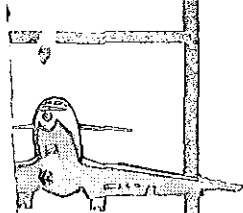


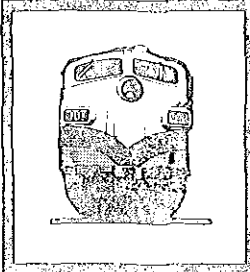
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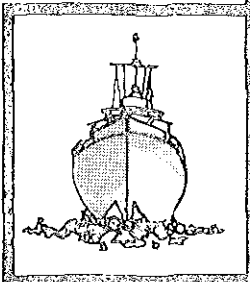


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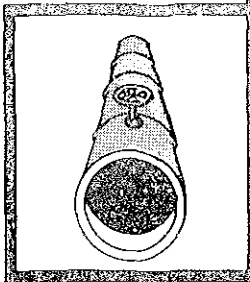


WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT



REAR END COLLISION OF SOUTHERN PACIFIC
TRANSPORTATION COMPANY FREIGHT TRAINS
02-HOLAT-21 AND 01-BSMFK-20
THOUSAND PALMS, CALIFORNIA
JULY 24, 1979



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UNITED STATES GOVERNMENT

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16 Abstract <p>About 4:03 a.m., on July 24, 1979, Extra 7810 West (01-BSMFK-20) collided with the rear of Extra 8484 West (02-HOLAT-21) while it was standing in a siding at Thousand Palms, California. Both trains were owned by the Southern Pacific Transportation Company (SP). The engineer died following the collision as a result of smoke and fire, and four crewmembers were injured. Damage was estimated at \$1,479,700.</p> <p>The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer, whose performance was significantly impaired by alcohol, to stop his train as required by the stop aspect displayed by the interlocking home signal at Thousand Palms and the failure of the head brakeman to take emergency action to stop the train before it collided with the standing train.</p>					
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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

Adopted: February 14, 1980

REAR END COLLISION OF SOUTHERN PACIFIC TRANSPORTATION
COMPANY FREIGHT TRAINS 02-HOLAT-21 AND 01-BSMFK-20
THOUSAND PALMS, CALIFORNIA
JULY 24, 1979

SYNOPSIS

About 4:03 a.m., on July 24, 1979, Extra 7810 West (01-BSMFK-20) collided with the rear of Extra 8484 West (02-HOLAT-21) while it was standing in a siding at Thousand Palms, California. Both trains were owned by the Southern Pacific Transportation Company (SP). The engineer died following the collision, as a result of smoke and fire, and four crewmembers were injured. Damage was estimated at \$1,479,700.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer, whose performance was significantly impaired by alcohol, to stop his train as required by the stop aspect displayed by the interlocking home signal at Thousand Palms and the failure of the head brakeman to take emergency action to stop the train before it collided with the standing train.

INVESTIGATION

The Accident

About 11:30 p.m., July 23, 1979, Southern Pacific Transportation Company (SP) train Extra 7810 West (01-BSMFK-20) arrived at Yuma, Arizona, from Tucson, Arizona, where it had been given a 500-mile inspection and brake test. No exceptions to the train's condition were taken at Tucson. As the train arrived at Yuma, a roll-by inspection was made by the relieving crew. No brake test was made at Yuma, but the outgoing engineer was told that the dynamic brakes were not operable. The train departed from Yuma at 11:35 p.m. The engineer and the head brakeman were on the lead locomotive unit and the conductor and the rear brakeman were on the caboose. The train consisted of 3 locomotive units and 97 cars.

En route from Yuma to Thousand Palms, California, the train was stopped three times and slowed several other times to comply with slow orders. The engineer commented to the head brakeman that the train was responding "well to the brakes" and "in general, was a good handling train." The locomotive and caboose were equipped with functioning radios, and the conductor and engineer communicated with each other several times after leaving Yuma. Their last conversation was at Thermal, California, 20.5 miles east of Thousand Palms, when the engineer announced to the conductor that he was approaching the wayside train scanning equipment.

Extra 7810 West stopped east of the yard at Indio, California, because Extra 8484 West was ahead making a switching movement. While Extra 7810 West was standing at

Indio, the train dispatcher called the engineer to advise him that his locomotive might be used as a helper unit to assist Extra 8484 West over the grade west of Indio. The engineer responded to the call, but the dispatcher told him to disregard the transmission, and the two did not communicate any further.

After Extra 8484 West completed the switching work at Indio, the engineer called Extra 7810 West and told the engineer that his train was departing. This information was acknowledged by Extra 7810 West, and there was a brief exchange of conversation between the two. This was the last radio response or transmission from the locomotive of Extra 7810 West.

When Extra 8484 West departed from Indio, the dispatcher advanced it to the extreme west end of the siding at Thousand Palms, located about 11.9 miles west of Indio where it was to be held for a following train and the plan for helper assistance could be completed. The dispatcher's train graph showed that Extra 8484 West entered the siding at 3:42 a.m., and passed the home signal at an interlocking plant about midway the siding at 3:46 a.m. The engineer reported that the signal indications he received between Indio and Thousand Palms were proper. The dispatcher planned to advance Extra 7810 West onto the siding at Thousand Palms where it was to be held at the midway interlocking home signal. After another westbound train had passed Thousand Palms, the dispatcher planned to use the locomotive as a helper unit.

