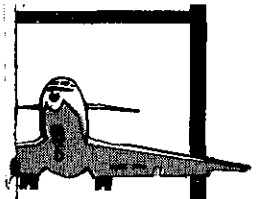
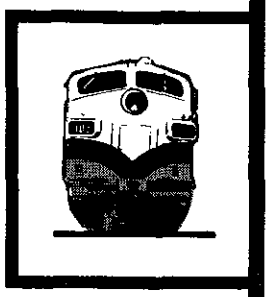
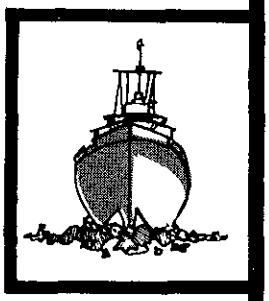


NATIONAL TRANSPORTATION SAFETY BOARD

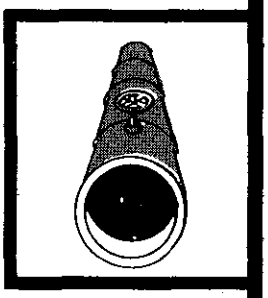
WASHINGTON, D.C. 20594





RAILROAD ACCIDENT REPORT

**HEAD-END COLLISION OF
AMTRAK TRAIN NO. 392 AND
ICG TRAIN NO. 51
HARVEY, ILLINOIS
OCTOBER 12, 1979**



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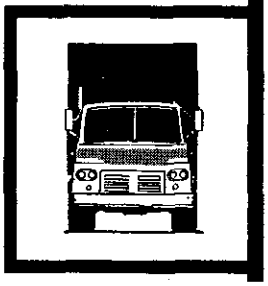

UNITED STATES GOVERNMENT

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15 Supplementary Notes		

16 Abstract

At 9:05 p.m., e.s.t., on October 12, 1979, northbound Amtrak passenger train No. 392 was traveling at 58.5 mph on track No. 4. at Harvey, Illinois. Illinois Central Gulf Freight Train No. 51 was waiting on track No. 3 to crossover to track No. 4 after train No. 392 went north. The switchtender on duty at Harvey aligned the crossover switch on track No. 4 seconds before train No. 392 arrived. Train No. 392 entered the crossover and struck train No. 51. The engineer and head brakeman on board train No. 51 were killed, and all 6 crewmembers and 38 passengers on board train No. 392 were injured.

The National Transportation Safety Board determines that the probable cause of the accident was the switchtender's manual misalignment of a switch, immediately in advance of a train, which caused train No. 392 to be directed into a crossover and collide with a standing freight train on the adjacent track. The msialignment was made possible by the lack of an interlock or other positive means to prevent its movement. Contributing to the accident was the lack of training and limited experience of the employee assigned as switchtender. Also contributing to the accident was an inadequate communications system for giving directions to the switchtender.

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CONTENTS

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

Adopted: April 3, 1980

HEAD-END COLLISION OF AMTRAK TRAIN NO. 392 AND ICG TRAIN NO. 51 HARVEY, ILLINOIS OCTOBER 12, 1979

SYNOPSIS

At 9:05 p.m., c.s.t., on October 12, 1979, northbound Amtrak passenger train No. 392 was traveling at 58.5 mph on track No. 4 at Harvey, Illinois. Illinois Central Gulf Freight train No. 51 was waiting on track No. 3 to crossover to track No. 4 after train No. 392 went north. The switchtender on duty at Harvey aligned the crossover switch on track No. 4 seconds before train No. 392 arrived. Train No. 392 entered the crossover and struck train No. 51. The engineer and head brakeman on board train No. 51 were killed, and all 6 crewmembers and 38 passengers on board train No. 392 were injured.

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INVESTIGATION

The Accident

At 8:45 p.m., on October 12, 1979, Illinois Central Gulf Railroad (ICG) southbound freight train No. 51, consisting of 3 locomotive units, 40 cars, and a caboose, stopped on track No. 3 at Harvey, Illinois, because a train ahead of it was waiting for a crew change. Train No. 51 stopped 20 feet in advance of a crossover to track No. 4. The train director at Kensington Tower, had instructed the crew of train No. 51 to wait at this location until Amtrak passenger train No. 392 went north on track No. 4, and then was to cross over from track No. 3 to track No. 4 and continue its trip southward. The engineer on train No. 51 extinguished the locomotive headlight before train No. 392 arrived.

The crossover switches at Harvey are all hand-operated by a switchtender. The train director telephoned the yardmaster to relay the instructions for moving trains No. 392 and No. 51 to the switchtender. The yardmaster then radioed the switchtender, but the reception was not clear on the radio and the switchtender did not understand the instructions. After the switchtender advised the yardmaster that his radio was breaking up, the yardmaster called him on the telephone. The switchtender further stated that he understood that he was to align the crossover for train No. 51 to move from track No. 3 to track No. 4 after a passenger train had passed, but he was also instructed to line a train coming out of the yard to track No. 6. The yardmaster stated he did not remember whether he said passenger train or train No. 392 when he gave the instructions to the switchtender on the telephone; however, the yardmaster did not give the locomotive number or the track on which the train was to operate.

The switchtender had aligned the switches for a local transfer train to back out of the yard. However, he had made a mistake and had not aligned one of the switches properly. The conductor of the train called him back over channel 2, the yard channel, to correct the mistake. After properly aligning the switch for the transfer train, the switchtender began to walk toward the crossover switch on track No. 4.

At 8:52 p.m., after making a regular station stop at Homewood, Illinois, ICG northbound commuter train No. 160 departed on track No. 2. While the switchtender was walking to the mainline crossover switch on track No. 4, commuter train No. 160 passed Harvey at 9 p.m. The switchtender proceeded to the switch and began to unlock it, assuming that commuter train No. 160 was the passenger train referred to in his instructions.

Amtrak northbound passenger train No. 392, consisting of one locomotive unit and five superliner coaches, made a regular station stop at Homewood at 8:58 p.m. During this stop, the conductor heard the following transmission on his radio: "After 392 goes by, let 51 down cross him over onto 4," and "Your radio is breaking up, I can't understand it." At 9 p.m., train No. 392 left Homewood station on track No. 4 to continue its trip north to Chicago, Illinois.

The engineer of train No. 392 was operating the locomotive while seated on the right side of the cab, and the fireman was seated on the left side of the locomotive cab. After leaving Homewood station, the engineer accelerated the train to 65 mph. As he approached Harvey, he applied the trains brakes to slow the train to 58 mph. The train's brakes remained applied as he passed under signal 2056, which displayed a "proceed" aspect. While still holding the train brakes applied, he noted that the switch targets were green, indicating that track No. 4 was aligned for a straight movement through the crossover area. The fireman and engineer saw the green targets simultaneously, and the fireman called out "lined." When the engineer received this verification from the fireman that the switch targets displayed green aspects, he released the train brakes and operated his train with the understanding that the way was clear.

Before operating the switch, the switchtender looked to the south and saw a locomotive headlight and thought it was a slow moving freight train. He was unable to determine what track it was on. He then aligned the switch on track No. 4 to enter the crossover. Immediately after aligning the switch, the

switchtender heard the locomotive horn blowing on train No. 392, looked to the south, and saw the train approaching very rapidly approximately 200 feet away. Realizing that a collision was inevitable, he ran west to clear himself of the tracks and equipment.

The engineer and fireman on train No. 392 did not see anyone on the ground around the area of the switches. The engineer stated he did not see the switch target turn red. The fireman stated that he saw the switch target turn red only a short distance in advance of the train, shouted a warning, and sat on the floor, bracing himself against the forward bulkhead. The engineer put the train brakes in emergency and sounded the horn in one continuous blast.

The conductor on board train No. 392 heard the following radio transmission repeated twice over channel 1 of his radio: "Don't line that switch you are going to line him in on top of us." Realizing that a switch may have been aligned improperly and that train No. 51 was to be cross over to track No. 4 after they had passed, he reached for his radio to instruct the engineer to stop. Before he could speak, with train brakes applied in emergency and the horn screaming, train No. 392, entered the crossover from track No. 4 at 58 mph. Before the train's speed could be reduced, the train struck train No. 51 at 9:05 p.m., c.s.t.

On impact, the locomotive of train No. 392 pushed the lead locomotive unit of train No. 51 34 ft under the second locomotive unit, struck and overrode the front end of the second locomotive unit, and struck and tore down the overhead catenary wires. The Amtrak locomotive and first coach of train No. 392 were overturned onto their sides. The locomotive traveled 134 feet before coming to rest on its left side adjacent to and west of the second locomotive unit of train No. 51. (See figure 1.)

After the accident, the switchtender stated that he had not heard the radio communication heard by the conductor of train No. 392.

Description of the Track

Eight tracks were located at the accident site and were numbered from west to east as follows:

Number	Direction and Use
1	Southward, Suburban - Commuter Service
2	Northward, Suburban - Commuter Service
3	Southward, Passenger and Freight
4	Northward, Passenger and Freight
5	Southward, Freight
6	Northward, Freight
7	Northward and Southward Transfer Trains
8	Lead to Private Industrial Spurs

