictions covered by the general order. None of the remaining order restrictions applied to the territory between the Springfield passenger station and Hazel Dell. (See appendix D.)

Illinois Central Gulf operating rule 34, as amended on January 1, 1978, requires all employees located in the operating compartment of a locomotive to communicate "when practicable" with each other in an audible and clear manner the name or aspect of each signal affecting movement of their train as soon as they can clearly see the signal. The rule also requires crewmembers who are aware of the engineer's failure to comply with a signal, and who have communicated with him without receiving the proper response, to protect the train by taking action which may include opening the emergency brake valve. (See appendix C.)

According to the fireman of Amtrak No. 21, it was his custom and the engineer's to call out only restrictive signal indications. ICG does not formally require its engineers to check the accuracy of locomotive speed indicators, and the St. Louis-Missouri Division timetable does not show any designated test miles for making such checks. However, the former GM&O had designated the track between mileposts 137 and 138 south of

1/ The timetable does not give milepost references for the Springfield street locations where the allowable speed changes. There are no speed restriction signs, or signs identifying the streets on the ICG right-of-way.

Bloomington as a southbound test mile. A sign erected north of milepost 137 identified the location as a test mile and this was still in place on October 30, 1980.

The Safety Board's investigation found that whenever possible the dispatchers routed trains operating in both directions through the 30-mph turnout at Hazel Dell rather than through the 10-mph turnout at K. C. Junction. The dispatchers estimated that as few as 5 to 10 percent of the trains were routed through the 10-mph turnout. The fireman of No. 21 could not recall a single occasion when his train was routed through the 10-mph turnout and the engineer thought he had been routed that way on only one occasion.

Iles Tower is a manually-operated interlocking plant manned continuously for ICG and Norfolk and Western Railway (N&W) by operators who are employees of N&W. ICG also uses Iles Tower as a continuously-operated train order station. The operator could communicate with the dispatcher at Bloomington by the dispatcher's telephone line. However, the operator was not furnished an ICG radio. N&W required the operator to inspect N&W trains as they passed from a ground location outside the tower. ICG permitted the operator to observe ICG trains from inside the second floor office area of the tower.

Track, Signal, and Crossing Information

Formerly, the Alton District from Bloomington southward to Springfield, Iles, and beyond was a double-track main line with automatic block signals. By 1972, the GM&O had changed most of this territory to single track under Centralized Traffic Control. The change was made by removing one main track except for short sections which were utilized as passing tracks. No. 20 turnouts with dual control power switches were installed at the ends of all the passing tracks. The only remaining double-track section was the 6.6 miles between Ridgely Yard, on the north side of Springfield, and Hazel Dell (then known as Iles South). The southbound main track was terminated at Iles South and was connected to the northbound main track with a No. 20 turnout. At this time, all of the signals on the Alton District were of the approach-lighted color-position type.

The single-track Air Line District to Kansas City formerly left the southbound Alton District main track by way of a right-hand turnout at Iles tower. During 1975-1976, ICG made some substantial track and signal changes at Iles in order to give trains moving over the former Illinois Central main line, which parallels the Alton District to the east, access to the Kansas City line. This was accomplished by moving the Kansas City turnout to a point on the southbound main track 3,070 feet south of Iles Tower, retiring the northbound main track between the N&W crossing and the new junction, and placing the southbound main track between those points under CTC. A No. 10 turnout with power switch was installed to connect the southbound main track with the remaining section of the northbound main track. Opposing home signals of the continuous-lighted color-light type used on the former Illinois Central were installed on both sides of the new junction. The southbound home signal consisted of three signal heads mounted on a vertical mast west of the main track.

Coincident with the track changes, the southbound and northbound main tracks between the new junction and Iles South were redesignated tracks No. 1 and No. 2, respectively. The new junction was initially called Iles and the old Iles interlocking was renamed N&W Crossing interlocking. (See figure 1.) Early in 1976, ICG completed the new access line from former Illinois Central trackage adding a third No. 10 turnout at the



Figure 1.--View from southbound train approaching the home signal and tower at Iles. Iles Avenue crossing is beyond the tower.

new Iles interlocking. Later in 1976, the southbound home signal for the N&W crossing was changed to continuous-lighted color-light type with two signal heads on a mast to the west of the southbound main track. (See figure 1.) Finally, at the end of 1978, the northbound main track from N&W Crossing interlocking to Ridgely Yard was removed and the former southbound main track was placed under CTC.

The new Iles interlocking was renamed K. C. Junction early in 1976. Later ICG restored the old designation of Iles to the N&W Crossing interlocking and changed the name of Iles South to Hazel Dell. The various name changes reportedly caused much confusion among employees and supervisors. This was evident from the wording of operating bulletins issued to cover the changes. (See appendix E.) During the Safety Board's investigation, the engineer of Amtrak No. 21 twice referred to K. C. Junction as Iles South, a senior signal supervisor several times referred to Hazel Dell as Iles South, and other employees and supervisors were heard to misname the various locations.

When Amtrak No. 21 made its last stop at Springfield, the approximate location of the locomotive was milepost 185.7, slightly more than one-half mile south of the Springfield passenger station and about 2.2 miles north of the left-hand turnout to track No. 2 at K. C. Junction. For the first 1.3 miles, the single main track was tangent. For the remaining .9 mile to the turnout, the track was in a $0^{\circ} 30'$ curve to the right southbound. Superelevation throughout this curve varied from $1 \frac{1}{4}$ inch to $1 \frac{1}{2}$ inch. Beginning at milepost 185.7, the gradient southbound was 0.65 percent ascending for 0.1 mile, then 0.17 percent ascending for 0.6 mile. From milepost 186.4 to the accident location the grade was level. The permitted speeds of trains required the track to be maintained to the Federal track safety standards for Class 4 track.

The derailment occurred on the turnout side of a No. 10 left-hand facing point switch built of 115-pound jointed rail with 16-foot, 6-inch Sampson switch points and a No. 10 frog. The first mark on top of the rail was 36 feet 10 1/2 inches behind the turnout switch point. Cross level was 2 inches low at the switchpoint, 1 1/2 inches low at the heel of the switchpoint, and 1 1/2 inches low at the point of derailment, on the right-hand rail.

The southbound color-light type home signals at Iles and K. C. Junction were installed during 1975 and 1976 and were arranged to display three different combinations of aspects, one combination for each of the three routes a southbound train could take at K. C. Junction. The Iles-K.C. Junction section was the only location on the Alton District where these aspect combinations could be displayed. Gulf, Mobile and Ohio had adopted an advanced design of color-position signal (see appendix C), the aspects of which were radically different than those of the IC color-light signals. On October 30, 1980, the former GM & O color-position signals were still in use throughout the Alton District except at Iles and K. C. Junction.

The three-aspect color-light combinations that could be displayed at Iles and K. C. Junction and the routes they governed were as follows:

If the dispatcher had encoded the route for a southbound train to take the diverging Air Line District Route toward Kansas City by way of the right-hand facing-point turnout, the following aspects should have been displayed by the southbound home signals:

Home Signal at Iles

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
284	Yellow-over-yellow	Medium approach	Proceed: approaching next signal prepared to enter turnout at prescribed speed (10 mph as per timetable) but not exceeding 30 mph

Home Signal at K. C. Junction

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
288	Red-over-red-over-green	Slow clear	Proceed: at prescribed speed within interlocking limits or through turnout (10 mph as per timetable)

With the turnouts at K. C. Junction aligned for straight movement over track No. 1 but with the turnout at Hazel Dell aligned for movement through the turnout from track No. 1 to track No. 2, the route the engineer of No. 21 thought he was taking, the following aspects should have been displayed by the southbound home signals:

Home Signal at Iles

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
281	Green-over-red	Clear	Proceed

Home Signal at K. C. Junction

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
283	Yellow-over-green-over-red	Approach limited	Proceed: approaching next signal prepared to enter turnout at prescribed speed, (30 mph) but not exceeding 40 mph.

With the left-hand facing-point turnout at K. C. Junction aligned for movement through the turnout to track No. 2 and the turnout at Hazel Dell aligned on the straight route from track No. 2, the route the dispatcher coded for No. 21, the home signals should have displayed the following aspects:

Home Signal at Iles

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
283	Yellow-over green	Approach limited	Proceed: approaching next signal prepared to enter turnout at at prescribed speed, (which was 10 mph) but not exceeding 40 mph.

Home Signal at K. C. Junction

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
286	Red-over-green over-red	Diverging clear	Proceed on diverging route; not exceeding prescribed speed through turnout (which was 10 mph at K. C. Junction)

The train order signal at Iles Tower was of the lighted semaphore type with day and night aspects displayed for the indications "stop" and "proceed." The day aspect for "proceed" was the semaphore blade displayed vertically in the upper quadrant; the night aspect was a green light. The day aspect for "stop" was the semaphore blade displayed on a horizontal axis; the night aspect was a red light. The Illinois Central Gulf Railroad Rules provide for the following train order signal aspects.

<u>Rule No.</u>	<u>Aspect</u>	<u>Name</u>	<u>Indication</u>
297	Red light; horizontal sema- phore blade	Stop	Stop; unless clearance received
298	Green or yellow light;diagonal semaphore blade in lower quadrant	Clear	Proceed

However, the timetable in effect included a modification to the rules which acknowledged that train order signals at some locations display the "proceed" aspect by having the semaphore blade inclined vertically upwards.

Prior to July 25, 1977, the rail/highway grade crossing of Iles Avenue and ICG was protected by flashing lights and gates manually operated by the Iles Tower operator. These devices were replaced with automatic flashers and a bell alarm mounted on short masts on each side of the crossing. This change was coordinated with reconstruction of the horizontal and vertical approaches of Iles Avenue to the crossing and relocation of the crossing itself slightly to the south of the original alignment. All of the changes were ordered by the Illinois Commerce Commission (ICC) in December 1975. A count of more than 19,000 motor vehicles using the crossing in a 24-hour period was tallied by ICC on April 1, 1975.