Extra 7810 West followed Extra 8484 West from Indio on the main track. Extra 7810 West's speed between Indio and Thousand Palms was estimated by the conductor at 25 to 30 mph. The conductor said that the engine crew did not advise him by radio that the train was approaching the scanning and dragging equipment detector located just west of Indio, nor of the signal at the east end of the Thousand Palms siding. He assumed that the engineer's radio transmitter had failed and he was not alarmed. Extra 7810 West passed a standing train in a siding at Myoma, California, 4.4 miles west of Indio. None of the crew on that train remembered seeing any activity on the locomotive of Extra 7810 West.

The train graph indicated that Extra 7810 West entered the siding and the caboose cleared the main track at 3:55 a.m. The conductor called the locomotive and relayed this information to the engine crew but there was no reply.

The brakeman on Extra 8484 West saw Extra 7810 West approaching but he did not know the identity of the train or whether or not it was on the siding or the main track. When he realized that it was on the siding, about 500 ft from him, he shouted to his conductor to get out of the caboose. Then the brakeman jumped from the caboose and ran to the south where he witnessed the collision. He said that as the train approached him the locomotive was under power, the headlight was on bright, the white oscillating light was on, the train brakes were not applied, and the red oscillating light, which would indicate an emergency brake application, never came on.

The head brakeman of Extra 7810 West said that he remembered a red over yellow signal aspect at the east entrance to the siding at Thousand Palms, which permitted the train to proceed at a restricted speed, but that he did not call it to the engineer as required by operating rule 34. He did not recall the signal aspect displayed by the crossover interlocking home signal, signal 224L, at the midway point of the siding, but he said that he saw a flashing white light at that point. He did not take any action in either instance.

West of the crossover interlocking, the head brakeman remembered seeing the door open on the caboose of Extra 8484. He did not see any persons and he did not remember seeing a red marker light. He was not sure whether or not he operated the emergency brake valve on the fireman's side, but he thought he did. He did not call the aspect of signal 224L at the crossover interlocking to the engineer, but he recalled the engineer telling him that the train ahead was moving out and "we will follow it down to the west end." He said he did not question this logic. Shortly thereafter, about 4:03 a.m., while moving at approximately 20 mph, Extra 7810 West struck the rear of Extra 8484 West about 4,238 feet west of the crossover interlocking signal. (See figure 1.)

While discussing the manner in which helper assistance would be provided to the trains, the train dispatcher and the chief dispatcher in Los Angeles noticed that an indication light on the dispatcher's control machine illuminated, which was interpreted to mean that Extra 7810 West had moved past the stop signal, signal 224L, midway of the Thousand Palms siding. The train graph showed that Extra 7810 occupied the detector track at the interlocking at 4:00 a.m. The chief dispatcher immediately made a radio call to Extra 7810 West, but there was no response. Although the conductor on the caboose of Extra 7810 West heard this call, he took no action to stop the train. Immediately thereafter, the dispatcher received a radio call from an unidentified caller, advising him that there had been an accident and for him to send emergency assistance.

Injuries to Persons

<u>Injuries</u>	<u>Crewmembers</u>
Fatal	1
Nonfatal	4
None	3

Damage

The caboose of Extra 8484 West was heavily damaged. The second, third, fourth, eighth, and ninth cars from the rear sustained minor to heavy damage. The three locomotive units of Extra 7810 West were destroyed and the first, second, third, fourth, and fifth cars from the head sustained minor to heavy damage. (See figure 2.) The track was damaged slightly.

Crewmember Information

The engineer of Extra 7810 West arrived at Yuma from West Colton about 12:05 a.m., on July 23, 1979. He obtained a room at a local motel and reportedly was well rested. He was seen on several occasions in establishments where alcoholic beverages were sold, and he was seen by another member of his crew consuming alcoholic drinks.

When he reported for duty, neither his conductor nor other crewmember took exception to his mannerism or questioned his sobriety. He operated the train consistent with his usual manner. There were no serious offenses logged in his personnel record, and he was considered a good engineer by his co-workers. A report of a medical examination given January 28, 1975, indicated he was in good physical condition. A urine specimen was drawn from his body at 12:30 p.m., on July 24, 1979, and a urinalysis test indicated an ethyl alcohol level of 0.23 percent. This equates to a blood alcohol level of 0.18 percent. No barbituates were detected.