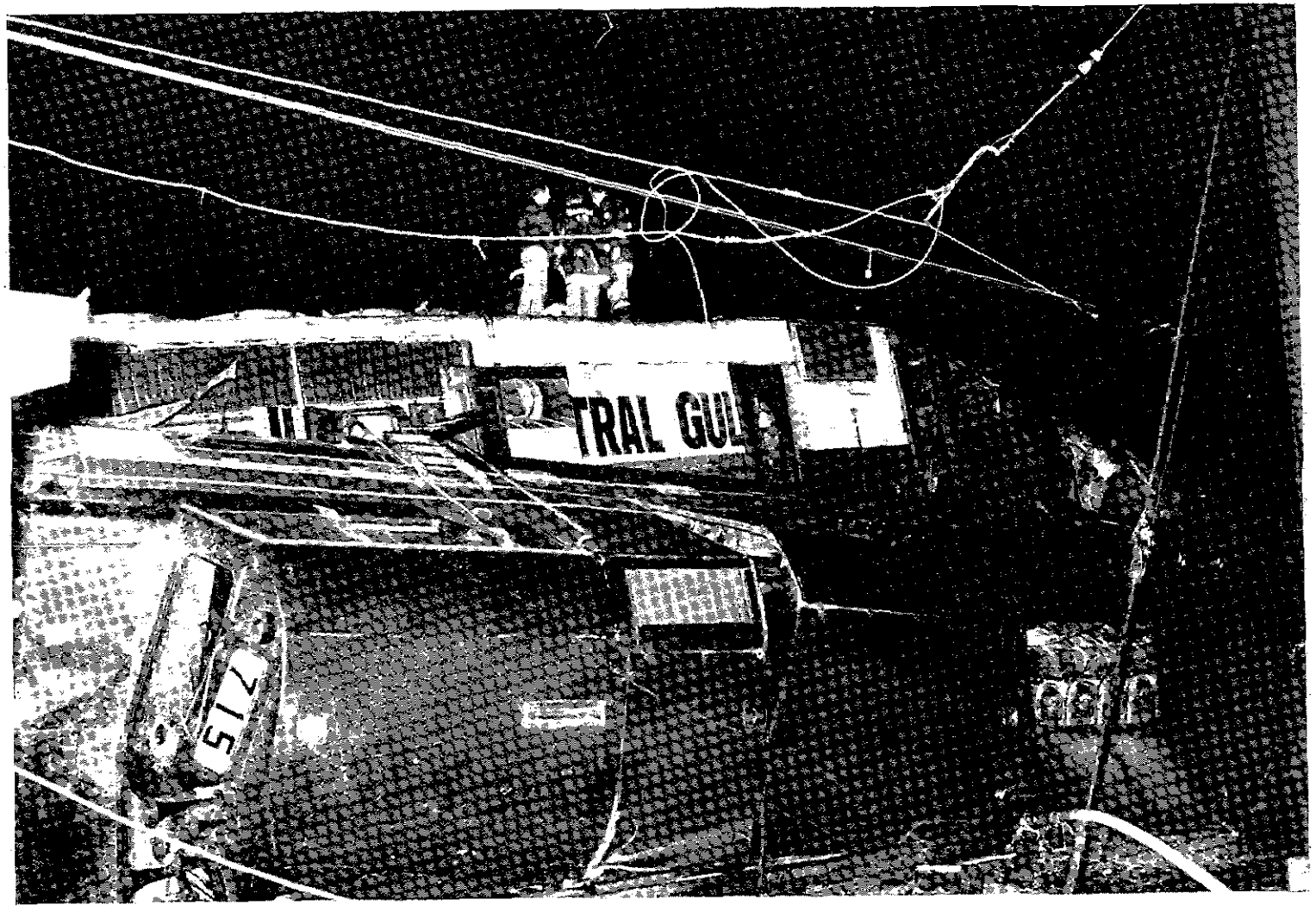


Figure 1.—Amtrak locomotive unit of train No. 392
and second locomotive unit of train No. 51.

Seven crossovers permitted trains to cross over from one track to another and to enter and leave Harvey yard. (See figure 2.)

The crossovers of tracks No. 3 and No. 4 had been equipped with electrically locked hand throw switches 1/ before 1971. The switches were replaced with low stand hand throw switches with mechanical locks. To operate the switch, the padlock is disengaged and the foot lever is depressed to release the latch. An unlighted four sided target, 7 x 12 inches, on a side, was mounted at the top of the spindle of the switch stand. Two opposite sides of the target were coated with reflectorized green scotchlite paint, and the alternate sides were coated with red. When the switch was lined for a straight movement, the green sides of the target were displayed to approaching trains, and when the switch was lined for the crossover, the red sides were displayed.

The tracks in the area of the collision were built on a fill 21 feet above the surrounding area. The grade for northbound trains is 0.26 percent ascending.

Injuries to Persons

Injuries	Train No. 51 Crew	Train No. 392 Crew	Train No. 392 Passengers	Other Railroad Employees
Fatal	2	0	0	0
Nonfatal	0	6	38	0
None	2	0	172	1

Damage

The first locomotive unit of train No. 51 was destroyed. The entire superstructure, including the cab, was sheared from the underframe. The second locomotive unit was damaged extensively. (See figure 3.) The third locomotive unit and cars were not derailed or damaged.

The locomotive unit on train No. 392 was destroyed. The engine mounts were broken, and the engine was separated from the unit. The fuel tanks were ruptured. The left sidewall of the cab was crushed inward against the fireman's seat which remained secured.

The first car of train No. 392 was overturned and damaged moderately. The shaft of a switch target penetrated the left side of the car about 12 inches below an upper level window and protruded 3 inches into the passenger carrying section. The second and third cars derailed, but remained upright, and were damaged slightly. The refreshment bar, located in the snackbar area on the lower level of the fourth car, was pulled loose from its two anchor bolts by the impact. No other damage occurred to this car. The fifth car did not derail and was not damaged significantly.

1/ A hand-operated switch equipped with an electrically controlled device which prevents the movement of the switch during a predetermined time period.

Damage was estimated as follows:

Train equipment	$1,630,000
Track and signal	25,000
Overhead wires	10,000
Wrecking and cleanup	20,000
Total	$1,685,000

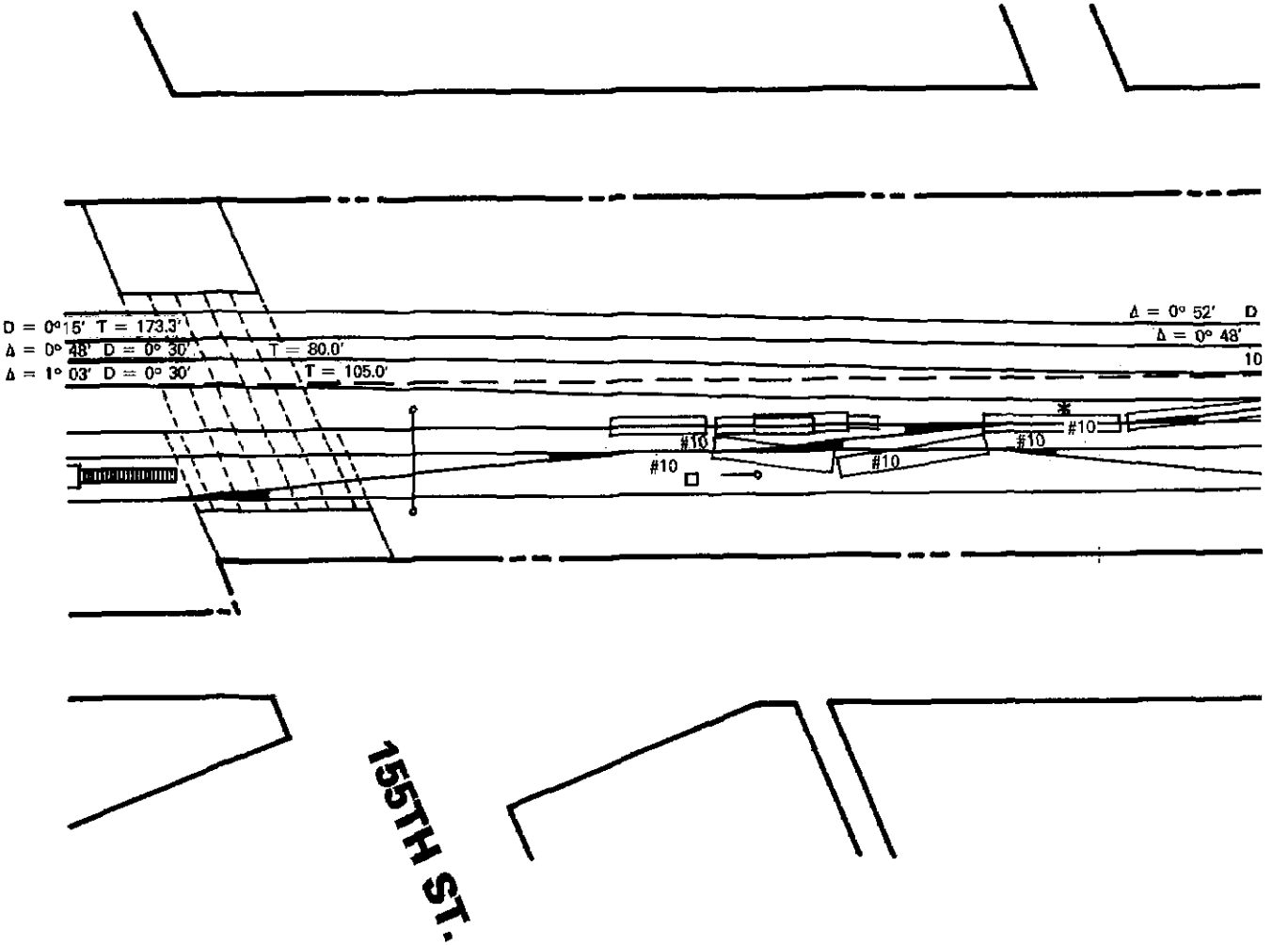
Crewmember Information

The crew of train No. 51 consisted of an engineer, conductor, and two brakemen. All were qualified under ICG operating rules without restrictions. The engineer and head brakeman reported for duty at 4:25 p.m., on October 12, 1979, and had been on duty 4 hours 40 minutes when the accident occurred. The conductor and rear brakeman reported for duty at 4:45 p.m., on October 12, 1979, and had been on duty 4 hours 20 minutes when the accident occurred. The engineer had 10 years' experience as a fireman and 22 years' as an engineer. Before reporting for duty on October 12, 1979, the engineer had been off duty 27 hours. Prior to reporting for duty on October 12, 1979, the head brakeman had been off duty 15 hours; this trip was only his third assignment as a brakeman. (See appendix B.)

The crew of train No. 392 consisted of an engineer, conductor, fireman, baggageman, flagman, and a service representative. All of the operational crewmembers were qualified under ICG operating rules without restrictions. The crewmembers had reported for duty at 7:10 p.m., on October 12, 1979, and had been on duty 3 hours 55 minutes when the accident occurred. All the crewmembers had worked Amtrak train No. 391 south to Champaign, Illinois, earlier the same day and had been off duty 6 hours before beginning their return trip to Chicago, Illinois, on train No. 392. Except for the baggageman, who had been off duty for several days before reporting on October 12, 1979, each crewmember had worked the previous day but had been off duty 8 hours before reporting at 6:55 a.m. on October 12, 1979, for the trip south to Champaign. The engineer had 9 years' experience as a fireman and 30 years' as an engineer. The engineer was required to wear glasses while on duty.

The train director had 25 years' experience as an agent-operator and 5 years' as train director. The yardmaster at Harvey yard had worked for 15 years as a switchman and conductor and 12 years' as a yardmaster. He had reported for duty at 2 p.m., and had been on duty 7 hours 5 minutes when the accident occurred.