On October 31, 1980, Safety Board investigators observed traffic over the Iles Avenue crossing between 8:00 p.m. and 9:00 p.m. During this period, the flow of vehicles was virtually constant in both directions with traffic frequently stopping on the crossing due to congestion at intersections east and west of the crossing. Subsequent observations revealed that many motorists ignored the flashers and bell as well as the warning whistles of trains approaching the crossing. (See figure 2.)

Meteorological Information

At the time of the accident it was clear and dry. There was no atmospheric restriction to ground visibility. The temperature was 37° F, and winds were southwesterly at 10 mph.

Medical and Pathological Information

Four passengers were taken to Springfield hospitals. Three passengers had minor injuries and the fourth passenger, a pregnant woman, had no apparent injury but was taken to the hospital as a precaution. None of the passengers were hospitalized. Of the crewmembers, the fireman, who had injuries to both knees and the neck, was hospitalized. The engineer, who had multiple bruises and lacerations, was released after outpatient treatment. Postaccident toxicological examinations of the engineer and fireman were negative for alcohol and drugs.

Survival Aspects

Except the sleeper, which sustained extensive underfloor damage to the electrical system, the emergency lighting system of each car functioned as intended after the accident.



Figure 2.—Alton Division main track viewed facing north, showing southbound approach to N&W crossing and Iles Tower. Iles Avenue crossing is in the foreground.

The conductor and flagman were in the fourth head car at the time of the derailment. The flagman used the small portable radio he had been furnished to transmit a "Mayday" call for emergency assistance. He also tried unsuccessfully to contact the enginemen. The "Mayday" alert was monitored by the engineer and conductor of Extra 8002 South and by the night yardmaster at Ridgely Yard. The yardmaster promptly notified the Springfield-Sangamon County Rescue Squad, and emergency personnel began arriving on scene about 15 minutes after the accident. The crew of Extra 8002 South responded by backing their train so that the caboose was in the vicinity of the derailed passenger train. The conductor then took a lantern and went to assist the crew of No. 21. After notifying the dispatcher and receiving his permission, the freight train crew detached their locomotive, moved to track No. 2 through the turnout at Hazel Dell, and backed down to the derailment area. The locomotive's rear headlight was then used to effectively illuminate the area during the rescue and evacuation operations.

The conductor of Amtrak No. 21 had more than 14 years of emergency training and experience as a volunteer fireman in his home community. While the flagman was summoning help, the conductor went forward to the lead coach, checked for injured persons, calmed several passengers, including children, and then led and assisted the passengers to the rear of the train where he thought they would be the safest until help arrived. The conductor then went to the overturned and unlighted sleeper where he found all eight passengers trapped in their compartments, unable to open the doors. With the help of the sleeping car porter, the conductor managed to open all the compartment doors and evacuated the passengers from the car.

The engineer was pinned between his seat and the control stand in the locomotive cab. The fireman was laying unconscious behind the back of the control stand. The first person to attempt to help the engineman was a man who lived next to the tracks on a dead-end street south of the derailment site. He was later joined by the baggagemaster, the conductor, and a male nurse who had been a passenger on the train. After rescue squad members arrived, the fireman regained consciousness and was helped out of the cab. About 1 1/2 hours after the accident, rescuers finally succeeded in freeing the engineer. (See figure 3.)

After emergency forces arrived on the scene and the locomotive of Extra 8002 South illuminated the accident area, the passengers were evacuated to the dead-end street. (See figure 4.) The resident who had tried to free the enginemen opened his home to the passengers, crewmembers, and emergency personnel. Ultimately, the passengers were transported by Springfield Mass Transit District buses to the Springfield passenger station where they were sheltered until Amtrak could arrange bus transportation to St. Louis.

Postaccident Inspection and Testing

Examination of the speed recorder tape removed from the locomotive of No. 21 revealed that prior to arriving at Bloomington, the train was consistently operated at speeds recorded at about the 80-mph level, occasionally reaching as high as 83 mph and as low as 77 mph. The tape also indicated that after leaving Bloomington, the train was consistently operated at speeds of 85 mph or above, twice reaching the 88- to 89-mph level and twice dropping to 80 mph. (See appendix F.)

Following the accident, the speed recorder and speed indicator were calibrated on the basis of an actual wheel diameter of 39.31 inches. It was disclosed that speed was recorded at a rate 2 mph greater than actual speed up to 70 mph; 1 mph greater than actual speed from 80 to 95 mph; and at the correct rate at 100 mph. It was also found that speed was indicated at a rate of 1 to 1 1/2 mph slower than actual speed at virtually all speeds. When the train was traveling at an actual speed of 80 mph, the needle of the speed indicator would be at 79 mph and the speed being recorded on the tape would be 81 mph.

Postaccident sight-distance tests indicated that the fireman should have been able to see clearly and continuously the southbound home signal at Iles from the time No. 21 reached a point 6,060 feet north of that signal and 834 feet north of intermediate block signal 1863 at South Grand Avenue. The engineer should have been able to see the home signal at Iles when it was still 4,760 feet ahead of his train. Due to foliage west of the track and track curvature between Iles and K. C. Junction, the southbound home signal at K. C. Junction was not fully visible to the engineer until his locomotive was 1,676 feet north of the signal. The fireman should have been able to see the home signal when it was over 1,900 feet ahead.

No meaningful postaccident observation of the locomotive controls could be made since it was necessary for rescuers to move the various control handles in the process of releasing the engineer from the operator compartment.

After repairs were made to damaged cables and apparatus, the signal system was restored to service on November 4, 1980. ICG signal supervisors and Federal Railroad Administration signal inspectors inspected and tested the system on that date. All cables,

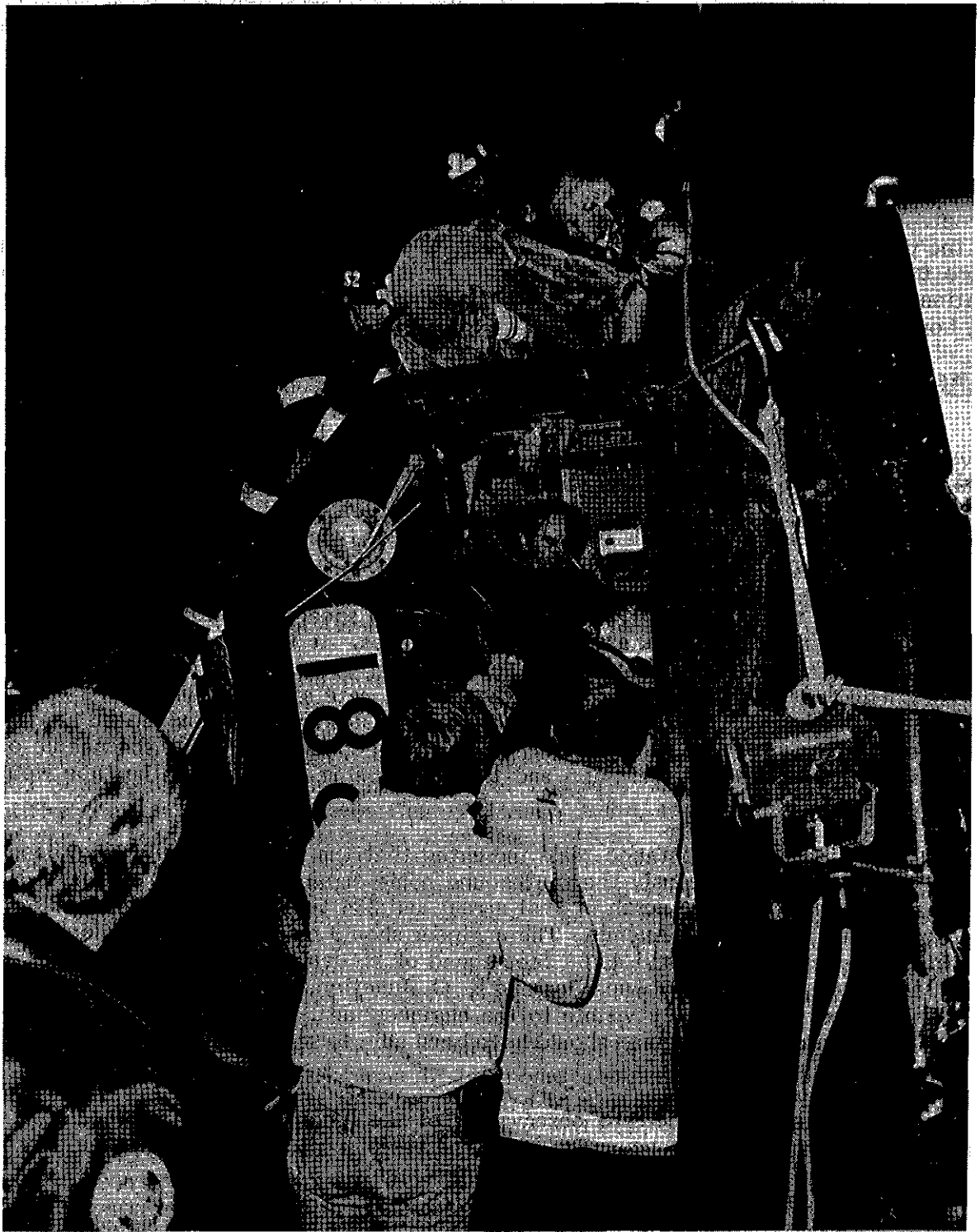


Figure 3.—Emergency personnel removing the engineer from the lead locomotive unit of Amtrak No. 21 about 90 minutes after the train derailed.