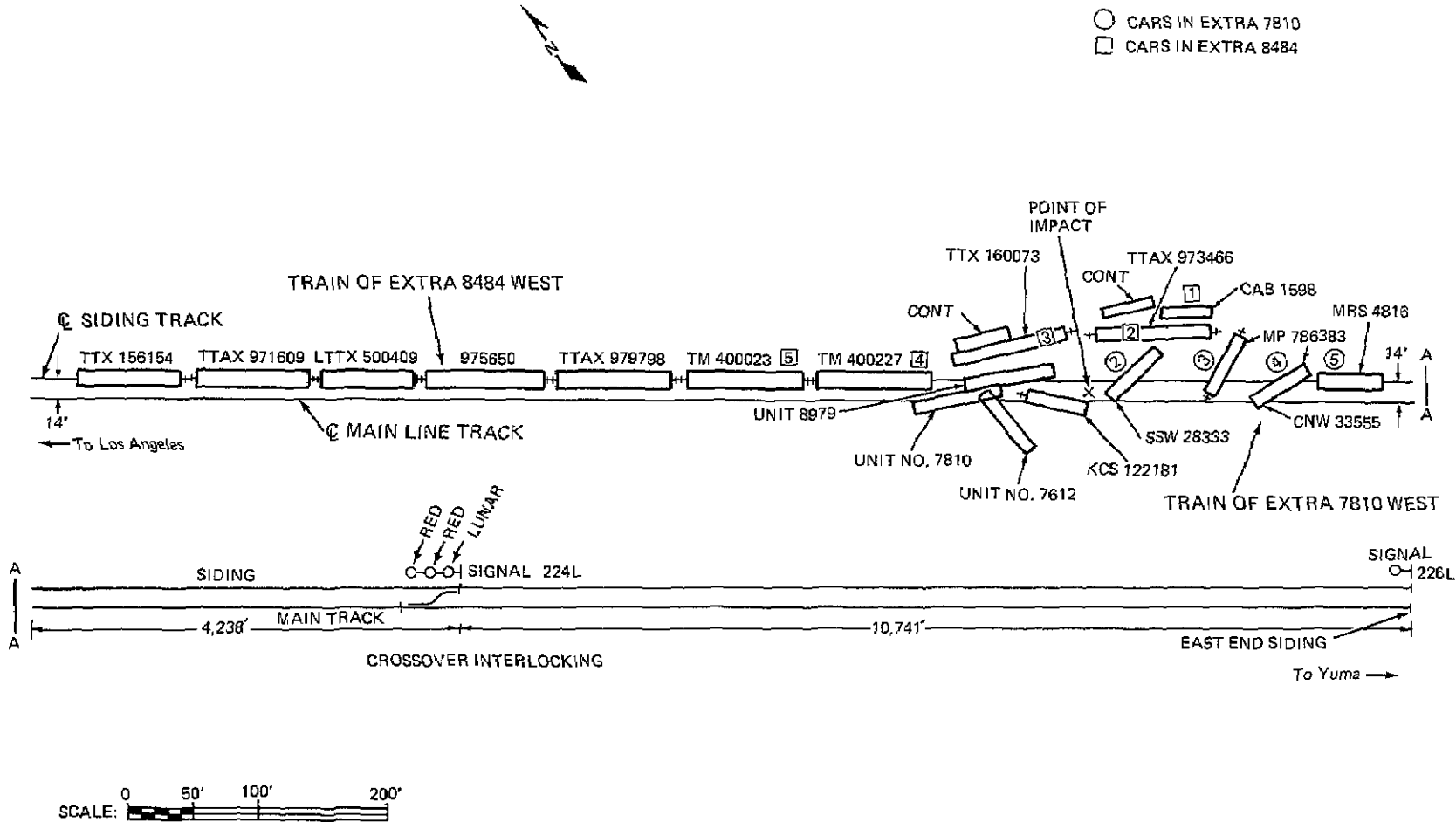


Figure 1. Thousand Palms derailment.

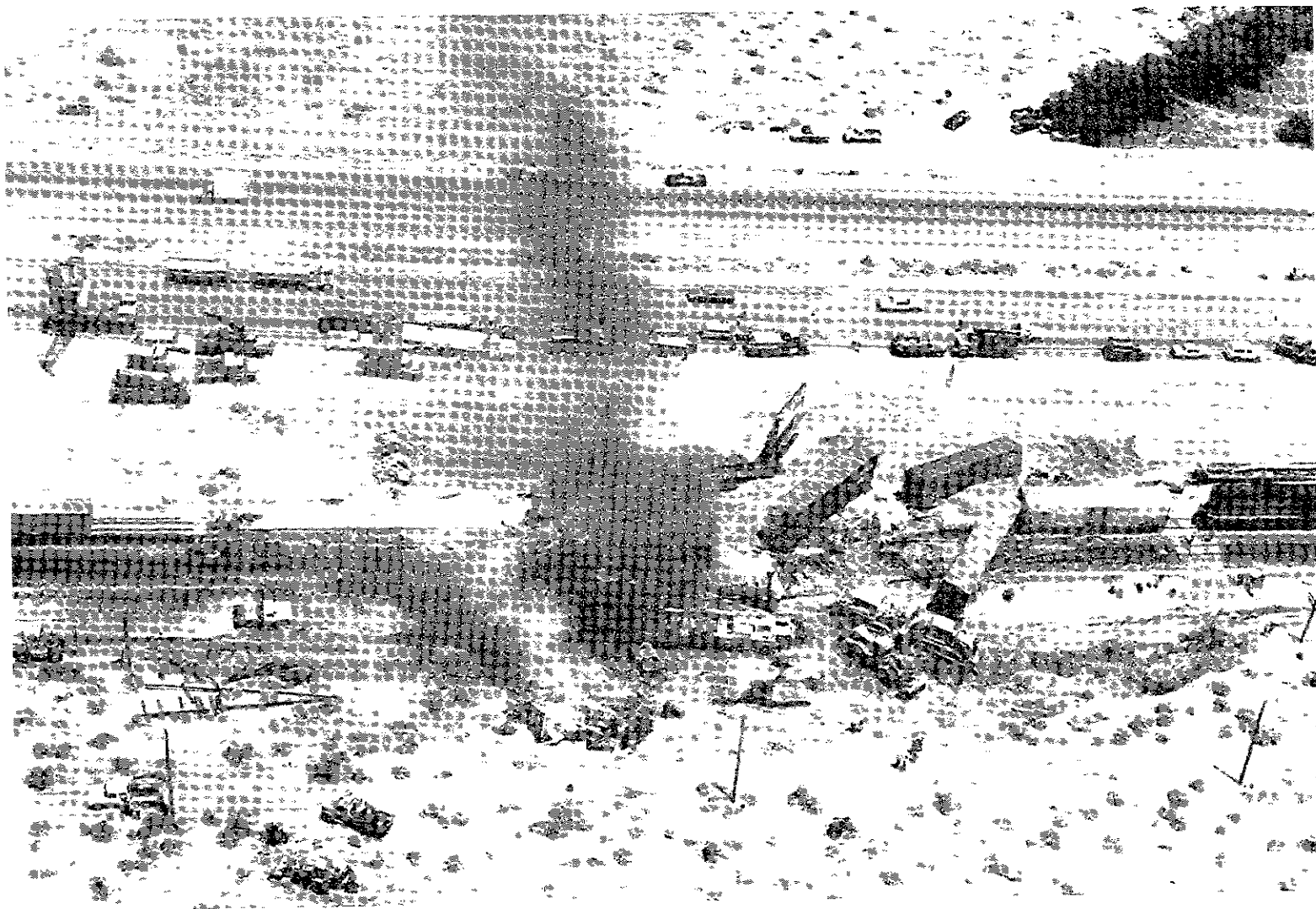


Figure 2. Wreckage at point of impact.