The Harvey switchtender had been employed 2 months by the ICG railroad. He had qualified as a switchman/brakeman by attending a 1-day orientation session; a 1-day session conducted by a trainmaster, which included verbal instructions on safety and on the operating rules; and by participating in eight student trips as a brakeman, following the classroom instruction. He was not assigned as a switchtender on any of the student trips but was assigned to various traincrews under the direction of the conductor of each crew. He was required to wear glasses while on duty.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Δ = 0° 48' D = 0° 30'
Δ = 1° 03' D = 0° 30'
T = 80.0'
T = 105.0'
Δ = 0° 52' D
Δ = 0° 48'
10
#10
#10
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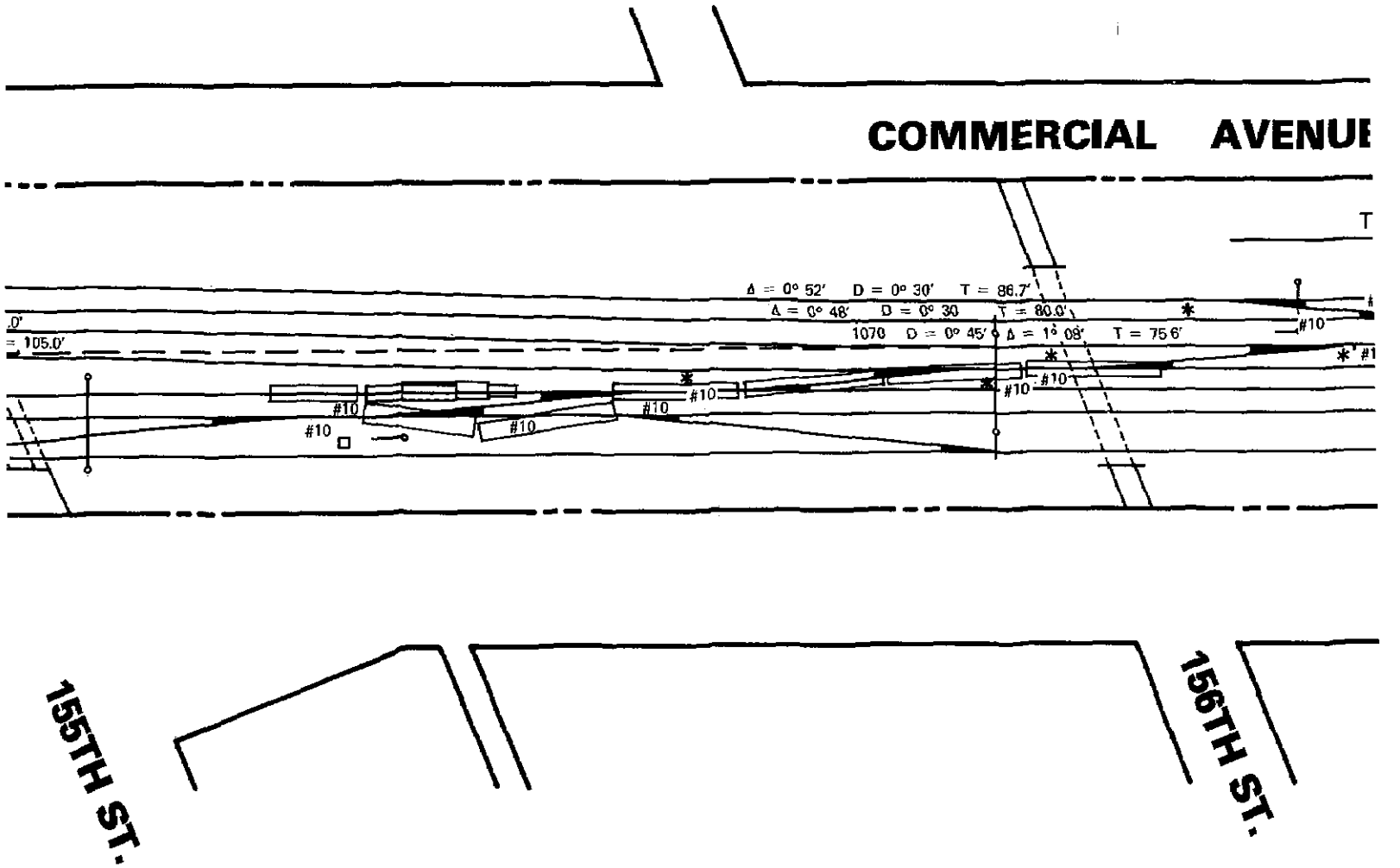
155TH ST.


COMMERCIAL AVENUE
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Δ = 0° 48′ D = 0° 30 T = 80.0′
1070 D = 0° 45′ Δ = 1° 08′ T = 75.6′
= 105.0′
#10
#10
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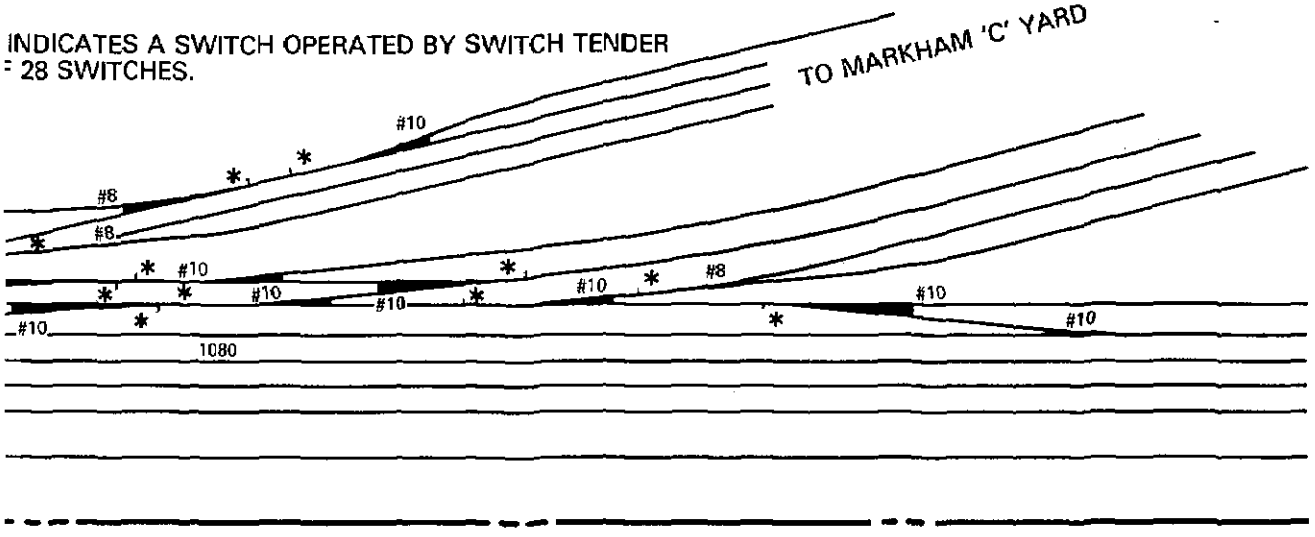
155TH ST.
156TH ST.

Figure 2.1

INDICATES A SWITCH OPERATED BY SWITCH TENDER
= 28 SWITCHES.



AVENUE

157th

COLLISON OF AMTRAK NO. 392
AND ICG FREIGHT NO 51

SCALE 1" = 100'