Figure 4.—Passengers of Amtrak No. 21 during the evacuation from the derailment area.

relays, and circuitry were found to be free of defect. The combination of signal aspects the fireman and engineer of No. 21 stated they saw displayed at Iles and K. C. Junction could not be duplicated with the left-hand turnout at K. C. Junction aligned to track No. 2, or aligned on the normal, straight route with track No. 1 occupied.

According to Amtrak, the approximate distance required to reduce the speed of a train similar in makeup to Amtrak No. 21 on October 30, 1980, from 60 to 10 mph with a full-service application of the train brakes on level track would be 0.4 mile or 2,100 feet.

Training and Supervision

ICG requires employees in train and engine service to attend instruction and examination classes on the rules, timetable, and other instructions which are conducted by division supervisors every 4 years. The last such classes were conducted in 1978 and ICG plans to conduct classes again during 1982. No special program of training Alton District employees was conducted after color-light type signals were installed at K. C. Junction and Iles during 1975 and 1976. A qualified engineer is considered by ICG to be qualified in both freight and passenger service and no special training or handling is given to an engineer when he moves up to a regular passenger train assignment.

ICG operating supervisors are tested annually on their knowledge of the rules, the timetable, and current bulletin instructions. They are expected to routinely make periodic efficiency checks of train crews during the course of their normal duties. Alton District records indicate that the engineer and fireman who were involved in this accident were subjected to an en-route wayside check by a trainmaster on September 4, 1980. Torpedoes ^{2/} were placed on the rails, and after the train passed over these, the train was observed to have reduced speed by throttle reduction and train brake application. The trainmaster also noted that the train, Amtrak No. 21, had red markers properly displayed to the rear. On September 9, 1980, the same trainmaster rode with the engineer and fireman from St. Louis to Bloomington on Amtrak No. 22. According to the trainmaster, the enginemmen called all signal aspects as required and he evaluated their performance as "very satisfactory."

The investigation found that neither ICG nor Amtrak operating supervisors monitored the locomotive speed recorder tapes of passenger trains to ascertain whether or not the trains were operated in compliance with speed restrictions. There was no record of Amtrak supervisors riding the locomotives of trains No. 21 and No. 22, no record of Amtrak officials taking exception to the track and signal changes made at Iles and K. C. Junction, and no record of en-route checks of Amtrak trains in the Alton District.

ANALYSIS

Operation of Amtrak No. 21

Because the engineer of Amtrak No. 21 wanted to operate the train on schedule, he repeatedly violated the maximum allowable speeds for his train. Although the train departed from Bloomington 4 minutes behind schedule, the engineer was able to make up this time by operating the train between Bloomington and Springfield beyond the maximum authorized 79 mph. However, the need to stop after leaving the Springfield

^{2/} Torpedoes are percussion-type charges attached to the tops of rails and which can be easily heard when locomotives pass over and detonate them.

passenger station had again put the train 4 minutes behind schedule. In an effort to make up some of the lost time, the engineer accelerated Amtrak No. 21 at maximum power attaining a speed of 47 mph by the time the train reached the end of a 25-mph restriction at Laurel Street. Since the intermediate block signal at South Grand Avenue had displayed a "clear" aspect, the engineer knew that his train would not be stopped at the N&W crossing at Iles Tower. Because the fireman heard the engineer of Extra 8002 South radio the train order signal aspect at Iles, the Safety Board believes that the engineer of Amtrak No. 21 also heard this radio transmission, understood that the freight train was ahead of his train, and interpreted the "clear" aspect at the South Grand Avenue signal to mean that the freight train had already cleared K. C. Junction. On the basis of their past experience, the enginemen could assume that the dispatcher intended for Amtrak No. 21 to overtake the freight train on the double track between K. C. Junction and Hazel Dell. It probably never occurred to the enginemen that Extra 8002 South would be occupying track No. 1 and that the passenger train was to be routed through the turnout to track No. 2 at K. C. Junction.

The most critical event that preceded the accident was the failure of No. 21's engineer and fireman to observe and comprehend the aspect displayed by the home signal at Iles Tower. This aspect should have indicated to them the route their train was to take at K. C. Junction. Had the signal displayed a green-over-red "clear" aspect to take the straight route, as they supposed, they could pass through K. C. Junction as fast as 79 mph. However, if the signal displayed a yellow-over-green "approach limited" aspect, the train's speed would have to be reduced to 10 mph to permit entering the turnout to track No. 2.

The home signal at Iles should have been visible to the engineer when Amtrak No. 21 was still 4,760 feet north of it. Since the train covered that distance in slightly more than 1 minute, at an average speed of 50 mph, the engineer had to have the ability to promptly recognize and properly interpret the aspect during that time. However, he was apparently totally distracted from that task by, first, the necessity to observe and report to the trainmen the aspect of the relatively dim train order signal located beyond and almost directly in line with the home signal at Iles. Had the train order signal indicated there were train orders for No. 21, the flagman would have to be informed of the fact soon enough to open a vestibule door and get into position to catch the orders as he passed Iles Tower. Since the engineer was probably reluctant to reduce speed for that purpose, the Safety Board believes that he concentrated on the train order signal rather than the home signal. This would be particularly likely in the event the engineer had already assumed that his train was to use the high-speed route through K. C. Junction. No sooner had the engineer recognized and reported the "clear" train order signal, he was confronted by another distraction, the Iles Avenue crossing. Particularly since there was heavy traffic on the street, the engineer's view of the crossing was restricted, and a vehicle may very well have been standing on the crossing. The engineer's attention was probably riveted to the crossing until after he had passed the home signal. The fireman, who was experienced and a promoted engineer, should have observed the signal, but was just as preoccupied with the train order signal and the crossing as was the engineer.

Having most likely failed to perceive and comprehend the signal at Iles, the engineer continued to accelerate Amtrak No. 21, and by the time he was in a position to see the home signal at K. C. Junction, the train was moving at about 60 mph. Had the engineer instantly perceived the aspect as meaning he was routed through the 10-mph turnout and

had immediately made a full-service application of the train brakes, the train probably would have been slowed sufficiently to traverse the turnout safely. However, it is obvious that neither engineman recognized the signal aspect as being different from what they normally received for the straight route and did not realize that their train was routed through the turnout until their locomotive had entered it.

The engineer had reduced ability to see at a distance and was required to wear corrective eyeglasses at all times while on duty. Nevertheless, he put the glasses and train orders in his grip after reading the orders at Bloomington and did not use them again prior to the accident. This may explain why he made an excessive reduction of speed to 50 mph to comply with a 60-mph slow order between Bloomington and Springfield at a time when he was trying to make up lost time, and also explain the discrepancy between his statement concerning the accuracy of the locomotive speed indicator and the results of the postaccident calibration of the indicator. Without his glasses, the engineer probably had more than normal difficulty making out the dim train order signal which contributed to a protracted preoccupation with this signal. Similarly, without his glasses the engineer may have had difficulty distinguishing at a distance the difference between the signal aspect displayed at K. C. Junction and the very similar aspect he was accustomed to seeing at that location.

The investigation revealed that the engineer was not very familiar with timetable speed restrictions, particularly those governing the K. C. Junction turnout which was the most restrictive of any turnout he might have to use on his regular run over the Alton District. Although the color-light signals at Iles and K. C. Junction had been in service for several years, this was the only section on the entire Bloomington-St. Louis trackage used by Amtrak passenger trains where this type of former-IC signal was installed and where three different combinations of aspects indicating separate routes could be displayed. It is evident that the engineer and fireman had never before been confronted by the combination of aspects indicating their route was through the turnout to track No. 2. Since "approach limited" was the most favorable aspect that could be displayed for southbound trains at K. C. Junction and was the aspect habitually displayed there, the enginemen may not have perceived it to be a restrictive aspect when and if they saw it at Iles. Whatever aspect they thought they saw, they did not call it out as required by the rules, and they stated they did not make a practice of calling out nonrestrictive signal aspects. Being former GM&O employees, they had no exposure to the color-light signals prior to 1975 and had received little instruction on these signals since that time. ICG had conducted rules and timetable instruction and examination classes on the Alton District only once since the signals were installed. The employees were expected to learn the signal aspects and signal aspect combinations on their own. But even if they had done this, the knowledge of the relatively complicated color-light signal system the ICG management favored could be readily forgotten if it was seldom needed to be recalled.

Changes in the Track and Signal Systems

The track changes made by ICG between Springfield and Hazel Dell were motivated by the desire to give the former Illinois Central main line a direct connection with the former GM&O Kansas City line. Prior to the advent of the ICG changes, there was a continuous main line for northward trains whereas southbound trains left the double-track section by way of the 30-mph turnout at Hazel Dell. Since the changes resulted in operating difficulties for the Alton District, it appears that little advance and coordinated planning was involved. Apparently, ICG did not make an analysis which would have taken

into account the system's operational efficiency and safety factors. The changes were made piecemeal and were probably based on what was most expedient and least costly at the time. The decision to remove the northbound main track between K. C. Junction and Iles in 1975 eliminated the opportunity to have a continuous main track once Centralized Traffic Control was fully installed. The choice of a No. 10 turnout at the end of the truncated section of double track at K. C. Junction when all other CTC turnouts on the Alton District were the 30-mph No. 20 design was particularly unfortunate. Instead of having two relatively high-speed running tracks 1.7 miles long, ideal for flexible operation under CTC, the dispatchers were given a bottleneck at K. C. Junction which they avoided by running as many trains as possible through the 30-mph turnout at Hazel Dell. As often as possible, meets and runarounds were staged at other locations which had the higher-speed turnouts at both ends. Avoiding the use of track No. 2, particularly as a runaround track, was in itself an unsafe practice because it became commonplace and may have caused train crews to anticipate such action. However, an alert dispatcher might take the option of using track No. 2 as a runaround track for a passenger train if it would probably eliminate a potential delay to that train. Such an occasion was reportedly very rare, but it happened on the night of the accident, and in combination with other factors, set the stage for the derailment of Amtrak No. 21.