Alcohol is "burned up" by the body at a rate of 0.15 percent per hour. The engineer weighted about 170 pounds. Based on the blood content at death, weight, and consumption rate, the engineer's blood alcohol level would have been 0.3 percent or greater 6 hours earlier when he reported for duty. (See appendix A.)

The head brakeman had 8 to 10 hours bedrest during his off duty period of more than 22 hours. His conductor took no exceptions to his fitness for duty even though he had drunk several beers during the course of the day. His personnel record indicates he had been dismissed on two occasions for violating company rules and he had been disciplined in 1977 for alleged use of alcohol in violation of rule G. (See appendix B.) He suffered a strained back in an accident on March 1, 1978, when train slack action knocked him to the floor of a caboose. He was not required to nor did he take a blood-alcohol test.

The conductor took no exception to any of the other crewmembers of Extra 7810 West when they reported for duty at Yuma on July 23, 1979. Before leaving Yuma, the conductor had cautioned the crew about the hazardous materials cars in the train. His personnel record indicated he had received 10 demerits for a rule infraction April 7, 1955. There was no other indication of disciplinary action on his record. (See appendix C.)

Track Information

The railroad through Thousand Palms is built on an approximate 15-foot-high earth fill. The 115 lb jointed rail is laid on 7" by 8" by 8 1/2' treated crossties, 24 per rail length with 8 3/4" by 14" tie plates. Sixteen rail anchors are used per rail length. The south rail has two rail and two tie holding spikes per tie while the north rail has two rail holding spikes per tie. It is ballasted with crushed stone and dirt.

The track at Thousand Palms is tangent with a grade averaging about 1.13 percent ascending westward from Myoma and continuing westward. A siding 21,620 ft in length parallels the main track on the north. A crossover connecting the siding with the main track is located 10,471 ft from the east end of the siding. (See figures 3 and 4.)

Train and Locomotive Information

Extra 7810 West (01-BSMFK-20) originated at East St. Louis, Illinois, on July 20, 1979. The "K" indicates the presence of hazardous materials in the train. It had 48 loaded and 49 empty cars for a trailing weight of 5,861 tons, and it was 6,932 ft long. The lead locomotive unit and the caboose were equipped with an operable radio. The automatic train brakes were reported to function well but the dynamic brakes were not operable. The locomotive of Extra 7810 West was not equipped with a deadman control or other backup safety device.

The caboose of Extra 8484 West was equipped with a red marker light that was checked by the rear brakeman just east of Indio and it was known by him to have been illuminated at that time. The crew on the standing train at Myoma did not remember whether or not the marker light was illuminated when Extra 7810 West passed it.

The first locomotive unit of Extra 7810 West was manufactured by the Electro Motive Division (EMD) of General Motors. It was a four-axle, 3,000 hp type GP-40-2 unit. The cab was equipped with air conditioning. The locomotive was equipped with a white oscillating light and a red oscillating light that would illuminate if the train brakes were operated in emergency by any means. The second locomotive unit was also an EMD unit, type SD-45, six-axle rated at 3,600 hp. The third locomotive unit was manufactured by the General Electric Company, and it was a four-axle, type GEB-7 rated at 3,000 hp.

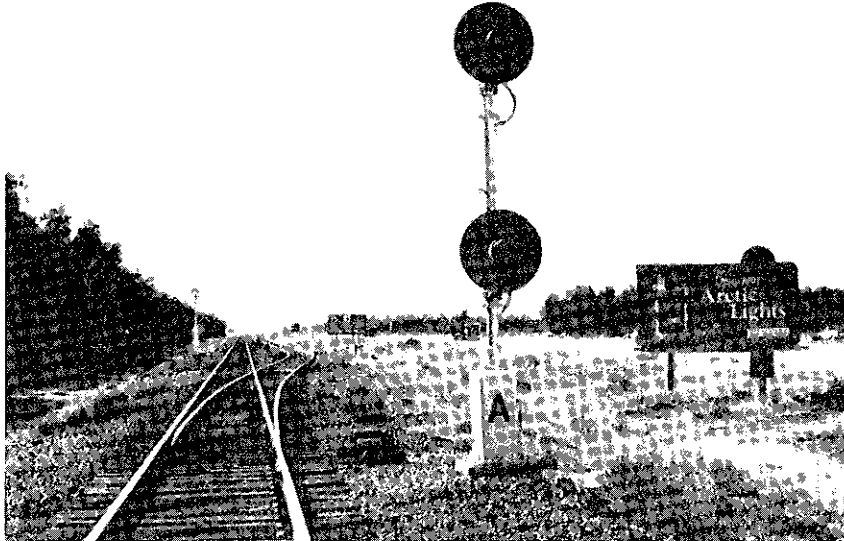


Figure 3. Signal 226L east entrance to Thousand Palms siding and view west.