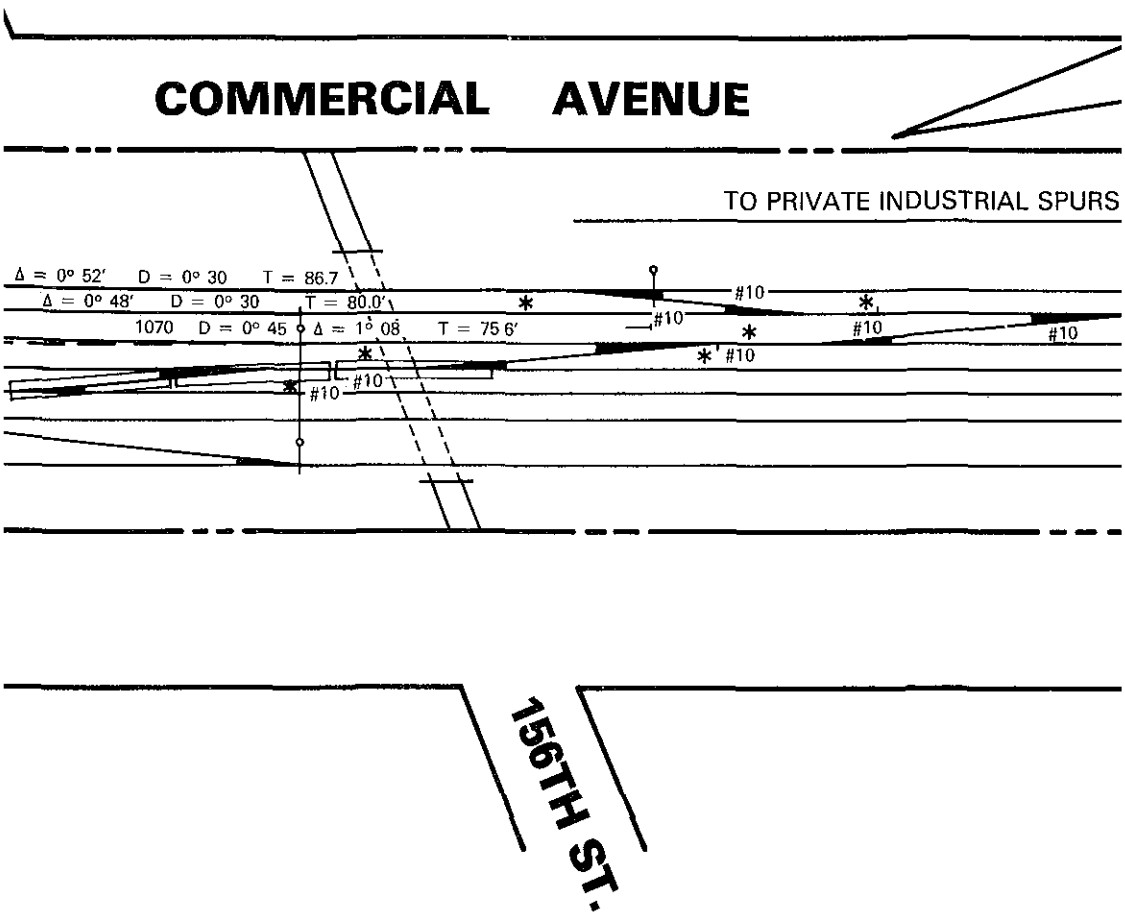


Figure 2. Plan view

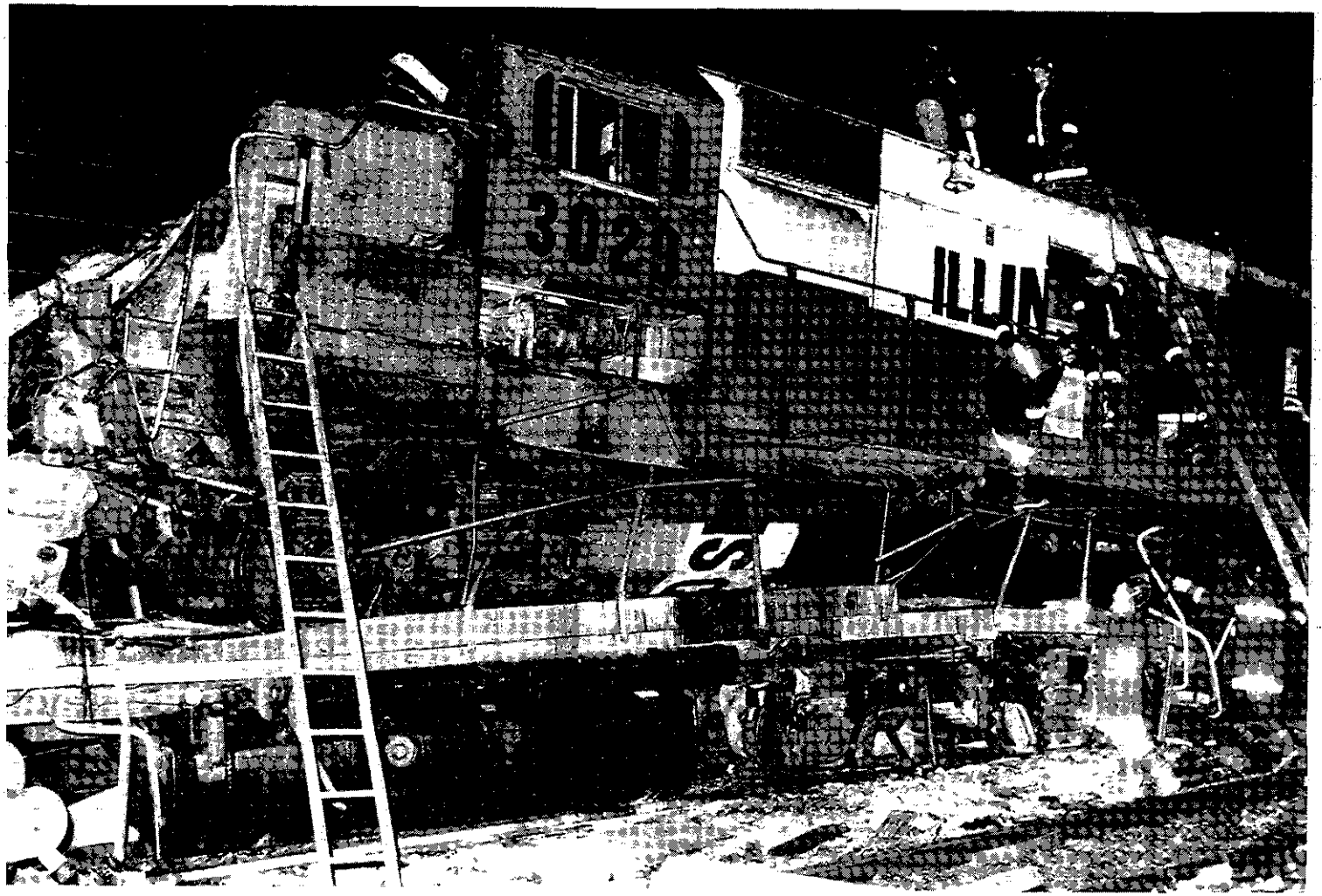


Figure 3.—Second locomotive unit of train No. 57.

His first assignment was as the switchtender at Harvey on the night of August 10, 1979. The employee working as a switchtender on the preceding 8-hour shift stayed for 2 hours to instruct him in his duties. The instructor was also a switchman/brakeman, who had been working for the ICG for 5 months, but had worked the Harvey switchtender assignment on only five nonconsecutive times. During the 2 hours of instruction, the instructor performed all switch operations and attempted to explain the physical layout of tracks and switches, the logging of train movements, and the telephone numbers necessary for the switchtender to perform the assignment. During the next 6 hours, the switchtender worked alone, and he stated he made many switch errors. The traincrews, however, had been instructed that a new employee was working as switchtender and they were warned to approach Harvey with caution, expecting switches to be misaligned.

For the next 2 months, he worked assignments as a train crewmember or switchman under the direct supervision of the conductor of the crew. His assignment to Harvey yard on the day of the accident was the second time he had worked as a switchtender, and no caution was given to the traincrews. On the day of the accident, he had reported 30 minutes early for duty and the switchtender on duty showed him the physical layout in daylight and reviewed with him the telephone numbers that were necessary for him to perform the assignment. The relieved swithchtender did not stay over the end of his shift to give additional instructions.

Train Information

Train No. 51 consisted of three General Motors model GP-40 diesel-electric locomotive units, 40 cars, and a caboose. The lead locomotive unit had the short hood forward and was equipped with a dual sealed-beam headlight and a speed indicator. On this class of locomotive, the underframe is 5 ft 1 3/4 inches from the top of the rail. Both the lead locomotive unit and caboose had functioning permanently installed radios that used the ICG frequency.

Train No. 392 consisted of one General Electric Model P30CH diesel-electric locomotive unit and five superliner coaches. The locomotive unit was equipped with a dual sealed-beam headlight, speed indicator and recorder, overspeed control, alertor safety device, and cab signals with an acknowledging switch. On this class of locomotive, a steel constructed anticlimbing device at each end of the platform extends 20 inches outward from the underframe and is 6 feet 3 inches above the top of the rail. The device is strengthened by two steel supports on the underside, which are an extension of the center sill of the underframe and are tapered on the leading end. (See figure 4.)

The five bilevel, full coaches were manufactured by the Pullman Standard Car Manufacturing Company between December 1978 and July 1979. Each car was constructed of stainless steel and was 85 feet long. Seating capacity was 77 (62 in upper level and 15 in lower level). Car-to-car passage was made through end doors on the upper level only. (See figure 5.) These doors were power-operated and opened by sliding into the end wall when a push panel, located on the door, was touched. When a red-colored guarded toggle switch, located adjacent to the door, was moved to the emergency position, the doors opened and stay opened until the switch was returned to the normal position. The doors also could be manually forced open. A stairwell, 24 inches wide, was located in the center of the car for

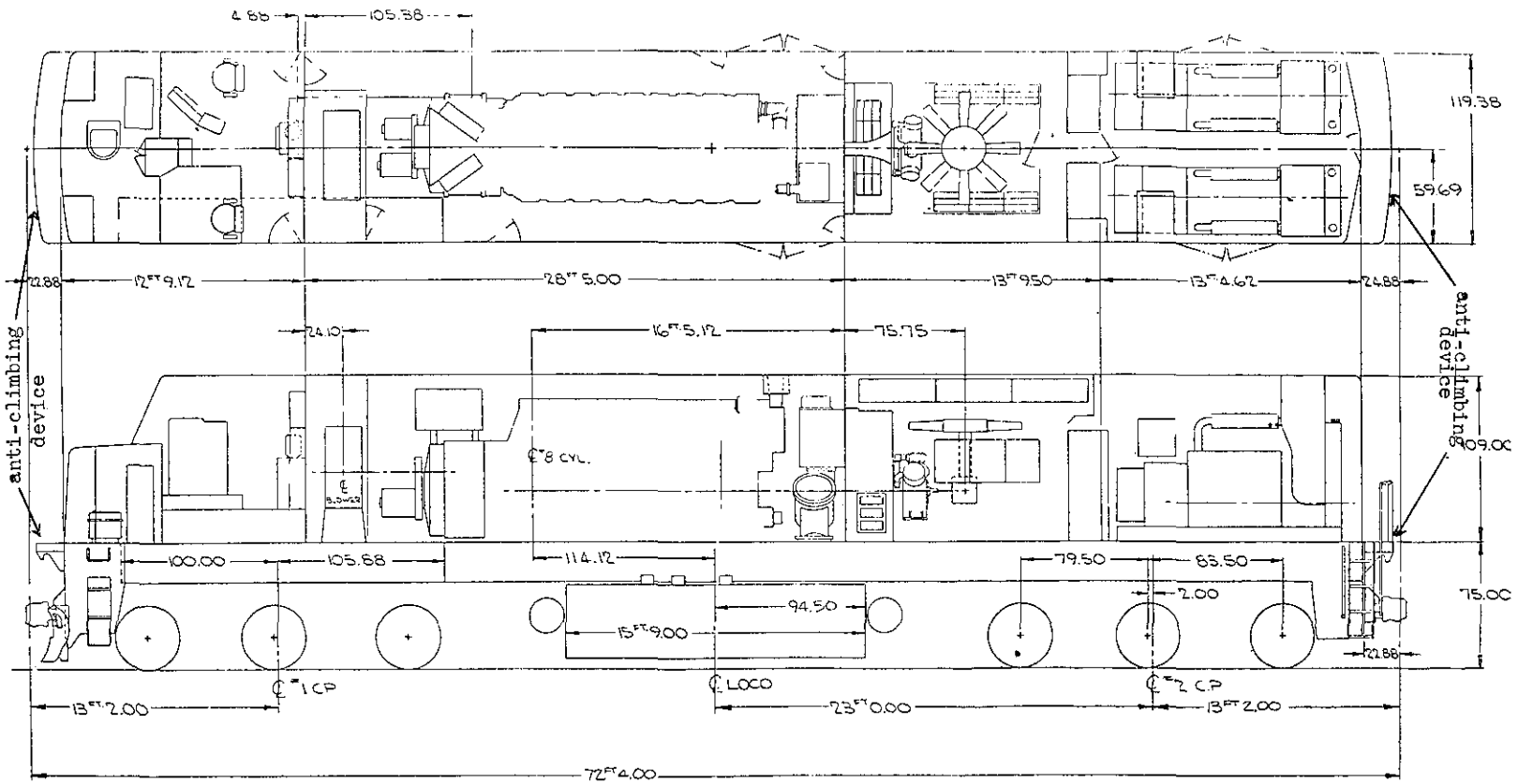
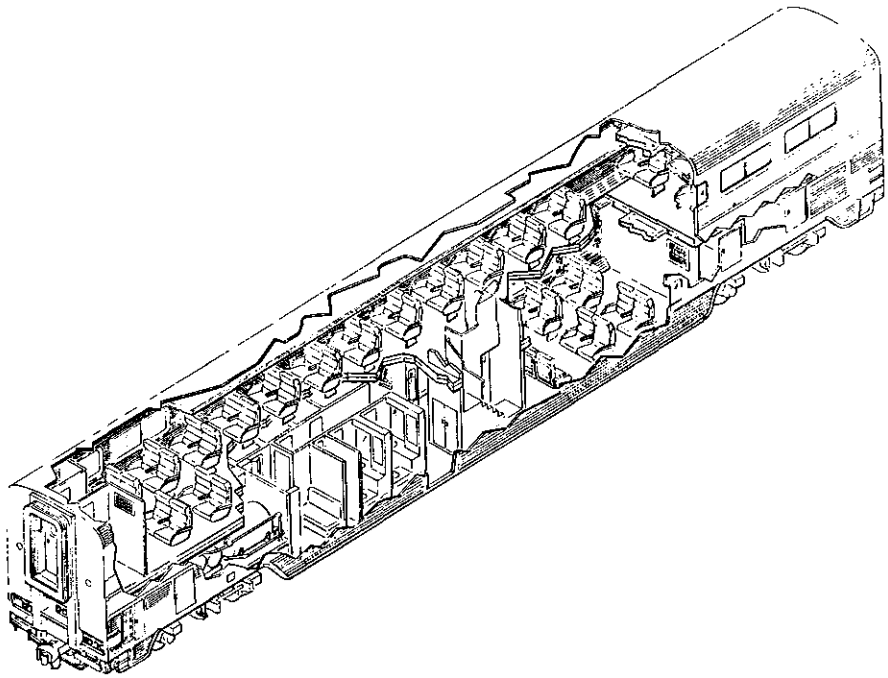