When ICG installed the color-light type southbound home signal at K. C. Junction in 1975, and replaced the color-position type home signal at Iles with a color-light type in 1976, it arranged totally different aspect combinations for each of the three routes that a southbound train could take at K. C. Junction. The least restrictive signals were those displayed for the straightline route over track No. 1 and through the turnout at Hazel Dell. The next least restrictive aspects were those displayed for the route through the turnout to track No. 2, and the most restrictive aspects were those displayed for a train routed through the turnout to the Kansas City line. Of the three aspect combinations, the two most similar to each other were those displayed for the Alton District No. 1 track and No. 2 track routes, either of which might be used by 79-mph passenger trains. The most dissimilar set of aspects were those displayed for the 50-mph trains being diverted to the freight-only Kansas City line. Since Iles was the first signal to indicate the routing of southbound trains, it was the more critical of the signals and the use of the most restrictive aspect there would probably have been much more effective in alerting enginemen to the fact that they were routed through the low-speed turnout at K. C. Junction. Particularly in view of the relatively short distance between the signals at Iles and K. C. Junction, the signal engineers who designed the system should have considered the necessity of alerting crews by displaying the most visibly striking aspect it was possible to display at Iles. However, the investigation revealed that the ICG was content that there was adequate stopping distance for passenger trains between the two signals and that engineers could be relied upon to acquaint themselves with the color-light aspects so thoroughly that even if they rarely, if ever, saw an aspect they would instantly recognize it and know what action was required. The wisdom of that reasoning is questionable, at best, in light of what occurred preceding this accident.

Ultimately, ICG retired the northward main track from Iles to Ridgely Yard. Had the southward main track between the same points been retired instead, southbound engineers would have had the ability to see from a greater distance the home signals at Iles and K. C. Junction, the train order signal at Iles, and the Iles Avenue crossing. Realigning Iles Avenue to the south only made the engineers' view of the crossing more restricted than before. Removal of the crossing gates also contributed to the hazardous nature of the Iles Avenue crossing.

The limits of ICG's timetable and speed restrictions should have been identified by milepost references as was done in the case of speed restrictions stipulated in general orders and train orders, rather than by the names of city streets. Considering the Alton District crossed 15 streets between the Springfield passenger station and the end of the 25-mph speed restriction at Laurel Street, it was unreasonable to assume that without speed limit signs or street name signs, engineers would know where the restrictions began and ended.

Permitting passenger trains to operate as fast as 79 mph over the 0.9 mile of trackage between the end of the 25-mph territory at Laurel Street and the 60-mph restriction at Iles Tower was meaningless unless the engineers violated the lesser speed restrictions. Considering the distractions that the engineer of Amtrak No. 21 encountered in this section, it is evident that enforced operation at a considerably lesser speed here and in the short section between Iles and K. C. Junction would be prudent and would not materially affect the running time of the trains.

Although the electronic crew alerter device of the locomotive of Amtrak No. 21 was inoperative, the investigation revealed no indication that the enginemen were other than normal, rested, and fully alert prior to the accident. As a result, the lack of a functioning alerter device was not considered to be a factor in this accident.

Training and Supervision

ICG train and engine service employees are required to attend rules and timetable training classes when they are held every 4 years. This program was not changed on the Alton District even when the color-light type signals were installed at Iles and K. C. Junction. It was not until 3 years after the initial installation of the signals that classes were conducted, and there have been none since. This probably is a fair indication of ICG management's lack of concern for the safety of its operations and assurance that employees have the proper understanding of how they are to function even when radical changes in the operation are made. A further questionable reflection of management attitude is evident in the performance of Alton District supervisors. Although the engineer involved in this accident had a record of noncompliance with speed restrictions and restrictive signal indications (see appendix B), he was evidently allowed to move from freight to regular passenger service without any special instruction or training. Although the ICG medical department had restricted the engineer by requiring him to wear glasses at all times while on duty, he was apparently allowed to reenter service as a passenger engineer before he was notified of that fact. Since no supervisor had followed up to ensure that the engineer had the glasses and was wearing them as required, the engineer was permitted to operate trains without anyone determining whether or not he was complying with the eyeglass requirement.

As a result of his off-the-job training and experience as a volunteer fireman, rather than from any emergency training received as an ICG employee, the conductor of Amtrak No. 21 knew how to take immediate and effective action to provide for the comfort and safety of his passengers after the accident occurred. His highly-skilled handling and evacuation of the passengers, coupled with the emergency lighting equipment of the cars, prevented panic and was probably instrumental in the prevention of injury to the passengers during the evacuation. Actions on the part of the crew of Extra 8002 South, including their ingenuity in illuminating the accident area with their locomotive's headlight also contributed to the successful postaccident operation. The Safety Board

also recognizes and commends the family which assisted in the rescue of the enginemen and opened their home to the passengers and emergency rescue personnel.

Operational Safety On ICG

Since 1969, the Safety Board has investigated 10 major accidents which occurred on Illinois Central Gulf and its predecessor, Illinois Central Railroad. Seven of these accidents involved passenger trains. Additionally, 10 of the 28 Safety Board field investigations of ICG derailments and collisions since 1976 involved passenger trains. Sixty-two persons were killed and 808 persons were injured in the 17 passenger train accidents, a toll far exceeding the experience of any other U. S. railroad system during the existence of the Safety Board. Including those resulting from the investigation of this accident, the Safety Board has made 29 safety recommendations to IC and ICG, far more than have been made to any other railroad.

On September 8, 1970, the crew of an Illinois Central Yard train failed to comply with a restrictive signal indication and their train collided with the train of another railroad at Riverdale, Illinois. ^{3/} The Safety Board's investigation developed that track changes led to modification of the critical signal so that it continuously displayed a red "stop-and-proceed" aspect which, in turn, resulted in train crews habitually disregarding the signal's aspect. Further, a few days before the accident, IC modified its rule covering the aspect so that it was no longer necessary for trains to stop before passing the signal. The Safety Board concluded that the accident would not have occurred had the IC crew complied with the rules. However, the Board's probable cause also included IC's failure to provide positive protection after making the track and signal changes, and "inadequacies in IC's operating rules, practices, and personnel training." As a result, the Safety Board recommended that IC "take the necessary action to ensure that its employees comply with the Company's operating rules." The recommendation was subsequently reiterated in the Safety Board's special study on train accidents attributable to employee negligence. ^{4/}

The collision of two ICG commuter trains at Chicago in October 1972 killed 45 persons and injured 332. ^{5/} The Safety Board concluded that the same inadequacies in ICG's operating rules, practices, and personnel training which had contributed to the Riverdale accident were also factors in the Chicago accident. Further, the Board stated that ICG's supervisors had accepted the inadequacies and suggested that management had failed to respond to the situation. As a result of its investigation, the Safety Board recommended that ICG "ensure that its employees understand and comply with its rules;improve its training program by developing: a system of regularly testing the ability of employees to interpret actions required in specific operating situations;" and "....review its organizations systematically to ensure that safety is covered adequately in all interactions of equipment, personnel, rules, and procedures."

^{3/} Railroad Accident Report--"Illinois Central Railroad Company and Indiana Harbor Belt Railroad Company, Collision Between Yard Trains at Riverdale, Illinois, September 8, 1970" (NTSB-RAR-71-3).

^{4/} Special Study--"Train Accidents Attributed to the 'Negligence of Employees'" (NTSB-RSS-72-1).

^{5/} Railroad Accident Report--"Collision of Illinois Central Gulf Railroad Commuter Trains, Chicago, Illinois, October 30, 1972" (NTSB-RAR-73-5).

On October 12, 1979, a switchtender at ICG's Harvey, Illinois yard threw a main track switch in front of a moving Amtrak passenger train causing the train to enter a track occupied by a standing freight train. ^{6/} Two crewmembers on the freight train were killed and 44 persons were injured. The investigation revealed that the switch involved in the accident had no interlock or other positive means to prevent its movement, and that the switchtender had not been adequately trained or supervised in his duties. Further, it was learned that this and other main track switches at Harvey had formerly been equipped with electric lock devices. Apparently to expedite operations, ICG had removed the electric locks but had not substituted any positive means to protect against the accidental misalignment of the switches. Among the recommendations the Safety Board made to ICG as a result of the investigation of this accident was yet another call for improved employee training and supervision.

During the decade between the Riverdale and Springfield accidents, ICG responded positively to a number of Safety Board recommendations. However, basic inadequacies in rules, practices, and personnel training, repeatedly cited by the Board, have seemingly continued to persist. Engineering changes have continued to cause operating situations that ultimately are at least factors in serious accidents. The record suggest that there has not been the fundamental change in ICG policy necessary to produce meaningful and long-lasting improvement in operational safety. Neither the 1972 catastrophe at Chicago nor the 1973 Safety Board recommendation that safety be factored into all operational aspects seem to have resulted in any demonstrable change in the situation.

Amtrak Concern For Safety

On June 10, 1971, Amtrak passenger train No. 1 derailed on the Illinois Central near Salem, Illinois. ^{7/} Eleven passengers were killed and 163 persons were injured in this, the first major Amtrak accident. There have been a number of derailments and collisions involving Amtrak trains on ICG since this accident including five that occurred during the 13 months preceding the Springfield accident. All but one of these, as was the case with the Springfield derailment, occurred within a 200-mile radius of Chicago.