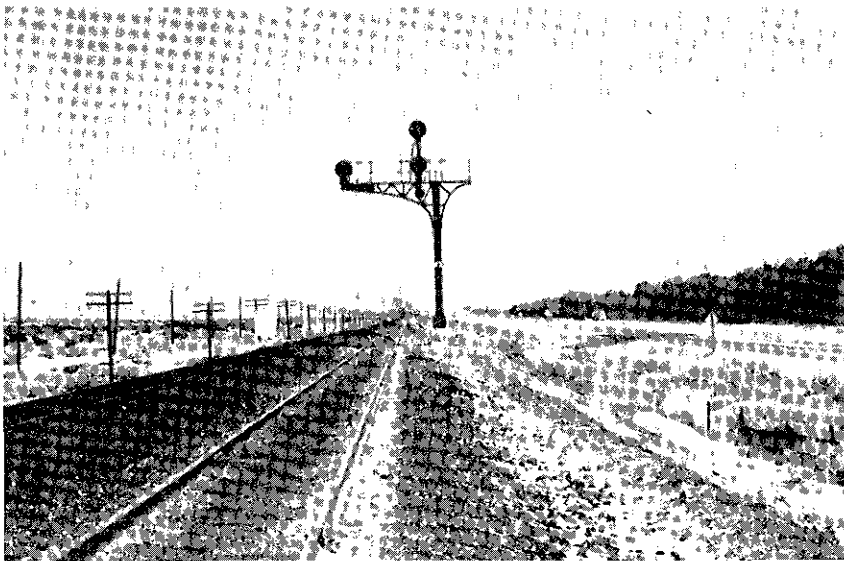


Figure 4. Signal 224L at crossover interlocking and Thousand Palms siding and view west.

Method of Operation

Trains are operated through the accident area by automatic block signal indications of a centralized traffic control (CTC) system. The signals are approach lighted and signal 224L at the crossover is illuminated when a train enters the detector circuit 1/ at the east end of the siding. The maximum allowable speed of freight trains on the main track in the Thousand Palms area is 40 mph and on the siding, 25 mph.

The switches of the siding to the main track are controlled remotely by the dispatcher in Los Angeles. Movements over the crossover on the siding are governed by signal 224L. If a train is in the siding west of the crossover, signal 224L displays a stop aspect. To move a train past signal 224L on the siding, the dispatcher can cause signal 224L to display a proceed aspect by lighting a lunar light under two red lights. This allows a train to proceed on the siding past signal 224L at a restricted speed without stopping. The same arrangement exists at the east entrance to the siding. The signal circuits do not provide a flashing white light at signal 224L, but only a steady lunar light. Trains are equipped with radios for communication between the dispatcher, other trains, and each end of the train.

Southern Pacific Transportation Company does not require employees to be examined periodically on the operating rules. Rules classes are made available to employees but attendance is voluntary on the employees' own time. Qualified rules instructors randomly stop operating personnel on the job and question them on operating rules. Some of the crewmembers involved in this accident had not taken a rules examination since they were employed.

Rule 843 establishes the conductor as the employee having the primary responsibility for the operation of the train. Rule 34 requires employees in the locomotive cab to call signal aspects to each other and when practicable, to call restricting signals to the crew on the caboose. Rule 874 requires the engineer to call to the rear end, when feasible, the train's approach to scanning equipment. (See appendix B.)

Meteorological Information

On the morning of July 24, 1979, the weather at Thousand Palms was clear, and it was still dark. The temperature was about 90° F.

Wreckage

The lead unit of Extra 7810 West turned about 145° toward the southeast. The other two units stopped approximately in line with the track just west of the lead unit. Although the first, second, third, and fourth cars remained in line, they were skewed to the side and were partially down the roadway fill. The fuel tanks of the locomotive units were punctured; the fuel oil ignited and engulfed the impact area in flames. The cars carrying hazardous materials were not involved in the fire. The locomotive radio was destroyed in the fire.

At impact, the caboose of Extra 8484 West raised over the lead unit and slid off to the north side of the track. The second, third, and fourth rear cars derailed to the north. The caboose marker light was destroyed in the fire.

1/ An electrical track circuit activated by a train by which its presence at that point can be detected. At selected points, a train's passage is annunciated by a detector circuit encompassing a switch and signal, as at Thousand Palms.

Survival Aspects

The rear brakeman of Extra 8484 West saw Extra 7810 West in sufficient time to escape the collision. He injured his ankle slightly when he jumped. Although the conductor did not have time to vacate the caboose before the collision, he was not seriously injured. Because the door at one end of the caboose was jammed and the other door was engulfed in flames, he escaped through a window in the side of the caboose.

The cab of the lead unit of Extra 7810 West was not deformed and both crewmen survived the crash. The engineer apparently remained in his seat during the collision until motion ceased. The brakeman dropped to the floor and was not injured except for some bruises and abrasions.

The two men encountered difficulty in getting out of the locomotive cab and into the clear because of the flaming fuel oil. The brakeman jumped over the handrail along the short hood of the locomotive and aggravated an old back injury when he landed. He was able to move away from the burning wreckage by himself. The engineer apparently chose another route of escape and was overcome by smoke and fire. His body was found on the front walkway of the locomotive.

When the trains collided, the rear brakeman of Extra 7810 West had just gotten up from his seat in the caboose to check on the train's condition. He was thrown forward and received bruises and abrasions. Although slightly dazed, he was able to move about and assist in evaluating the situation. The conductor was seated at the time, and was not injured.

Emergency units from Indio and nearby communities in Riverside County, California, responded quickly to the call for assistance and injured crewmembers were taken to a hospital nearby. The fire was controlled by the firefighting units on the scene.

Tests and Research

Because of the fire following the collision, it was not possible to check the marker light on the standing train's caboose or the radio on the striking locomotive.