Figure 4.--General Electric Model P30CH diesel-electric locomotive.



AMTRAK Coach Car Arrangement

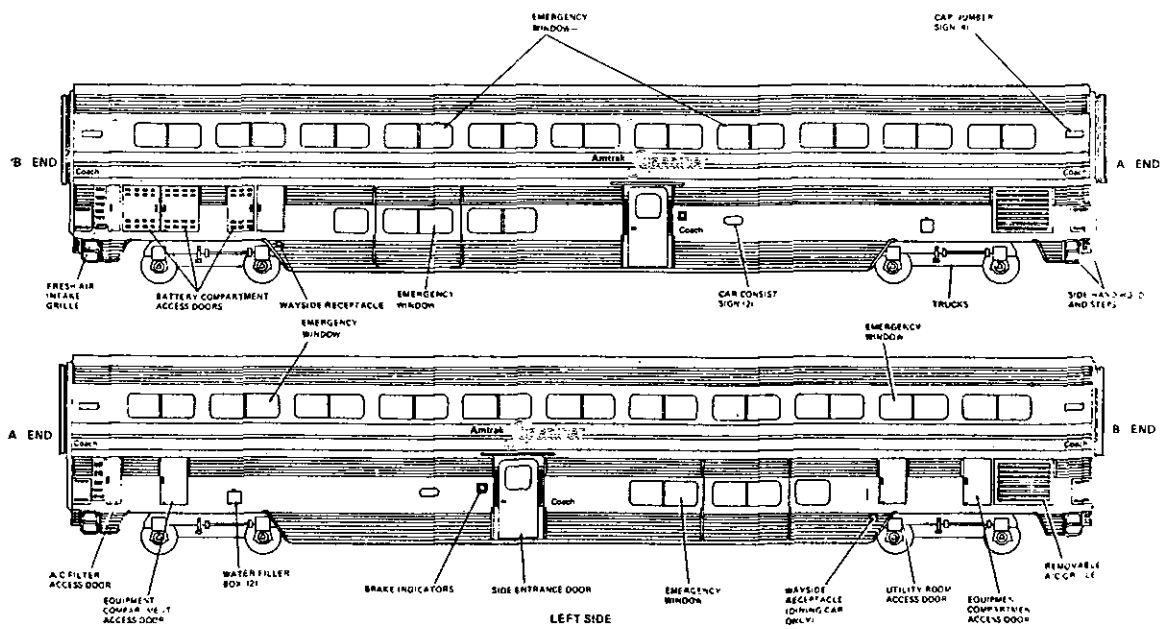


Figure 5.--Amtrak Superliner Car Exterior Arrangement.

passage between the upper and lower levels. A side entrance door was provided at the center of each side of the car on the lower level. These doors were operated manually and were locked with a key from the inside. Emergency exit windows, four on the upper level (two on each side) and two on the lower level (one on each side) were provided. Emergency lighting was provided in the aisles from an onboard battery supply. Eight seats had been removed from the bottom level of the fourth coach to provide a refreshments serving counter. This serving counter was installed by Amtrak at its 21st Street shop in Chicago. The bottom shelf of the counter was constructed of 3/4-inch presswood board material. The two anchor bolts used to secure the counter were fastened into the track in the floor, which was used to secure the seats. The bolts extended through the bottom shelf of the counter where a 2- by 3-in plate was applied and held in place with a nut.

Method of Operation

Trains are operated on tracks No. 1 and No. 2 by signals of a centralized traffic control system. Trains are operated on tracks No. 3, No. 4, No. 5, and No. 6 by signals of an automatic block signal system (ABS), and each track is signalled for a designated direction. No signal system governs movements on track No. 7 or track No. 8. Movements against the current of traffic and crossover moves on tracks No. 3, No. 4, No. 5, and No. 6 are under the jurisdiction of the train director at Kensington. (See appendix C.)

The accident site was within yard limit territory. The ICG operating rules provide that within yard limits all trains or engines must move at yard speed, except in ABS territory where movements will be governed by block signal indication. Yard speed is defined by the ICG as "a speed prepared to stop within one-half the range of vision." (See appendix C.)

On January 23, 1971, a switchtender with 18 years' experience misaligned a switch in the crossover from track No. 5 to No. 4 as a locomotive passed under signal 2056 northbound on track No. 4. The misaligned switch permitted a locomotive coming out of Harvey yard to collide with the locomotive on track No. 4. As a result of this collision, the ICG established timetable special instructions which required all trains and engines moving on main tracks No. 3 and No. 4 to approach the system of crossovers at Harvey at reduced speed, prepared to stop short of crossover, and not to proceed until it is known that switches are properly lined and the way is clear. Reduced speed is defined by the ICG operating rules as "proceed prepared to stop short of train or obstruction."

The ICG rules do not outline the specific duties of a switchtender nor do they define from whom he receives instructions. The rules that refer to switchtenders are only those general rules which apply to all operating employees. However, the following instructions were issued on June 23, 1975, to establish movements against the current of traffic at Harvey on track No. 4.

> "Train directors should personally supervise and record all movements against the flow of traffic, tagging his board as well as insuring that the leverman or switchtender make similiar arrangements at their locations. . . . Plan ahead for train and engine movements by securing line-up, etc. Be precise and accurate in their instructions to leverman and switchtenders and insure that instructions issued by subordinates to

> crews are the same. This includes just the minimum amount of conversation on the telephone and radio for business purposes only. . . . The above instructions must be literally complied with."

A copy of these instructions were on the desk in the switchtender's building. (See appendix C.)

The timetable special instructions also required that the switchtender comply with the train director's instructions at Harvey for movements on tracks No. 3, No. 4, No. 5, and No. 6. (See appendix C.) The operating rules state that the yardmasters have jurisdiction over all trains, engines, and employees in yards.

The ICG operating rules provide that radio communication may be used for issuing instructions governing the movement of trains or engines. However, neither the operating rules nor the timetable special instructions require the use of a particular channel by the switchtender.

The switchtender receives instructions by telephone or by a portable radio, Motorola Model MT500 handitalkie. The radio is powered by a rechargeable battery, is rated at 2 watts, and has a range for transmissions of approximately 2 miles. The radio is equipped with a selector switch that permits transmission and reception on either one of two channels. Channel No. 1, operating on 161.190 MHz, is used by crews on mainline freight trains and passenger trains, and channel No. 2, operating on 161.295 MHz, is used by crews in the yard operations. The original portable radios furnished to the switchtender at Harvey were powered by disposable D-type batteries and were rated at 5 watts. The range for transmissions was approximately 5 to 6 miles, but because they weighed 7 lbs 10 oz, they were replaced with the lighter handitalkie presently in use. A talk-back speaker 2/ was also in the area of the switches. However, this has not been in use since the radios were put in service. If the switchtender is away from the telephone, the train director gives instructions for the switchtender through the yardmaster at Harvey yard. This relaying of instructions became necessary because the train director is 4.5 miles north of Harvey, the switchtender's portable radio will not transmit that far, and the talk-back speaker system no longer functions.

The performance of the switchtender at Harvey is the responsibility of the Chicago Division Trainmasters. Four trainmasters are assigned to this location, two on each 12-hour shift. They are responsible for all operations on the Chicago Terminal District, which include 51 yard crews, 23 transfer crews working out of Markham Yard, and 4 local crews. Periodically, trainmasters would monitor the operation of onboard crewmembers of trains as they passed through Harvey, but they did not monitor the activities of the switchtenders.

Title 49 CFR, Part 235, provides instructions governing applications for approval of a discontinuance or a material modification of a signal system.

The maximum authorized speed on tracks No. 3 and No. 4 is 65 mph for passenger trains and 40 mph for freight trains.

2/ An intercommunication system for two-way communication with microphone and loudspeaker at each station for localized use.

Meteorological Information

The weather at the time of the accident was partly cloudy; the temperature was 39° F, ground visibility was 15 miles, and northwesterly winds were 10 mph, gusting to 17 mph.

Survival Aspects

The first passenger car turned over on its left side, but the damage to the car was moderate. A passenger who was seated in the first passenger car stated that it took several seconds to overturn.

The bodies of the engineer and head brakeman of freight train No. 51 were found in the vicinity of the debris of the locomotive. It is not known whether they were able to evacuate the locomotive cab. To exit the cab of this locomotive, the men should have left by a door behind the engineer to the side running board. However, the men had only 6 seconds from the time the switch error was made to impact. The engineer remained in the cab long enough to transmit a brief radio message in an attempt to prevent the switchtender from operating the switch that allowed passenger train No. 392 to enter the crossover.