Amtrak was justifiably concerned with "on time" performance, but should have been even more concerned with the safety of its trains and its passengers. Although ICG operated its trains, Amtrak could have remedied the situation since it always had the option to operate its trains over other railroads between Chicago and St. Louis. Since it elected to use ICG, Amtrak, having operating supervisors, safety supervisors, route engineers, and other officials headquartered at Chicago and St. Louis, should have monitored ICG's management of their trains, particularly after the Harvey accident in 1979. They could have regularly made on-board and lineside checks and should have routinely monitored the speed recorder tapes removed from their locomotives. Route engineers should have been concerned with the track and signal changes at Iles-K.C. Junction. Yet, there is no record that any of these were done or that Amtrak had taken exception to the operation of trains across the Alton District.

^{6/} Railroad Accident Report—"Head-End Collision of Amtrak Train No. 392 and ICG train No. 51, Harvey, Illinois, October 12, 1979" (NTSB-RAR-80-3).

^{7/} Railroad Accident Report—"Derailment of Amtrak Train No. 1 on the Illinois Central Railroad near Salem, Illinois, June 10, 1971" (NTSB-RAR-72-5).

CONCLUSIONS

Findings

1. Because the engineer of Amtrak No. 21 wanted to operate the train on schedule, he repeatedly violated timetable restrictions.
2. When Amtrak No. 21 left Springfield on a "clear" aspect displayed by the signal at South Grand Avenue, the engineer and fireman knew their train would not be stopped at Iles and that Extra 8002 South had already cleared K. C. Junction. On the basis of routine dispatching practice and their own experience, they assumed their train was to be routed through K. C. Junction to track No. 1 and that they could operate as fast as the 79-mph speed permitted at that location.
3. The dispatcher decided to have Amtrak No. 21 overtake Extra 8002 South by way of track No. 2 between K. C. Junction and Hazel Dell. This was contrary to routine practice; however, the decision was made at a time when it appeared that to do otherwise would delay Amtrak No. 21.
4. The southbound signals at Iles and K. C. Junction displayed the proper aspects for the route the dispatcher had coded the Centralized Traffic Control machine to align for Amtrak No. 21.
5. The need to quickly determine and report to the trainmen the aspect of the train order signal at Iles Tower, and the hazardous nature of the Iles Avenue crossing distracted the engineer and fireman of Amtrak No. 21 so that they failed to perceive and comprehend the home signal at Iles. The time they had to observe both signals was significantly reduced by the engineer's operation of the train at excessive speed leaving Springfield.
6. The engineer's failure to wear his corrective eyeglasses as required contributed to his preoccupation with the train order signal and to his failure to perceive and comprehend the home signal aspects displayed at Iles and K. C. Junction.
7. The engineer and fireman may have never before encountered an "approach limited" aspect at Iles. Because it was relatively similar to the "clear" aspect they habitually saw there and since "approach limited" was also the aspect displayed at K.C. Junction for the straight route, they probably did not comprehend its restrictive nature when it was displayed at Iles.
8. Amtrak No. 21 was traveling at 63 mph with the locomotive in full power when it entered the 10-mph turnout at K.C. Junction. No braking action had been initiated.
9. The derailment occurred because the speed of Amtrak No. 21 exceeded the design capability of the turnout.
10. The installation of a No. 10, 10-mph turnout, where two main tracks diverged in a territory where all passing track turnouts were of the No. 20, 30-mph design, led to the routine practice of using the No. 10 turnout as seldom as possible.

11. The former GM&O engineer and fireman were accustomed to the color-position type signals used on the Alton District and because they seldom, if ever, saw most of the color-light signal aspects which could be displayed at Iles and K. C. Junction, they probably did not comprehend what action those aspects required.
12. The piecemeal track changes that ICG made between Springfield and K. C. Junction were based on what was most expedient and least costly rather than on what could be done to improve operational efficiency and safety.
13. Using the 30-mph turnout at Hazel Dell to avoid using track No. 2 as a runaround track was so commonplace that the practice may have been normally anticipated by the enginemen of No. 21 as well as by the other passenger train crews on the Alton District.
14. When ICG installed the color-light signals at Iles and K. C. Junction, relatively similar combinations of aspects were used to indicate which of the two Alton District routes were to be used at K.C. Junction, although there was an extraordinary difference in the permissible speeds for the two routes.
15. Installation of color-light type signals at Iles and K. C. Junction on a main line otherwise equipped with the radically different color-position type signals was questionable engineering judgment which adversely affected the safety of the Alton District operation. The fact that it was permitted by ICG is indicative of a lack of concern for operational safety.
16. Removal of the gates and realignment of the street tended to increase the hazardous nature of the Iles Avenue crossing and contributed to the potential distraction of southbound ICG engineers who needed to be concentrating on the signal aspects displayed at that location.
17. The lack of proper reference points for 15- and 25-mph speed restrictions at Springfield and the practice of allowing passenger trains to travel as fast as 79 mph for less than 1 mile beyond the 25-mph restriction would tend to encourage schedule-conscious engineers to violate the 25-mph restriction and to reduce the time they had to comprehend the signals at Iles.
18. ICG made little effort to assure that the color-position oriented Alton District employees understood what the new color-light signal aspects indicated.
19. Repeated changes in the names of the interlockings as well as confusing bulletin instructions covering the signal and track changes were indicative of a lack of advance planning on the part of ICG.
20. Particularly, in view of his record of violating signal rules and speed restrictions, the engineer of Amtrak No. 21 should not have been allowed to operate passenger trains without receiving additional training from ICG operating and safety officers. Once permitted to operate passenger trains, the engineer's performance should have been closely monitored by Alton District supervisors.

21. After the engineer was required to wear corrective eyeglasses at all times while on duty, Alton District supervisors should have ascertained that he had the proper glasses and that he clearly understood what was required by the restriction.
22. Although ICG examines its train service employees on the operating rules and timetable instructions, doing this on a quadrennial basis is inadequate to insure that employees remain conversant with what is required, especially when highly radical changes are made in the methods of operation.
23. Although an Amtrak train was involved in a collision on the ICG in October 1979 and the investigation of the accident revealed serious operational deficiencies, Amtrak officials in the Chicago-St. Louis territory had not undertaken any program of observations and checks of the operation of Amtrak trains on the ICG, including basic and routine surveillance, such as the monitoring of locomotive speed tapes.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the operation of Amtrak No. 21 into the No. 10 turnout at a speed significantly higher than the turnout's design speed, due to the failure of the train's engineer and fireman to perceive and comprehend that the color-light signal aspects displayed for their train indicated that it was to be routed through the 10-mph (No. 10) turnout. This failure resulted from the routine dispatching of passenger trains to avoid the turnout, the crew's lack of familiarity with the color-light type signal aspects, distraction of the enginemen, and the train speed exceeding the 25-mph restriction between the Springfield passenger station and Iles Tower. Contributing to the accident were ICG's poorly planned modifications to the signal and track systems at Iles and K.C. Junction, ICG's inadequate instruction of Alton District employees on the color-light signals, ICG's and Amtrak's failure to adequately monitor the performance of Alton District employees in passenger service, and the failure of the engineer of Amtrak No. 21 to wear eyeglasses as required.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board made the following recommendations:

--to the Illinois Central Gulf Railroad:

Take immediate action to determine that train and engine service employees of the Alton District are fully conversant with and comply with timetable speed restrictions and the various color-light signal aspects that can be displayed at Iles and K.C. Junction. (Class II, Priority Action) (R-81-61)

Increase the frequency with which train and engine service employees are instructed and examined on the rules, timetable, and bulletin instructions. (Class II, Priority Action) (R-81-62)

Erect speed limit signs as provided for in its rules, and/or provide milepost references in its timetable to indicate the limits of restricted speed sections on the Alton District at Springfield, Illinois. (Class II, Priority Action) (R-81-63)

Reduce the allowable speed for passenger trains between Laurel Street and K.C. Junction to a speed that is consistent with the restrictions north of Laurel Street and at the N&W crossing as well as the possibility that a train may have to reduce speed to 10 mph at K.C. Junction. (Class II, Priority Action) (R-81-64)

In cooperation with the National Railroad Passenger Corporation (Amtrak), develop and execute a program of surveillance of passenger train operations on the Alton District, including on-board determination of how engine crews comply with signal aspects, speed restrictions, and ICG Rule 34, as well as routine monitoring of locomotive speed recorder tapes. (Class II, Priority Action) (R-81-65)

Require that appropriate division officers determine that enginemen who have been restricted because of impaired vision have obtained proper corrective eyeglasses and fully understand the nature of their restriction before they are allowed to continue in service. (Class II, Priority Action) (R-81-66)

—to the National Railroad Passenger Corporation (Amtrak):

In cooperation with the Illinois Central Gulf Railroad, develop a program of close surveillance of the operation of its trains on ICG's Alton District which includes the compliance of train crews with speed restrictions and signal aspects, as well as the monitoring of locomotive speed recorder tapes. (Class II, Priority Action) (R-81-67)

Make route and schedule studies to determine that Amtrak trains can be safely operated over the ICG's Alton District on the existing schedules. (Class II, Priority Action) (R-81-68)

—to the Federal Railroad Administration (FRA):

Conduct a safety review of the Alton District of the Illinois Central Gulf Railroad to determine whether existing track and signal features, existing training of employees, and the enforcement of the operating rules and timetable are adequate for the safe operation of passenger trains over this district. (Class II, Priority Action) (R-81-69)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ PATRICIA A. GOLDMAN
Member

/s/ G. H. PATRICK BURSLEY
Member

FRANCIS H. McADAMS, Member, did not participate.