The signal circuits at the crossover interlocking were checked and no discrepancies were found. Visibility tests revealed that a caboose with a lighted marker light could be seen from about 15,000 ft, a point just east of the east switch. Signal 224L became visible from the east switch of the siding as soon as it became lighted. There were no obstructions to block or interfere with the line of sight. Visibility tests were conducted during darkness to simulate lighting conditions at the time of the accident.

Although a few cars had excessive piston travel, the brakes on the undamaged cars of Extra 7810 West were tested and no defects were found. The excessive piston travel would not have caused braking difficulties. There was neither sand nor marks on the rails east of the point of impact to indicate a heavy brake application. The emergency brake valve on the fireman's side was found in the closed position.

ANALYSIS

Extra 7810 West was operated from Yuma to Indio without any apparent problems. The engineer observed slow orders properly, and when the train was required to stop, it did so without difficulty. The switch at the east end of the siding at Thousand Palms was negotiated at a safe and reasonable speed. None of the crewmembers indicated observing any difficulties with the airbrake systems. The train responded well to the brake applications, and the absence of dynamic braking had no effect on the airbrake system.

The engineer of Extra 7810 West was operating the locomotive with a blood-alcohol level of 0.18 percent or greater. When the blood-alcohol level of an individual exceeds 0.5 percent, it is generally detectable by his or her mannerisms. For example, he may slur his speech; his reaction is slow to questions or to motion; he is not steady in walking or standing. Under these conditions, a person may not react to emergency situations, and it is not surprising that the engineer failed to respond to signal indications or the threat of a collision. Because of the engineer's death, it is not known why he took no action, even belatedly, to stop the train. There is no question that the use of alcohol by the engineer was a significant causal factor in this accident.

Although the head brakeman had drunk several beers during the day, no test was taken to determine his blood-alcohol level. The Safety Board has insufficient evidence to draw a conclusion as to why the head brakeman made no attempt to stop the train after it passed the stop signal and particularly when he sighted the standing caboose.

Despite the engineer's condition, if the head brakeman had complied with SP operating rules, he would have applied the brakes in emergency. If this had been done when the locomotive passed the stop aspect on the home signal at the crossover interlocking, the train would have stopped short of the standing train. Even if the brakeman had made an emergency brake application when he first saw the caboose about 500 feet away, the speed of the train and force of impact would have been reduced significantly. The conductor also could have prevented the accident or reduced the damage significantly if he had responded to the dispatcher's call to his engineer, even though the dispatcher did not report the reason for his urgent call.

On June 25, 1973, two trains collided on the Southern Pacific at Indio, California, 2/ approximately 12 miles east of Thousand Palms. Because that accident and the rear end collision at Thousand Palms were very similar, some of the recommendations made as a result of that accident are reiterated in this report:

-- to the Federal Railroad Administration:

The Federal Railroad Administration include in their proposed Standards for Rules Governing the Operation of Trains, regulations that will in effect prohibit the use of narcotics and intoxicants by employes for a specified period prior to their reporting for duty and while they are on duty. (Recommendation R-74-9)

As a result of Recommendation R-74-9, the FRA revised its accident causal code to read, "Impairment of efficiency and judgment due to drugs or alcohol" in order

2/ Rear-end Collision of Two Southern Pacific Transportation Company Freight Trains, Indio, California, June 25, 1973, NTSB-RAR-74-1.

to obtain data on the alcohol issue. In railroad submitted accident reports, only one accident in 1975 and two in 1976 were attributed to alcohol. The FRA does not believe that a Federal regulation which prohibits the use of alcohol by operating employees would be effective because of difficulty in enforcing it. Instead, the FRA has decided to support the cooperative labor-management program directed at helping the problem drinkers. SP commented that its rule prohibiting the use of alcohol was more restrictive than the regulation which was recommended by the Safety Board.

-- to the Southern Pacific Transportation Company:

- (a) Establish more effective procedures to insure that employes comply with the operating rules such as by requiring that conductors examine crewmembers coming on duty to ascertain their apparent physical competence to perform their responsibilities. (Recommendation R-74-10)
- (b) Train all new employes including brakemen in their responsibilities and duties so that they understand their responsibility to monitor the performance of other employes and to take positive action when the situation warrants. (Recommendation R-74-11)

After the 1973 accident at Indio, through correspondence and visits by Safety Board staff members to SP property, SP convinced the Safety Board that SP's training program was superior to the average railroad's training programs for operating employees. Additionally, the SP described an on-the-job program for assuring that operating employees understood the application of the rules. The Safety Board agreed and the evidence still indicates that the program can be effective in insuring that employees understand their responsibilities under the rules. However, the engineer used alcohol in violation of Rule G; the conductor, who is responsible for the behavior and performance of the crew while they are on duty, could not prevent the violations; and the head brakeman who is the final backup when the engineer fails, did nothing to prevent the engineer from operating the locomotive while impaired by alcohol or to stop the train after it passed the stop signal. It is unlikely that the engineer could have developed a 0.18 percent blood-alcohol level without the head brakeman being aware of it. If the engineer did have a blood alcohol level of 0.3 percent when he reported for duty, his conductor and other crewmembers should have detected his condition. Therefore, since he was deemed stable with no slurring of speech or other visible telltale traits of excessive drinking, he may have brought alcohol with him on the job and consumed it en route to Thousand Palms.

It has been known for many years by industrial psychologists, doctors, and social workers dealing with problem drinkers that a person whose blood alcohol content exceeds 0.05 percent cannot operate machinery or work around moving equipment without endangering himself and his fellow workers. The rehabilitation programs for problem drinkers, which the FRA considers superior to a regulatory approach, treats the use of alcohol as a social problem. The Safety Board approves and supports the rehabilitation of problem drinkers; however, even the best programs only help those who want to be helped. As admirable as this approach is, it does not prevent employees from working while impaired by alcohol. The problem, as exemplified by this and the 1973 accident in Indio, is to find a way to prohibit operating employees from working when their efficiency is impaired by alcohol. Air carriers in the United States and abroad effectively control the problem through stringent self-enforcement of regulations.