After impact, the locomotive cab of train No. 392 was relatively intact. The engineer and fireman remained in the locomotive cab and made no attempt to go into the engineroom. The fireman stated that when he saw that the impact was inevitable, he sat on the floor, facing forward with his feet against the front wall. He received serious injuries to his cervical spine and a possible concussion. His actions minimized the extent of his injuries during the impact and subsequent rollover of the locomotive at which time the sidewall of the cab crushed inward against the fireman's seat. The engineer has no recollections of his actions and his injuries included a fractured left hip and right ribs with hematoma, internal injuries, and a possible concussion. Since the radio control box and knobs were damaged, it is possible that he struck this equipment during the impact and subsequent rollover of the locomotive.

The only other serious injury to crewmembers occurred when the refreshment counter pulled loose from the floor and struck the Amtrak service representative who was standing in front of the counter during the collision and was temporarily trapped.

The other three crewmembers' injuries consisted of minor sprains and contusions. Five passengers were hospitalized for more than 48 hours, with injuries consisting of concussions, lacerations, contusions, and sprains. Of the remaining 33 passengers who received minor injuries, most received contusions, lacerations, sprains, and abrasions.

As a result of their close proximity, the Harvey police and fire department arrived on the accident site within 3 minutes after the accident. The evacuation and rescue were well executed, with only minor difficulties reported.

The emergency lights failed to operate in the first and fifth cars of the Amtrak passenger train.

The Amtrak conductor testified that he had no training on the emergency features of these new cars. Consequently, he had difficulty operating the upper level door which interconnected two of the coaches. The door was later successfully opened by other crewmen.

Tests and Research

The brake equipment on the locomotive and cars of Amtrak train No. 392 was tested and was found to be functioning properly.

Amtrak locomotive unit No. 715 was equipped with a Barco SIS-800 system speed indicator and recorder. This equipment was removed from the locomotive and was tested at the Aeroquip Corporation, Barco Plant, at Barrington, Illinois. The following results were attained in that testing:

Speed (mph)	Indicator Reading	Recorder Position
70	69	69
60	58.5	60
50	47.5	50

It was noted during testing that when the recorder read 58 mph, the correct speed, the indicator read 56.5 mph.

The signals of the automatic block signal system were tested and were found to be operating properly.

Examination of the 3/4-inch presswood board material that failed to keep the refreshment counter secured revealed that, in addition to the basic weakness of this material, it was further weakened by moisture damage.

Examination of the switchtender's logbook revealed omissions of some train movements by the switchtender on the day of the accident. Subsequently, he said that he knew he was doing a poor job of recording train movements not only on the date of the accident but also the other time he had worked the job.

ANALYSIS

The Accident

The crossovers on tracks No. 3 and No. 4 at Harvey had been provided with electrically locked switches; however, some time before 1971, they were removed. The removal of the electrically locked switches eliminated the protection feature necessary to allow a train to travel from signal 2056 to clear the switches at the crossover before the switch could be operated. If signal 2056 displayed a "clear" aspect as a train passed, there was sufficient delay in the electric locking feature to allow time for the train, if it were operated at normal speed, to pass the crossovers before they could be changed. However, in doing this, the ICG eliminated the only positive safety feature to prevent switches being operated immediately in front of an approaching train. If the electrically locked switches had not been removed or some other system to preclude operating a switch

immediately in front of a moving train had been installed, this accident would not have occurred.

In 1971, some time after the electric locks had been removed, a collision occurred when a switchtender with 18 years of experience misaligned a crossover switch. Although the switchtender should have known the physical layout and should have been well versed in the instructions that pertained to his duties, this knowledge did not preclude him from misaligning a switch which caused the collision. The physical layout of tracks, hand thrown switches, and crossovers has remained the same since the electrically locked switches were removed. The inexperienced switchtender on duty at the time of the accident made frequent errors, which included the error which was made by the experienced switchtender in 1971. Therefore, the possibility of this type of accident was inherent to the system which would allow a switchtender to operate the switches in the crossover area, without regard to the location of trains, and was only indirectly related to the experience, instructions, or training of the switchtender.

Title 49 CFR, Part 135 does not prohibit the removal of certain signal and operational protection devices so long as proper applications are filed with the FRA. After examination by the FRA, if it is found that the proposal provides ample safe operation for the intended service and that the protests received are answerable, the requested changes are granted. The FRA and the ICG were not able to provide information on any requests for removal of the electrically locked switches before 1971, but the hand operated switches had been observed by the FRA some time before the accident. Therefore, it must be assumed that the FRA took no exceptions to this method of operation.

The ICG rules in effect at the time of the accident did not require the engineer to operate a train through the Harvey crossover area at a prescribed speed. Reduced speed is required by the timetable special instructions, but the ICG rules do not define a speed range for reduced speed. The timetable also requires that an engineer operate his train prepared to stop short of the crossovers and not proceed until it is known that the switches are properly lined for his route and the way is clear. The engineer of train No. 392 reduced the speed of his train from 65 to 58 mph as he approached Harvey. Signal 2056 and the switch targets on the crossover switches were the only available sources of information to the engineer. Therefore, when signal 2056 and the switch targets displayed green aspects he should have been able to assume that the track was lined and the way was clear for straight movement through Harvey. The ICG rules, however, do not define at what point this indication of green switch targets can be accepted for the train to proceed without restriction. The rules of the ICG are so written that an engineer is required to use his own discretion when operating a train through the Harvey crossover area.

The switch leading from track No. 4 to the crossover to track No. 3 was opened about 6 seconds before the arrival of train No. 392 at the switch. If the train had been traveling at a much slower speed--25 mph--the engineer still would not have been able to stop short of the open switch, but he may have stopped short of a collision. Therefore, if the hand thrown switches can be operated at any time regardless of a trains location, adequate protection cannot be provided by the signal system for trains operating through the Harvey crossover area, nor can the ICG rules provide the needed protection. To comply with the ICG rule, which was

made following the collision in 1971, an engineer would be required to operate his train at walking speed for the movement of trains through Harvey.

The switchtender's duties are not defined by a particular set of rules or instructions, but the requirements of the position are lumped together with those of other train crewmembers. The training program, consisting of a 1-day orientation program, a 1-day session conducted by a trainmaster, and the student trips, is designed to aquaint new employees with the duties of train crewmembers. After being assigned to a traincrew, a new employee is under the direct supervision of his conductor. At no time is the new employee provided adequate information on the switchtender's position nor does he work as a student before being assigned to the position.

Training

The switchtender on duty at Harvey at the time of the accident had worked this assignment on only one other occasion 2 months before the accident--his first day of employment as a switchman/brakeman on the ICG. He had no other railroad experience. The first time he worked this assignment, extra precautionary instructions were issued to traincrews operating in or through Harvey, but no such precautions were given on the night of the accident. He made many errors during the first assignment, yet no supervisor made an evaluation of his ability to perform the necessary duties of the position or of his understanding of the physical layout and of train operations. Although he was not able to log all train movements during this tour of duty, this was not noted by a supervisor. The switchtender's activities are not directly supervised by the yardmaster or train director, but once instructed, the switchtender is relied upon to properly carry out the assignment.

Traincrews moving in and out of the Harvey territory that evening had detected errors in switch alignment and had to ask that the switches be aligned properly. This occurred with the train which moved out of Harvey yard just before the misalignment of the crossover switch and before the accident. The 2 hours of instruction he received from another switchtender during his first assignment, and the 30 minutes of instructions when he reported early on the day of the accident, were the only times he received any instructions that were germane to his responsibilities at Harvey. The short period of instruction and ensuing short work experience did not permit him to become familiar with the physical layout of the tracks, switches, and train operations. The 2-month interval between assignments as switchtender had diminished any understanding of the instructions he had received previously, and he reported early because of his uncertainity about the job requirements. It is apparent that the training he received after being employed by the ICG was not sufficient to prepare him to perform the necessary duties as switchtender at Harvey. In addition, the ICG did not provide supervisory monitoring of the activities, fitness, or ability of the switchtenders in the performance of their duties.

The switchtender knew that the train director was responsible for train operations, but he thought that all of his instructions came from the Harvey yardmaster since he was the only one who gave him any instructions. The

yardmaster's procedure of giving instructions to the switchtender for mainline train operations was not in accordance with ICG rules. When the original portable radio was changed to the smaller, lightweight type, the problem of the switchtender's inability to communicate with the train director by radio resulted. The switchtender's radio was not able to transmit a strong enough signal to reach the train director and he could no longer verify instructions to the train director. The talk-back system, which provided direct communication without interference and had been used before the introduction of the radios, was no longer in working order. Because the switchtender worked outside and was not aways near his telephone during his tour of duty, it became necessary for the train director to relay instructions to the switchtender through the Harvey yardmaster. The Harvey yardmaster was always in the office and could be contacted on the telephone. Thus, the practice developed whereby the train director would call the yardmaster to relay all switching instructions, even if the switchtender was near a telephone. The practice was followed when the train director gave instructions to the yardmaster to relay to the switchtender that after train No. 392 went north to line the crossover for No. 51 to go south. It was a violation of ICG instructions to involve a third-party to establish a block for a movement against the flow of traffic. The yardmaster also included instructions for a yard move with the instructions from the train director. These instructions were given 7 minutes before train No. 392 arrived at Harvey. The yardmaster gave these multiple instructions as a matter of expedience. If the yardmaster had given only the instructions for the movement of the freight train backing out of Harvey yard and then waited until passenger train No. 392 passed Harvey before issuing the instructions to cross over No. 51 to go south on track No. 4, this accident would have been prevented. The local supervisors on the ICG knew about the practice of relaying instructions and the reason for it, but they made no provision for direct communications between train director and switchtender, other than the telephone.

Communications

When the switchtender received the instructions by radio from the yardmaster he was not able to understand what was transmitted. The yardmaster then called the switchtender on the telephone. The switchtender stated that he was instructed to line the crossover for train No. 51 to move south from track No. 3 to track No. 4 after the passenger train went by. The yardmaster stated that he could not remember if he said passenger train or 392 when he gave the instructions to the switchtender. At the time, the switchtender did not understand the difference between a commuter train and a passenger train. He thought that if it was not a freight train it was a passenger train so it would have made little difference if the yardmaster had said passenger train or No. 392. While walking toward the main tracks at night, it would be difficult to determine what track a train was running on. Therefore, when the commuter train passed, the switchtender assumed that it was the passenger train referred to in his instructions. The instructions were poorly given and did not contain sufficient information to identify trains. It might have been more beneficial to the switchtender if the passenger train had been identified by the locomotive number.