April 28, 1981

APPENDIXES

APPENDIX A

INVESTIGATION AND HEARING

Investigation

The National Transportation Safety Board was notified of the accident about 10:45 p.m., on October 30, 1980. The Safety Board immediately dispatched an investigator from the Chicago Field Office to Springfield and subsequently dispatched an investigative team from Washington, D.C. to the scene. Investigative groups were established for operations, vehicle factors, track and signals, and human factors.

Depositions

The Safety Board conducted a 1-day deposition proceeding on January 15, 1981, at Springfield, Illinois, as part of its investigation of this accident. Parties to this proceeding included the Illinois Central Gulf Railroad, the National Railroad Passenger Corporation (Amtrak,) the Illinois Commerce Commission, the Brotherhood of Locomotive Engineers, and the United Transportation Union. Testimony was taken from seven witnesses.

APPENDIX B

TRAIN CREWMEMBER INFORMATION

Amtrak No. 21

Conductor Donald E. Schenkel

Donald E. Schenkel, 41, was employed as a brakeman by the Gulf, Mobile and Ohio Railroad on May 15, 1960, and was promoted to conductor on May 15, 1966. He passed a company physical examination on October 26, 1979, and he was last examined on the ICG operating rules on November 22, 1978. He was not restricted in any way. He had been regularly assigned as a passenger conductor since December 1979. On April 21, 1980, he was issued a letter of caution as a result of his violation of ICG rule 93 on ICG's Joliet District, between Chicago and Bloomington. According to the letter, a radar speed check indicated his passenger train was running at 47 mph at a location where yard speed (a speed not exceeding 20 mph) applied.

Engineer Morris G. Colson

Morris G. Colson, 53, was employed as a brakeman by the Gulf, Mobile and Ohio Railroad on February 3, 1956, was transferred to engine service on January 18, 1957, and was promoted to engineer on August 1, 1962.

During July 1980, he experienced a mild heart attack and subsequently was under convalescence for about 6 weeks. On the basis of an examination by his personal physician and a company doctor on August 26, 1980, he was found to be physically fit for duty. However, the company doctor's report indicated that he needed glasses for distance vision, and that once he had the corrective eyeglasses he could return to work as an engineer. Mr. Colson received the glasses and returned to duty, as the engineer of Amtrak No. 21 on August 29, 1980. On September 8, 1980, ICG's Chief Medical Officer notified the St. Louis-Missouri Division superintendent in writing that Mr. Colson "must wear glasses at all times while on duty." The trainmaster at Bloomington forwarded a copy of the notification to Mr. Colson on September 9. There is no known record of Mr. Colson having actually received the notice or of being notified verbally of the restriction by an Alton District supervisor. Following the accident, he stated he had never been told he had to wear the glasses at all times while on duty.

Mr. Colson was last examined on the operating rules on June 28, 1978. His service record indicates that he was disciplined for passing a "stop" aspect on a home signal in December 1960; reprimanded for failure to stop short of a "stop" aspect on a home signal in September 1974, operating a train at excessive speed in violation of signal rules on April 16, 1975, and for "failure to stop your engines when two switches were lined against you," on April 29, 1975; suspended for 5 days for failure to stop his engine short of another train on May 29, 1975; reprimanded for running at excessive speed on September 17, 1975; and suspended for 30 days for running past a "stop" aspect at an interlocking that resulted in a derailment on May 26, 1978.

Fireman James E. Byrd

James E. Byrd, 40, was employed as a brakeman by the Gulf, Mobile and Ohio Railroad on July 10, 1968, transferred to engine service on September 2, 1969, and

promoted to engineer on October 17, 1973. He last passed a company physical on October 17, 1978, and was last examined on the operating rules on May 11, 1978. He was not restricted in any way. He had been regularly assigned in passenger service for about 3 years prior to the accident. His service record was clear of reprimand or disciplinary action.

Flagman James R. Price

Flagman Price, 45, was employed as a brakeman by the Gulf, Mobile and Ohio Railroad on June 23, 1957. He was promoted to conductor on August 31, 1963. He last passed a company physical examination on April 30, 1979, and was last examined on the operating rules on June 9, 1978. He was not restricted in any way. He was suspended for 60 days on April 14, 1978, for a violation of operating rules in connection with the failure to properly execute a meet between two passenger trains on the Alton District.

APPENDIX C

EXCERPTS FROM ILLINOIS CENTRAL GULF OPERATING RULES

34 Employees located in the operating compartment of an engine must, and other crew members will, when practical, communicate to each other in an audible and clear manner the name or aspect of each signal affecting movement of their train or engine, as soon as the signal is clearly visible or audible. It is the responsibility of the engineer to have each employe in cab of engine comply with these requirements, including himself

Each fixed signal must be watched until such signal is passed and if it displays an indication other than that first communicated, the change must be communicated as soon as it becomes clearly visible.

It is the engineer's responsibility to have each employe located in the operating compartment maintain a constant lookout for signals and conditions along the track which affect the movement of the engine or train

If a crew member becomes aware that the engineer has become incapacitated or should the engineer fail to operate or control the engine or train in accordance with signal indications or other conditions requiring speed to be reduced, other members of the crew must communicate with the engineer at once, and if he fails to properly control the speed of the train or engine, other members of the crew must take action necessary to ensure the safety of the train or engine, including operating the emergency brake valve (Revised January 1, 1978)

RULE	Block and Interlocking Aspects	NAME	INDICATION
281		Clear	Proceed
283		Approach Limited	Proceed; approaching next signal prepared to enter turn out at prescribed speed, but not exceeding 40 MPH
284		Medium Approach	Proceed, approaching next signal prepared to enter turn out at prescribed speed, but not exceeding 30 MPH

NTSB note: Signal aspects designated "L" are color-light type; aspects designated "P" are color-position type. "R" indicates red; "G" indicates green; "Y" indicates yellow; "W" indicates white lights.

APPENDIX C

RULE	Block and Interlocking Aspects	NAME	INDICATION
285		Approach	Proceed, prepared to stop at next signal; Train exceeding 30 MPH must at once reduce to that speed
286		Diverging Clear	Proceed on diverging route, not exceeding prescribed speed through turn out
287		Diverging Approach	Proceed on diverging route, through turn out at prescribed speed, prepared to stop at next signal, but not exceeding 30 MPH
288		Slow Clear	Proceed, at prescribed speed within interlocking limits, or through turn out

RULE	Train Order Signal Aspects	NAME	INDICATION
297		Stop	Stop, unless clearance received, or as provided in Rule 221 (g)
298		Clear	Proceed

NTSB note: Signal aspects designated "L" are color-light type; aspects designated "P" are color-position type. "R" indicates red; "G" indicates green; "Y" indicates yellow; "W" indicates white lights.

APPENDIX D

EXCERPTS FROM ICG ST. LOUIS-MISSOURI DIVISION TIMETABLE NO. 4

Southward			ALTON DISTRICT					Northward		
FIRST CLASS			Sliding Length In Feet	Sliding Standing Room, Cars With Engine.	Mile Posts	TIMETABLE NO. 4 Effective August 3, 1980 STATIONS	Miles From St. Louis	FIRST CLASS		
21 INTER-AMERICAN	303 STATEHOUSE	301 ANN RUTLEDGE						300 STATEHOUSE	22 INTER-AMERICAN	304 ANN RUTLEDGE
Daily	Daily	Daily								
Ls 7 30PM	Ls 4 35PM	Ls 10 21AM			126 6	C BLOOMINGTON	155 5	As 7 40AM	As 11 37AM	As 6 52PM
		.....	12,430	226	140 9	14.3 McLEAN	141 2			
	.....		4,235	77	145 8	4.9 ATLANTA	136 3			
s 7 57	s 5 04	s 10 50	10,010	182	156 4	10.6 LINCOLN	125 7	s 7 10	s 11 05	s 6 20
		..			163 4	7.0 BROADWELL	118 7			
			9,625	175	167 3	3.9 ELKHART	114 8			
8 15	5 25	11 11			177 6	10.3 SHERMAN	104 5			
			10,175	185	182 9	5.3 RIDGELY	99 2	6 45	10 40	5 55
s 8 30	s 5 40	s 11 26			185 1	2.2 SPRINGFIELD	97 0	s 6 40	s 10 35	s 5 50
8 35	5 45	11 31			187 3	2.2 ILES	94 8	6 30	10 37	5 42
					187 8	0.5 K. C. JCT.	94 3			
					189 5	1.7 HAZEL DELL	92 6			
			10,505	191	200 6	11.1 AUBURN	81 5			
			5,830	106	207 0	6.4 VIRDEN	75 1			
			9,625	175	210 8	3.8 GIRARD	71 3			
					214 5	3.7 NILWOOD	67 6			
s 9 07	6 15	12 01PM	17,490	318	223 8	9.3 CARLINVILLE	58 3	s 6 00	9 58	5 13
			11,165	203	238 3	14.5 SHIPMAN	43 8			
		....			246 0	7.7 BRIGHTON	36 1			
9 31	6 37	12 23	13,420	244	252 1	6.1 GODFREY	30 0	5 35	9 35	4 50
s 9 39	s 6 45	s 12 31			257 2	5.1 ALTON	24 9	s 5 30	s 9 30	s 4 45
A 9 43PM	A 6 49PM	A 12 35PM			262 1	2.9 WANN	22 0	L 5 25AM	L 9 25AM	L 4 40PM
						BE GOVERNED BY JOINT CONRAIL— ICG TIMETABLE		Daily	Daily	Daily
					274 9	12.8 C.GRANITE CITY	9 2			
					278 0	3.1 VENICE JCT.	6 1			
					280 0	2.0 BRIDGE JCT.	4 1			
						TRRA ROUTE				
L 9 59PM	L 7 05PM	L 12 51PM			274 9	12.8 C GRANITE CITY	9.2	L 5 10AM	L 9 10AM	L 4 25PM
A 10 45PM	A 7 50PM	A 1 35PM			284 1	9.2 ST. LOUIS A.S.	0.0	L 4 45AM	L 8 45AM	L 4 00PM