The Safety Board believes that this accident could have been prevented if the crewmembers had complied with pertinent SP operating rules. Furthermore, the Safety Board believes that SP needs more effective training and closer monitoring of practices to make conductors more competent as supervisors and brakemen more willing to exercise their responsibility when conductors and engineers fail to perform adequately. The Safety Board recognizes that effective training of employees to assert themselves when superiors fail to comply with operating rules is a very difficult undertaking. However, since the brakemen are the final backup in the safety system, the SP must find some way to require the brakemen to assert themselves consistently through action when the circumstances require it.

In violation of Rules 34 and 874, the brakeman on Extra 7810 West took no corrective or preventive action when the engineer failed to notify by radio the crew on the caboose of the approach to the dragging equipment detector or when the engineer allowed the train to pass the stop signal at the crossover interlocking without stopping. The rules appear to be very clear in their requirements and there is no evidence that the brakeman did not understand his duties under the rules. However, it is evident that the brakeman may not have been adequately trained in the importance of his responsibility as the final safety backup to the engineer.

Since the question of a safety device on the locomotive, which will stop the train when the crew becomes incapacitated, was an issue after the Indio accident, and since it appears that such a device might have averted the accident at Thousand Palms, the Safety Board reiterates Recommendation R-74-12. Recommendation R-73-8 issued as a result of an accident on the Penn Central at Herndon, Pennsylvania, on March 12, 1972, 3/ is also reiterated:

--to the Southern Pacific Transportation Company:

"Require the use of dead-man control, overspeed, and other safety devices on their locomotives and, if such devices are inoperative, require that all members of the crew be so notified." (Recommendation R-74-12)

--to the Federal Railroad Administration:

The Federal Railroad Administration (FRA), in cooperation with the Association of American Railroads, develop a fail-safe device to stop a train in the event that the engineer becomes incapacitated by sickness or death, or falls asleep. Regulations should be promulgated to require installation, use, and maintenance of such a device. (Recommendation R-73-8)

The SP and FRA do not disagree with the need for a device to stop the train if the engineer becomes incapacitated; however, in the past 5 years, very little productive effort has been evident. The SP feels that the research and development of such a device should be done through a cooperative effort by the industry and Government.

3/ Head-on Collision of Two Penn Central Freight Trains at Herndon, Pennsylvania, March 12, 1972, NTSB-RAR-73-3.

The Safety Board agrees that the issue may be too broad for the SP to solve. There are several devices which have been tried, but crews have resisted the use of them. Extensive education is needed as to their desirability and effectiveness as a backup safety device. To be effective, this education must involve a cooperative effort by labor and management. Additionally, a Federal regulation is required to insure the device's acceptance and regular use by the industry. It appears that the 1973 accident at Indio and this one could have been prevented by an effective locomotive safety device.

Despite the assurance by SP after the 1973 accident at Indio that SP has a superior training program and a program of monitoring employees' knowledge of and compliance with the operating rules, this accident occurred because some basic operating rules were not complied with. The SP has not translated its well-conceived training program into effective performance by the employees, and it must initiate an aggressive program to assure that employees understand the importance of complying with the operating rules and make the consequences of noncompliance serious enough to be both a deterrent to failure to abide by the operating rules and an incentive to compliance.

CONCLUSIONS

Findings

1. There were no mechanical malfunctions or defects which adversely affected the performance of the train.
2. The blood-alcohol level of the engineer of 7810 West was sufficient to impair significantly his proficiency in operating the locomotive. The engineer consumed some of the alcohol en route.
3. The locomotive radio was operating properly when the train was standing at Indio.
4. There was no evidence that Extra 7810 West was operated in an unsafe manner from Indio to its entrance into the siding at Thousand Palms.
5. Signal 224L displayed a stop aspect when Extra 7810 West passed.
6. Extra 7810 West passed the stop aspect of the signal at the crossover interlocking without stopping.
7. The head brakeman made no attempt to stop train 7810 West short of the collision.
8. The SP's system for evaluating an employees' knowledge and application of the operating rules does not insure that all employees understand and comply with the rules.
9. SP's management and labor need to join forces in a cooperative effort to educate locomotive engineers on the benefits provided by safety backup devices on the locomotive and to gain their acceptance.
10. Programs directed at the social aspect of problem drinkers does not address directly the problem of employees being on duty when their efficiency is impaired by alcohol.

11. SP's Rule G did not prevent the engineer from operating the locomotive while he was under the influence of alcohol.
12. A backup safety device is still needed to protect lives and equipment when the engineer becomes incapacitated.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer, whose performance was significantly impaired by alcohol, to stop his train as required by the stop aspect displayed by the interlocking home signal at Thousand Palms and the failure of the head brakeman to take emergency action to stop the train before it collided with the standing train.

RECOMMENDATIONS

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the Southern Pacific Transportation Company:

"In conjunction with the appropriate labor organizations, implement a system of operating rules re-examinations which will insure that all employees subject to those rules will be systematically and periodically examined. The system should insure that each employee satisfactorily exhibits his/her knowledge and understanding of the current operating rules. (Class II, Priority Action) (R-80-3)

"Establish supervisory procedures at crew-change terminals to ensure that operating department employees coming on duty are capable of complying with all pertinent operating rules. (Class II, Priority Action) (R-80-4)"

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ G. H. PATRICK BURSLEY
Member

PATRICIA A. GOLDMAN, Member, did not participate.