The engineer on train No. 51 shouted a warning on the radio to the switchtender not to throw the switch moments before train No. 392 arrived. The

switchtender's radio has two channels. However, ICG rules do not specify which channel the switchtender should monitor. The conductor on the train that was moving onto track No. 6 had been delayed in starting his move because of a misaligned switch. He had communicated with the switchtender on the radio to have the error corrected, and at the time, they were both on channel No. 2. It is probable that the switchtender did not switch to channel No. 1, and thus, did not hear the warning from the engineer on train No. 51.

Crashworthiness

The securement of the food service counter was insufficient to withstand even the relatively low impact forces developed on the fourth car as the majority of the kinetic energy was dissipated by the leading units. The inadequacy of this installation resulted from the insufficient structural strength of the 3/4 inch presswood board material used on the bottom panel of the counter. In addition to the basic weakness of this material, there was evidence that moisture in this area further decreased its strength.

The problem the conductor of train No. 392 experienced in attempting to open the upper level door which interconnects the coaches was due to a lack of familiarity with this equipment, rather than any mechanical defects. The door was opened successfully by other crewmembers, and an inspection indicated the door functioned as intended. The Safety Board also determined that Amtrak does not require that these doors be locked, but the boarding doors had been locked with a key from the inside by crewmembers. There is no means provided for rescue forces to open these locked doors from the outside. A problem would have existed with these locked doors if it had been necessary to evacuate passengers quickly, or if the rescuers had to remove severely injured victims. Since the crewmembers were not incapacitated in the accident, they were able to unlock the doors for the passengers to exit the last four cars. The passengers in the first car were removed through the end doors of the car and later through the entrance doors after the fire department placed ladders on the car. The conductor of the train had not received any familiarization instructions on these new cars.

The damage pattern of the passenger train locomotive unit indicated that most of the kinetic energy was transferred to the front and underside of the locomotive at impact. The lead locomotive unit on the freight train on impact was forced 34 feet under the second locomotive unit. The passenger locomotive then overrode the front end of the lead freight locomotive, crushing the forward section, and then overrode the front end of the second freight locomotive before turning over on its side. It came to rest 134 feet from the point of impact. The anticlimbing device on the front end of the passenger locomotive unit was 1 foot 1 1/4 inches above the underframe of the freight locomotive unit. This differential in the height of the strength section of the locomotive units contributed to the passenger locomotive unit overriding the first and second freight locomotive units. The majority of the deceleration of the passenger train occurred when the lead freight locomotive superstructure was being crushed as it was shoved backward and under the second freight locomotive, and the forward movement of the passenger locomotive as it shoved and overrode the freight units while traveling the 134 feet after impact. Thus, it is concluded that the primary deceleration forces imposed on the passengers were longitudinal and that the angular decelerations caused by

the overturning of the first car were minimal. If the kinetic energy of the Amtrak train had not been dissipated, passenger injuries could have been more serious.

CONCLUSIONS

Findings

1. Electrically locked switches or a system that would prevent the movement of switches on the crossover on tracks No. 3 and No. 4 would have prevented the switchtender from operating the switch immediately in front of train No. 392.

2. Neither the hand thrown switches nor the ICG rules prevent switches being operated immediately in front of an approaching train at the Harvey crossover area, and therefore, adequate protection is not provided for trains operating through Harvey.

3. A green indication at signal 2056 indicates that the switches are lined for straight movement through the Harvey crossover area, but it does not prevent the operation of switches after it is passed.

4. A green indication on the switch targets also indicates straight movement through the Harvey area, but it does not assure switches will not be operated before a train's arrival.

5. Except for signal 2056 and the switch targets, no other indicator is available for the engineer to determine the position of switches.

6. The ICG reduced speed rule for the Harvey yard did not specify maximum allowable speed.

7. The ICG rules made it necessary for an engineer to rely on his discretion in the operation of his train through the area of the Harvey crossovers.

8. The train director at Kensington relayed instructions through the Harvey yardmaster for the switchtender as a standing practice which did not conform to the ICG rules.

9. The portable radio used by the Harvey switchtender was not capable of transmission strong enough to reach the train director at Kensington, so the switchtender could not communicate with him directly from the outside area of the switches, except by telephone when in the building.

10. The switchtender at Harvey is not supervised, and therefore, he must be prepared to perform the tasks that are assigned to him by radio or telephone based upon his knowledge of the duties of his assignment, the physical layout of the switches, and train operations.

11. The ICG did not train the switchtender sufficiently to adequately perform the duties at Harvey.

12. The crewmembers were not adequately instructed in pertinent features of the new Amtrak passenger cars.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was the switchtender's manual misalignment of a switch, immediately in advance of a train, which caused train No. 392 to be directed into a crossover and collide with a standing freight train on the adjacent track. The msialignment was made possible by the lack of an interlock or other positive means to prevent its movement. Contributing to the accident was the lack of training and limited experience of the employee assigned as switchtender. Also contributing to the accident was an inadequate communications system for giving directions to the switchtender.

RECOMMENDATIONS

During its investigation of this accident, the National Transportation Safety Board recommended on December 18, 1979, that the Illinois Central Gulf Railroad Company:

> "Provide at the Harvey Yard location an interlocking or other positive means to prevent the inadvertent misalignment of switches in advance of a train operating within the signal block. (Class I, Urgent Action) (R-79-75)
>
> "Until positive safeguards can be provided for the operation of switches, restrict speeds through the area of the Harvey crossover so that trains can be stopped short of a switch which is not properly aligned, but not exceeding 20 mph. (Class I, Urgent Action) (R-79-76)
>
> "Immediately qualify all switchmen/brakemen who function as switchtenders by providing sufficient training in the specific rules that apply to switchtenders, in the physical layout of tracks and switches, and in train operations in the area of their responsibility. (Class I, Urgent Action) (R-79-77)"

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

— to the Illinois Central Gulf Railroad Company:

> "Install a system that will ensure that the switchtender at Harvey and the train director can have direct communication when necessary for the movement of trains through the Harvey area. (Class II, Priority Action) (R-80-17)

"When radios with multiple channels are used in train operations by employees who must use several channels, issue instructions that identify the channel the employee must monitor for receiving instructions. (Class II, Priority Action) (R-80-18)

"Instruct supervisors to monitor the activities of the employees performing the switchtender duties at Harvey for fitness and ability to perform those duties of the assignment." (Class II, Priority Action) (R-80-19)

-- to the National Railroad Passenger Corporation:

"Ensure that all crewmembers on Amtrak passenger trains are trained to identify and operate all pertinent features of the equipment. (Class II, Priority Action) (R-80-20)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PATRICIA A. GOLDMAN
Member

/s/ G.H. PATRICK BURSLEY
Member

April 3, 1980

APPENDIX A

INVESTIGATION AND HEARING

Investigation

The National Transportation Safety Board was notified of the accident at about 10:00 p.m., on October 12, 1979. The Safety Board immediately dispatched an investigator from the Chicago Field Office and an investigative team from Washington, D.C., to the scene. The investigation was completed with assistance from Federal Railroad Administration, National Railroad Passenger Corporation, and Illinois Central Gulf Railroad Company personnel.

Depositions

A 2-day deposition proceeding was held in Homewood, Illinois, at 8:30 a.m., on December 19 and 20, 1979. Parties represented at the hearing were the National Railroad Passenger Corporation, Illinois Central Gulf Railroad Company, Federal Railroad Administration, Brotherhood of Locomotive Engineers, and United Transportation Union. Statements were taken from 11 witnesses.

APPENDIX B

CREW INFORMATION

Train No. 51

Conductor Benjamin L. Gardner

Conductor Gardner, 37, was employed as a brakeman by the ICG on May 2, 1963, and was promoted to conductor on May 13, 1969. He last passed an examination on ICG operating rules on May 16, 1975. Gardner passed a company physical examination on October 22, 1975. He was not restricted in any way.

Engineer Harold Ross Coghlan

Engineer Coghlan, 55, was employed as a fireman by the ICG on June 5, 1974, and was promoted to engineer on May 21, 1975. He last passed an examination on ICG operating rules on July 10, 1978. Coghlan passed a company physical examination on February 27, 1970. He was not restricted in any way.

Head Brakeman Richard O. Kingery

Brakeman Kingery, 21, was employed as a trackman by the ICG on June 14, 1977. He transferred to the Car Department as a laborer on January 8, 1979. He then transferred to the Transportation Department as a brakeman on October 9, 1979, 3 days before the accident. He passed a company physical examination on June 9, 1977. He was not restricted in any way.

Rear Brakeman Thomas Parker Brown

Brakeman Brown, 20, was employed as a trackman by the ICG on May 9, 1978. He transferred to the Transportation Department as a switchman/brakeman on January 10, 1979. Brown passed a company physical examination on May 2, 1978. He was not restricted in any way.

Train No. 392

Conductor James Lowell Garrison

Conductor Garrison, 47, was employed as a brakeman by the ICG on August 1, 1950, and was promoted to conductor on December 15, 1958. He last passed an examination on the ICG operating rules on April 9, 1974. Garrison passed a company physical examination on May 11, 1979. The only restriction he had was that he must wear glasses at all times while on duty.

Engineer John Joseph Taksas

Engineer Taksas, 65, was employed as a fireman by the ICG on January 21, 1940, and was promoted to engineer on January 27, 1949. He last passed an examination on the ICG operating rules on September 30, 1974. Taksas passed a company physical examination on July 27, 1976. The only restriction he had was that he must wear glasses at all times while on duty.

Fireman James Alexander Murray

Fireman Murray, 29, was employed as a brakeman by the ICG on June 8, 1973. He entered engineer training on June 28, 1978, and was promoted to engineer on April 26, 1979. He last passed an examination on the ICG rules on April 26, 1979. Murray passed a company physical examination on June 28, 1978. He was not restricted in any way.

Baggageman Donald Eugene Schwieger

Baggageman Schwieger, 30, was employed as a brakeman by the ICG on December 8, 1967, and was promoted to conductor on October 6, 1972. He last passed an examination on ICG operating rules on July 16, 1975. Schwieger passed a company physical examination on June 19, 1978. He was not restricted in any way.

Flagman John Clarence Washington

Flagman Washington, 48, was employed as a laborer in the Car Department by the ICG on May 19, 1953. He worked various positions in the Car Department, including car inspector, until he transferred to the Transportation Department as a brakeman on August 26, 1968. He was promoted to conductor on March 3, 1973. He last passed an examination on ICG operating rules on June 6, 1978. Washington passed a company physical examination on July 8, 1976. He was not restricted in any way.