14 SPECIAL INSTRUCTIONS (continued from page 13)				
101 SPEED RESTRICTIONS: SPEEDS SHOWN ARE MAXIMUM AUTHORIZED BETWEEN POINTS NAMED				
Territory or Location	Passenger Trains	TOFC Trains	Freight Trains	
	MILES PER HOUR			
Between:				
NORMAL DISTRICT South Joliet and Bloomington	79	60	50	
PEQUOT DISTRICT South Joliet and Mazonia	79	60	50	
PONTIAC DISTRICT Pontiac and Flanagan		20	20	
BLOOMINGTON DISTRICT Normal Jet and Barnes, MP 135			10	
JACKSONVILLE DISTRICT Bloomington and Murrayville			25	
ALTON DISTRICT Bloomington and Ridgely Ridgely and Wann	79 79	60 50	50 50	

16 SPECIAL INSTRUCTIONS (continued from page 15)			
101(a) LOWER SPEEDS (Continued)			
Territory or Location	Passenger Trains	Freight Trains Including TOFC	
	MILES PER HOUR		
ALTON DISTRICT			
Lincoln: Between railroad crossings, Athol to South Lincoln MP 181 to Ridgely Interlocking (See Note C)	70	50	
Ridgely Interlocking:			
North Crossover	10	10	
South Crossover	10	10	
Ridgely Interlocking to Ridgely Ave, both tracks	35	25	
Springfield: Ridgely Ave to Carpenter St	25	25	
Carpenter St to Capital Ave	15	10	
Capital Ave to Laufel St	25	25	
Iles: N&W Crossing	60	50	
K C Jet: All Turnouts	10	10	
Mile 226 8, Rinaker, to Mile 234 2, Plainview	70	40	
Mile 227 6 to MP 229 (See Note C)			
MP 233: First curve North and second curve South (See Note C)			
Godfrey: Curve, Mile 252 3 (Also See Note C)	60	40	
Turnouts to Carrollton District	10	10	
Mile 252 3 to College Avenue	70	40	
Mile 258 3, Wood River Creek	25	25	
Cars with swivel couplers, when loaded, are restricted as follows:			
Ridgely to Iles		10	
MP 254 to Pearl St, Godfrey		10	
Granite City to Venice		10	

APPENDIX E

ILLINOIS CENTRAL GULF RAILROAD
ORDERS FROM OFFICE OF SUPERINTENDENT

Bloomington, Illinois
April 14, 1975

MISSOURI DIVISION (Alton & Air Line Districts)

BULLETIN ORDER NO. 32-75

ALL CONCERNED:

Rules: 277, 277(a), 278, 281, 283, 284, 285, 286,
287, 288, 290, 291, 292 and 525 to 542.

Effective 4:01 P.M., Thursday, April 17, 1975 the following track and signal changes are made at Springfield, Illinois.

AT N&W CROSSING INTERLOCKING

Air line district switch is removed from the interlocking.

AT ILES

Kansas City connection power switch is placed in service, and is equipped with dual control switch machine. Hand operation of this switch is in accordance with Rules 277, 277(a) and 278.

Home signals governing movements over the power switch display aspects as follows:

<u>ASPECT</u>	<u>RULE</u>	<u>ROUTE</u>
<u>SOUTHWARD</u>		
Yellow over Red over Red	285	To Track 1
Yellow over Green over Red	283	To Track 1
Red over Green over Red	286	To Track 2
Red over Yellow over Red	287	To Track 2
Red over Red over Green	288	To Kansas City
Red over Red over Red	292	STOP

NORTHWARD - FROM KANSAS CITY

Red over Red over Yellow	290	To N&W Crossing
Red over Red over Red	292	STOP

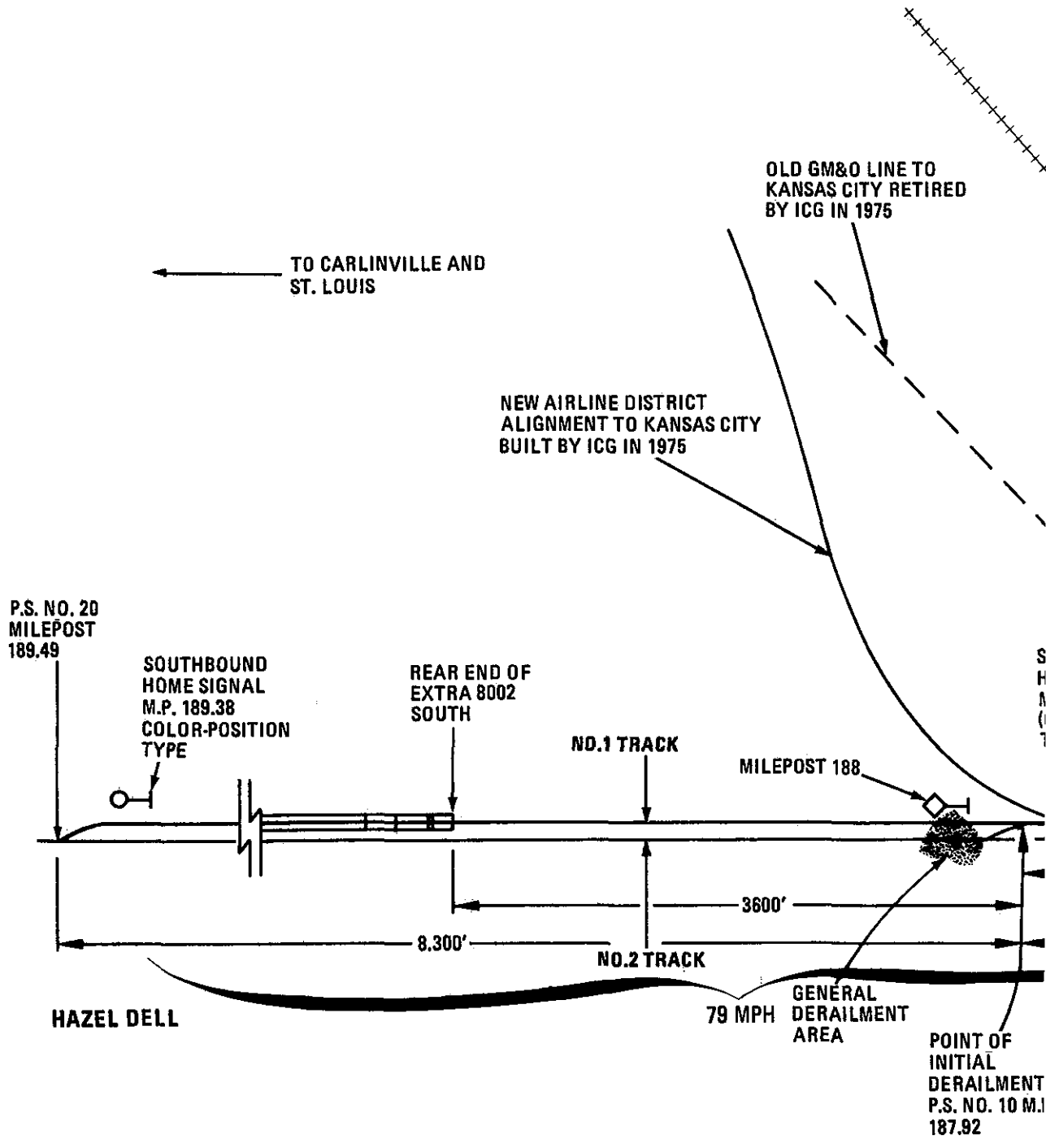
NTSB note: Facsimile of the bulletin covering the original changes at Iles and K. C. Junction. At this time, Iles had been renamed N&W Crossing Interlocking and what later became K. C. Junction was designated as Iles. No bulletin was issued to cover the subsequent re-designation of these locations.