February 14, 1980

APPENDIX A

STAGES OF ACUTE ALCOHOLIC INFLUENCE/INTOXICATION

<u>Blood Alcohol Level (Percent)</u>	<u>Stage of Alcoholic Influence</u>	<u>Clinical Signs/Symptoms</u>
0.01-0.05	Sobriety	No apparent influence. Behavior nearly normal by ordinary observation. Slight changes detectable by special tests.
0.03-0.12	Euphoria	Mild euphoria, sociability, talkativeness. Increased self-confidence; decreased inhibitions. Diminution of attention, judgment, and control. Loss of efficiency in finer performance tests.
0.9-0.25	Excitement	Emotional instability; decreased inhibitions. Loss of critical judgment. Impairment of memory and comprehension. Decreased sensory response; increased reaction time. Some muscular incoordination.
0.18-0.30	Confusion	Disorientation, mental confusion; dizziness. Exaggerated emotional states (fear, anger, grief, etc.) Disturbance of sensation (diplopia, etc.) and of perception of color, form, motion, dimensions. Decreased pain sense. Impaired balance; muscular incoordination; staggering gait, slurred speech.
0.27-0.40	Stupor	Apathy; general inertia, approaching paralysis. Markedly decreased response to stimuli. Marked muscular incoordination; inability to stand or walk. Vomiting; incontinence of urine and feces. Impaired consciousness; sleep or stupor.

APPENDIX A

Blood Alcohol
Level
(Percent)

Stage of
Alcoholic Influence

Clinical Signs/Symptoms

0.35-0.50

Coma

Complete unconsciousness;
coma; anesthesia. Depressed
or abolished reflexes. Subnormal
temperature. Incontinence
of urine and feces. Embarrassment
of circulation and respiration.
Possible death.

0.45

Death

Death from respiratory
paralysis.

Committee on Alcohol
and Drugs Traffic Conference.
National Safety Council.

APPENDIX B

GENERAL RULES

- C. Employees designated in Rule B who do not attend rules class within a 24 month period will be required to pass a written and oral examination for the highest class of service which they may be called upon to perform, such examination to be completed without loss of work time but no later than 60 days from date of notification.

Employees who have not performed service in past six months may not perform service until they pass an oral examination. Employees who have not performed service in past twelve months must pass written and oral examination before commencing service.

- G. The use of alcoholic beverages, intoxicants or narcotics by employees subject to duty, or their possession, use, or being under the influence thereof while on duty or on Company property, is prohibited.

Employees shall not report for duty under the influence of, or use while on duty or on Company property, any drug, medication or other substance, including those prescribed by a doctor, that will in any way adversely affect their alertness, coordination, reaction, response or safety.

843. The general direction and government of a train is vested in the conductor, except when there is a pilot in charge. All other persons employed on the train must obey his instructions. Should there be any doubt as to authority or safety of proceeding, he will consult with the engineer and pilot if any, who will be responsible with him for the observance of the rules and the safe handling of the train. Under conditions not provided for in the rules, they must take every precaution for protection. Conductor must obey instructions of yardmaster within yard limits and be governed by direction of agents in doing work at stations, and conform to instructions issued by the Traffic and Accounting Departments.

SPECIAL INSTRUCTIONS

34. Crew members in control compartment of engine must be alert for, and communicate to each other the name and aspect of each signal affecting movement of their train or engine as soon as it becomes visible or audible.

Crew members on rear of train must communicate each applicable signal aspect or indication to each other.

APPENDIX B

Any restrictive indication of signals must be communicated between crew members on head end and rear end (also helper engines) when radio communication is available and when it is practicable to do so.

If prompt action is not taken to respect signal, other crew members must remind engineer and/or conductor of rule requirement, and if no response, or engineer is incapacitated, must take IMMEDIATE action to insure safety, stopping train if necessary.

874. Enginemen and trainmen on engine must be alert in all matters pertaining to safety. While running, they must keep alert, carefully note signals affecting their movement, observe position of switches and derails immediately ahead of engine in direction of movement to see they are properly set, and watch for obstructions and defects in track.

If means of communication is available, engineer must inform conductor and helper engineer, if any, when approaching hot box detector, dragging and/or derailed equipment detector, excess dimension load detector or person making rolling inspection of his train. Crews on helper engine and on rear end of train must acknowledge and advise engineer of indications displayed in addition to taking appropriate action in accordance with applicable rules and special instructions.

APPENDIX C

Crewmember Information

Engineer Ronald Lee Oliver, 46, was employed as a crewman helper on the Los Angeles Division on June 22, 1952. He transferred to yard service as a student yardman on January 1, 1953. He was in the military service from April 28, 1953, until May 28, 1955. The date of his last operating rules examination was not furnished to the Safety Board. His last recorded medical examination was on January 28, 1975, at which time he was in good physical condition.

Conductor Ben Dale Zwanzig, 52, was employed as a student brakeman on April 14, 1953. He transferred from the Portland Division to the Los Angeles Division as a brakeman on June 23, 1954, and he was promoted to conductor on January 24, 1957. He attended his last operating rules review on October 1, 1978. His last company medical examination was when he was employed.

Head brakeman Byron Lee Kiemele, 34, was employed as a student brakeman on June 4, 1966. He became a switchman on August 2, 1967. He was promoted to conductor on May 6, 1971. He was dismissed from service on October 10, 1973, but he was reinstated on July 20, 1974. He last attended an operating rules review at Bakersfield, California, in 1976. The Safety Board was not provided information relative to his medical examinations.

Rear brakeman, James Richard Hamilton, 40, was employed as a student brakeman on April 23, 1963. The dates of his last operating rules examination or medical examination were not included in his personnel record.