Other ICG Personnel

Train Director Norville J. Gapen

Train Director Gapen, 49, was employed as an Agent-Operator by the GM&O on February 7, 1949, and was promoted to train director on October 28, 1974. He last passed an examination on ICG operating rules on August 1, 1978. Gapen passed a company physical examination on October 26, 1976. He was not restricted in any way.

Yardmaster James Alton Avant

Yardmaster Avant, 50, was employed as a switchman by the ICG on November 26, 1952, and promoted to engine foreman on June 13, 1953. He was promoted to yardmaster in 1967. He last passed an examination on ICG operating rules on July 11, 1978. Avant passed a company physical examination in 1970. He was not restricted in any way.

Switchtender Gregory Harris

Switchtender Harris was employed as a switch/brakeman by the ICG on August 10, 1979. He had attended a 1-day orientation session and a 1-day session which included verbal instructions on safety and on the operating rules. He had eight student trips with various traincrews under the direction of the conductor of each of crew. He passed a company physical examination and the only restriction he had was that he must wear glasses at all times while on duty.

APPENDIX C

EXCERPTS FROM ICG TIMETABLE, SPECIAL INSTRUCTIONS, AND OPERATING RULES

Timetable Special Instructions

93 Yard limits:
Ft Wayne Junction to Mile 15 3 on Joliet District
Between MP 35 on Joliet District and Mile 40 5 on Normal District and MP 42 on Pequot District
Randolph Street to 11th Place — Tracks 1, 2, & 3
South Wye Junction-18th Street to Broadview, including Harlem Branch, and to MP 30 on Freeport District
South Wye Junction-18th Street to 67th Street Interlocking — Tracks 5 & 6
67th Street Interlocking to Kensington Interlocking — Tracks 5, 6, 7 & 8
Kensington Interlocking to Richton — Tracks 3, 4, 5 & 6
Between Richton and Stuenkel — Tracks 1, 2, 3 & 4
Between Highlawn and Harvey — Track 7

Train movements in the following areas will come under the jurisdiction of the Train Director located at Kensington Tower:
Richton District—South Wye Junction-18th Street to Stuenkel
Broadview District—South Wye Junction-18th Street to Broadview
Joliet District— South Branch Bridge to Corwith (Yardmasters at Glenn will handle movements between Corwith and Argo with Control Operator at these points.)

Control Operators and Switchtenders will abide by Train Director's instructions

Since all tracks designated above except suburban main tracks are within yard limits, utilization of these tracks in either direction may be made without train orders, provided proper manual blocking is accomplished as prescribed above

101 **Speed Restrictions:** Speeds shown are maximum authorized between points named but do not modify any rule or special instruction which may require lower speed

Territory or Location	Passenger *Trains*	Freight *Trains* and *Transfer* Movements
	Miles Per Hour	
Between 11th Place and Kensington		
Tracks 1, 2, 3, 4	40	20
Between South Wye Junction-18th Street and Kensington Tracks 5, 6	65	40
Between 67th Street and Kensington		
Tracks 7, 8	10	10
Between Kensington and Richton		
Tracks 1, 2	40	25
Tracks 3, 4	65	40
Tracks 5, 6	30	30
Between Highlawn and Harvey		
Track 7	10	10
Between Richton and Stuenkel		
Tracks 1, 2	65	10
Tracks 3, 4	30	30
Between 67th Street and South Chicago		25
Between Kensington and Blue Island		25
Between South Wye Junction-18th Street and Broadview	30	30
Between Ft Wayne Junction and Corwith Interlocking	40	30
Between Corwith Interlocking and South Joliet	79	40
Moving against the current of traffic	55	40
Diverging routes, through crossovers, junction and siding switches:		
Through turn outs at spring switches unless otherwise authorized	25	25
All crossovers and turn outs including those in interlockings unless otherwise shown in 101(a)	15	10

RICHTON DISTRICT

At MP 1, 33rd Street, Tracks 5 and 6

- All trains and/or engines moving on main Tracks No 3 and 4 will approach system of crossovers at Harvey at **REDUCED SPEED** prepared to stop short of crossovers and will not proceed until it is known that switches are properly lined and way is clear
- A speed of 10 MPH must not be exceeded on all tracks except main tracks

513 On the **Richton, Broadview and Joliet Districts:**

Trains and engines must not enter upon any main track at points not protected by interlocking or Switchtender without first obtaining permission from the Control Operator, Trainlister and or Yardmaster who will secure authority from Train Dispatcher or Train Director

- Trains and engines must not cross over from one main track to another main track at locations where Switchtenders are on duty without receiving a Proceed signal from Switchtender

Highlawn-Mile Post 18 –Trains and/or engines moving across system of crossovers using Tracks No 4 5, 6 and 7, will approach this location at **REDUCED SPEED**, and prepared to stop short of crossovers and will not proceed until receipt of proceed signal from Switchtender, between 8:00 AM and 4:00 PM The five (5) minute waiting time as required by Rule 513, is suspended while Switchtender is on duty

- Harvey –Trains and or engines moving across system of crossovers using Tracks No 5, 6 and 7, will not proceed until proper signal is received from the Switchtender and the way is known to be clear
- Harvey The Switchtender will ascertain from the Train Dispatcher or Train Director through the Trainlister at Homewood that there are no approaching movements on Track No 4 before lining the crossover from Track No 5 to Track No 1 The five (5) minute waiting time as required by Rule 513 is suspended

Operating Rules

93 Within yard limits, the main track may be used without authority conferred by timetable schedule, train order or clearance

Within yard limits, trains or engines must not be moved against the current of traffic unless authorized by person in charge of yard who will make provision for protection of the movement, and such movement will be made at YARD SPEED, not exceeding 20 MPH

Within yard limits established by train order, trains or engines must have copy of such train order with a clearance

Within yard limits, flag protection is not required against other trains or engines, but all trains or engines must move at YARD SPEED, not exceeding 20 MPH, unless the main track is known to be clear by block signal indication in ABS territory When a main track is not known to be clear by block signal indication, trains or engines must be prepared to stop within one-half the range of vision, in addition to observing speed requirements of such block signal indication

BLOCK

BLOCK – A length of track of defined limits, the use of which by trains or engines is governed by block signals, cab signals, or both

BLOCK SIGNAL SYSTEMS

AUTOMATIC BLOCK SIGNAL SYSTEM (ABS) - A series of consecutive blocks governed by block signals, cab signals, or both, actuated by a train or engine, or by a certain condition affecting the use of a block

SIGNALS

BLOCK SIGNAL – A fixed signal at the entrance of a block to govern trains and engines entering and using that block

COLOR LIGHT SIGNAL - A fixed signal which conveys an indication by the color of a light, or lights, only

COLOR POSITION LIGHT SIGNAL - A fixed signal which conveys an indication by color and the position of two or more lights It consists of a cluster of lights normally displayed in pairs For some indications marker lights are displayed above, below, or to the side of the main cluster to qualify its meaning

DWARF SIGNAL - A low fixed signal at the entrance of a route or block to govern trains entering and using that route or block

FIXED SIGNAL - A signal of fixed location indicating a condition affecting the movement of a train or engine

NOTE:-The definition of a "Fixed Signal" covers such signals as block signals, cab signals, interlocking signals, train order signals; switch targets or lights; such signs as stop signs, yard limit signs, speed signs or other permanently installed means for displaying indications to govern the movement of trains or engines

HOME SIGNAL - A block or interlocking signal, designated by the absence of either a number plate or a marker light, at the entrance of a route or block to govern trains or engines entering and using that route or block

INTERMEDIATE SIGNAL - An automatic block signal in ABS or CTC territory that is equipped with a number plate or marker light

SIGNAL ASPECT - The appearance of a fixed signal conveying an indication as viewed from the direction of an approaching train, the appearance of a cab signal conveying an indication as viewed by an observer in the cab

SIGNAL INDICATION - The information conveyed by the aspect of a signal

SPEEDS

REDUCED SPEED Proceed prepared to stop short of train or obstruction

RESTRICTED SPEED Proceed prepared to stop short of train obstruction or switch not properly lined and look out for broken rail but not exceeding 10 MPH

YARD SPEED A speed prepared to stop within one-half the range of vision

TRACKS

CURRENT OF TRAFFIC - The movement of trains on a main track in one direction, as specified by the rules or in special instructions

MAIN TRACK - A track extending through yards and between stations, upon which trains are operated by timetable or train order or both, or the use of which is governed by block signals

SIDING - An auxiliary track for meeting or passing trains

CONTROLLED SIDING - A siding equipped with controlled signals that authorize trains or engines to enter or leave the siding

SINGLE TRACK - A main track upon which trains are operated in both directions

MULTIPLE TRACK - Two or more main tracks upon any of which the current of traffic may be in either specified direction

YARD - A system of tracks, other than main tracks, within defined limits provided for the making up of trains, storing of cars and other purposes, over which movements not authorized by timetable or by train order may be made, subject to prescribed signals, rules or special instructions

YARD LIMITS - A portion of main track designated by yard limit signs and special instructions, or train order Form Q

792 Switchtenders are responsible for the position and use of switches and the movement of trains within the territory assigned They must keep switches in their charge clear of obstructions

YARDMASTERS

795 Yardmasters are responsible for the safe, efficient and economical operation of yards and the prompt movement of cars and trains They have jurisdiction over all trains, engines and employes in yards

APPENDIX C

JUN 23 1975

Train Directors:
Levermen:

As you know, frequent movements against the flow of traffic on the Terminal are made daily in order to comply with restrictions, better utilization of tracks, track work and other numerous reasons.

These movements are made in accordance with Rule 93 and should not present a hazard if everyone complies and performs their work properly

Effective immediately, the following steps are to be taken by all Train Directors and Levermen:

Train Directors should personally supervise and record all movements against the flow of traffic, tagging his board as well as insuring that the leverman or switchtender make similar arrangements at their locations

Plan ahead for train and engine movements by securing line-up, etc Be precise and accurate in their instructions to levermen and switchtenders and insure that instructions issued by subordinates to crews are the same. This includes just the minimum amount of conversation on the telephone and radio for business purposes only

The following phrase should be used in all future instructions permitting crews to run against the current of traffic, and a laminated card with these instructions is being issued for use as a guide

"ENGINE (OR TRAIN) YOU HAVE A BLOCK TO RUN AGAINST THE CURRENT OF TRAFFIC ON TRACK_____(number) BETWEEN_____(point) AND_____(point) AS PRESCRIBED BY RULE 93. YOU MAY PROCEED AT YARD SPEED ON RECEIPT OF PROPER (hand)_____ OR_____(color) SIGNAL "

It is important that full compliance of Operating Rules P & R is adhered to The above instructions must be literally complied with

Terminal Superintendent