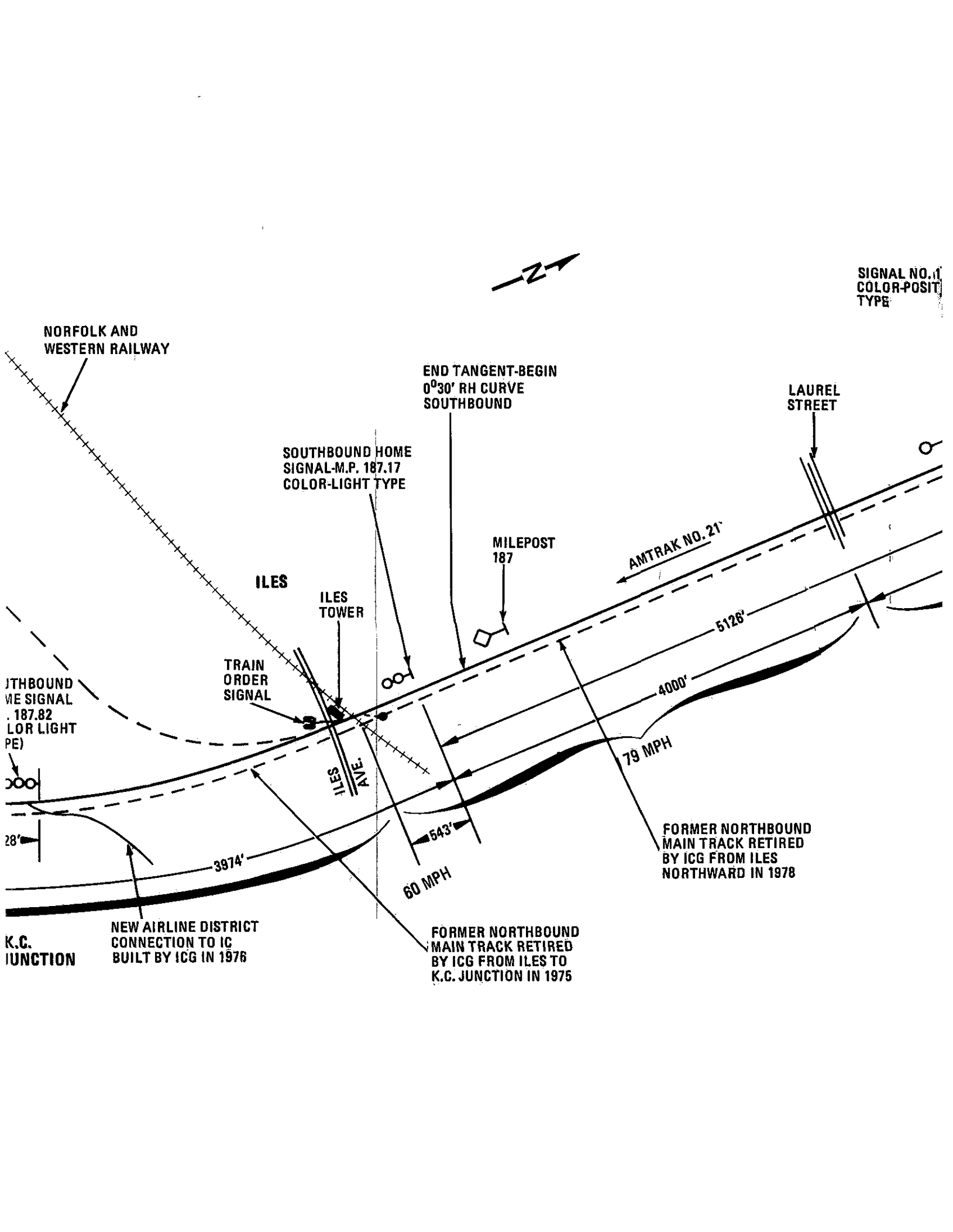
GENERAL ORDER NO 583

EFFECTIVE 1201 AM THURSDAY OCT 30TH, 1980 GENERAL ORDER NO 579 IS CANCELLED AND THE FOLLOWING REDUCE SPEED AND OTHER RESTRICTIVE CONDITIONS WILL BE IN EFFECT ON THE ALTON DISTRICT.

ITEM	PSGR SPEED	FRT SPEED	LOCATION
1	60	40	BETWEEN MILE 145.7 AND MP 146 ON CURVE ATLANTA. YELLOW SIGNS ARE DISPLAYED.
2	60	40	BETWEEN MILE 172.8 AND MP 173 WILLIAMSVILLE. YELLOW SIGNS ARE NOT DISPLAYED.
3	15	10	THROUGH C.T.C. SIDINGS AUBURN AND CARLINVILLE.
4	50	30	OVER ROAD CROSSING AT MILE 208.5 BETWEEN VIRDEN AND GIRARD. YELLOW SIGNS ARE NOT DISPLAYED
5	40	25	BETWEEN MP 222 AND MP 223 NORTH OF CARLINVILLE YELLOW SIGNS ARE NOT DISPLAYED.

J.E.MOSS
SUPT OF TRANSPORTATION
ISSUED OCT 27TH, 1980
SHEET ONE OF ONE





SIGNAL NO. 11
 COLOR-POSIT
 TYPE

NORFOLK AND
 WESTERN RAILWAY

END TANGENT-BEGIN
 0°30' RH CURVE
 SOUTHBOUND

LAUREL
 STREET

SOUTHBOUND HOME
 SIGNAL-M.P. 187.17
 COLOR-LIGHT TYPE

MILEPOST
 187

AMTRAK NO. 21

ILES

ILES
 TOWER

TRAIN
 ORDER
 SIGNAL

ILES
 AVE

THBOUND
 WE SIGNAL
 . 187.82
 LOR LIGHT
 PE)

79 MPH

FORMER NORTHBOUND
 MAIN TRACK RETIRED
 BY ICG FROM ILES
 NORTHWARD IN 1978

3974'

60 MPH

FORMER NORTHBOUND
 MAIN TRACK RETIRED
 BY ICG FROM ILES TO
 K.C. JUNCTION IN 1975

NEW AIRLINE DISTRICT
 CONNECTION TO IC
 BUILT BY ICG IN 1976

K.C.
 JUNCTION

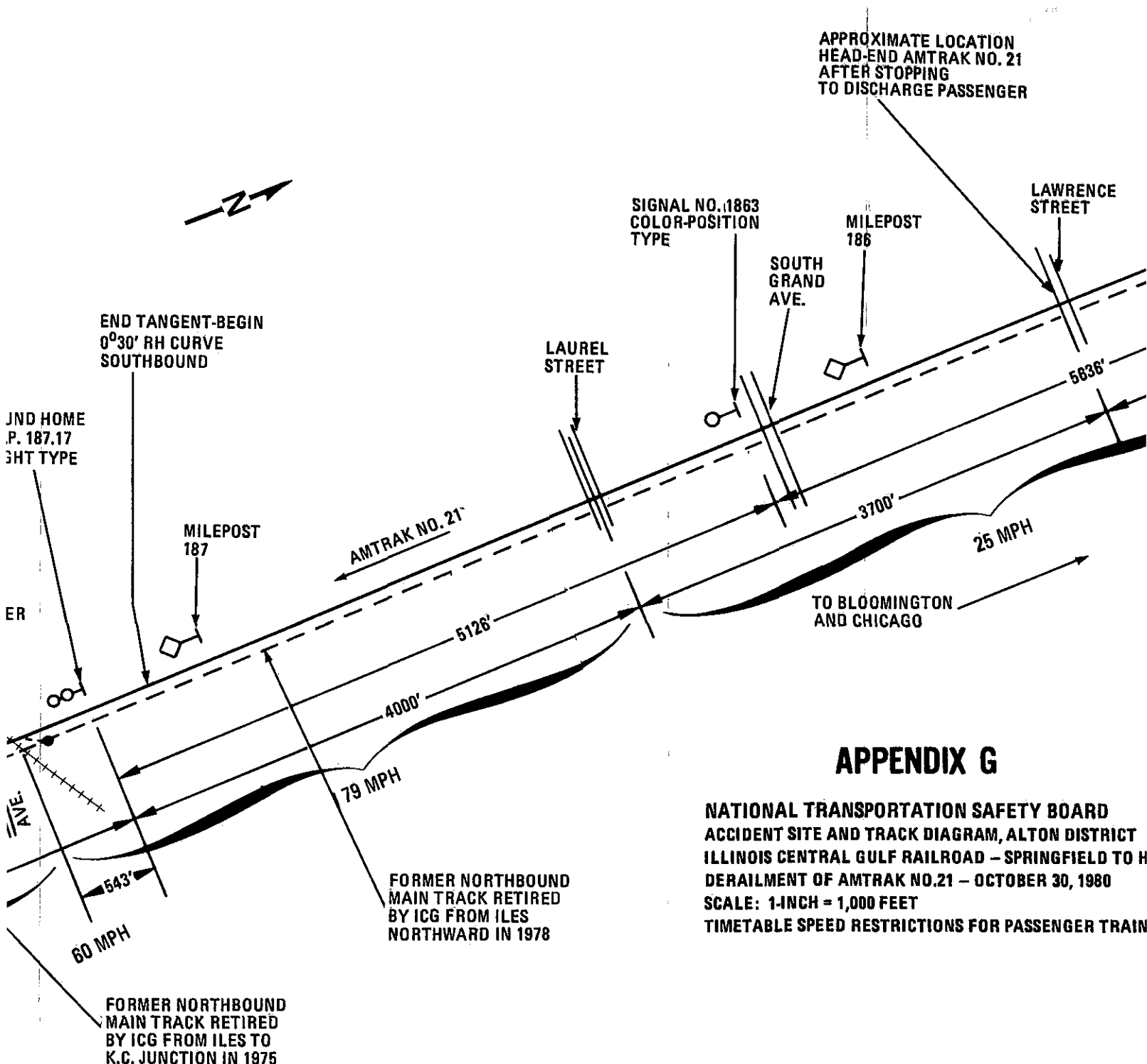
28'



5126'

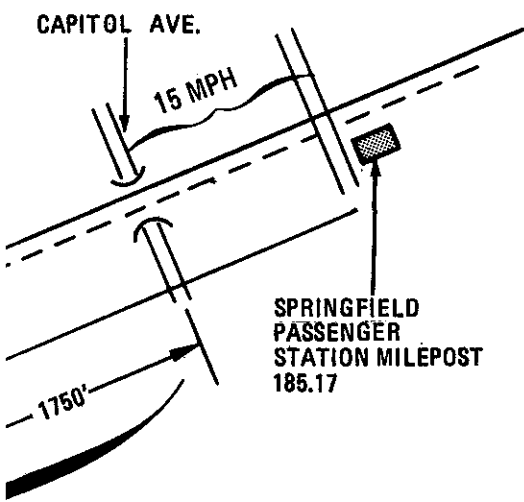
4000'

543'



APPENDIX G

NATIONAL TRANSPORTATION SAFETY BOARD
 ACCIDENT SITE AND TRACK DIAGRAM, ALTON DISTRICT
 ILLINOIS CENTRAL GULF RAILROAD - SPRINGFIELD TO H
 DERAILMENT OF AMTRAK NO.21 - OCTOBER 30, 1980
 SCALE: 1-INCH = 1,000 FEET
 TIMETABLE SPEED RESTRICTIONS FOR PASSENGER TRAIN



EL DELL

V BRACKETS

APPENDIX F

LOCOMOTIVE SPEED RECORDER TAPE
REMOVED FROM AMTRAK NO. 21

