

**In re Investigation of accident which occurred
on the Atchison, Topeka & Santa Fe Rail-
way, near Keenbrook, Calif., on
February 2, 1917.**

March 28, 1917.

On February 2, 1917, there was a derailment of a run-
away light engine on the First District of the Los Angeles
Division of the Atchison, Topeka & Santa Fe Railway, near Keen-
brook, Calif., resulting in the death of 1 employee. After
investigation of this accident the Chief of the Division of
Safety reports as follows:

The First District of the Los Angeles Division extends
between Barstow and San Bernardino, Calif., and is used joint-
ly by trains of the Atchison, Topeka & Santa Fe Railway and
the Los Angeles & Salt Lake Railway. That portion of the road
where this accident occurred is a double track line, equipped
with automatic block signals, trains using the left hand track
in the direction of traffic.

The engine involved in this derailment was Los Angeles
& Salt Lake Railway engine No. 3703, a large engine of the
Mikado type, equipped with Hagonnet power reversing gear. On
the date of the accident this engine was used as a helper to
assist Los Angeles & Salt Lake Railway trains over the summit
of San Bernardino Mountains.

The power reversing gear with which engine 3703 is
equipped is designed to be operated by air pressure, obtained
through a direct connection from the main reservoir. There
is also a steam connection which is designed for use only in
case of emergencies when the air pressure fails. In this type
of gear, control of the valve motion by means of the small re-
verse lever in the engine cab is possible only when pressure
is available for use in the reversing cylinder of the device.
When pressure is present in the reversing cylinder the position
of the valve motion follows the reverse lever in the cab, the
position of that lever in its quadrant determining the direc-
tion in which the engine shall run, as well as the point in
the stroke at which the admission of steam to the engine cylin-
ders shall be cut off. When pressure is not present in the
reversing cylinder the reverse lever in the cab may be placed
at any point in its quadrant without altering the position of the
valve motion in any degree; due to the weight of its various
parts the valve motion then, by force of gravity, assumes the
full stroke position in forward motion.

On the date of this accident engine 3703 left San

Bernardino at 11.30 a. m., in charge of Engineman Dalzell and Fireman Davis, as a helper for Los Angeles & Salt Lake Railway passenger train No. 250, arriving at Victorville, the eastern limit of the helper district, at 1.20 p. m. It returned westward as helper for an extra train, leaving Victorville at 7.00 p. m., arriving at Summit at 8.40, and leaving Summit at 9.05 p.m., two minutes behind the third section of Santa Fe passenger train No. 21.

According to the statement of Engineman Dalzell, when the engine reached a point about one mile east of Cajon, a station 6.6 miles west of Summit, while running at a speed of about 25 miles per hour, with independent straight air engine brake applied, there was a loud and sudden explosion on the right hand side of the engine, and air pressure immediately began to go down. Engineman Dalzell stated that as soon as he saw that he was losing his air he immediately reversed the engine, having then about 50 pounds of air pressure remaining. He stated that this reversal brought the engine almost to a standstill and he got down on the ground with the intention of blocking the wheels, at the same time calling to Fireman Davis to flag passenger train 4th No. 21, which was following. Before he could accomplish his purpose, and while the engine was still moving forward at a slow rate of speed, the valve gear dropped into forward motion by gravity, due to air pressure having entirely escaped from the reversing cylinder, and the engine started rapidly ahead. Engineman Dalzell said he was barely able to get on the engine again at this point, as it started ahead so quickly. It passed Cajon at 9.24, running at a high rate of speed, and was derailed on a 10-degree curve about three miles farther west, on a 2.2 per cent. descending grade, about 2,800 feet west of automatic signal No. 651, which signal was then in the danger position, indicating that passenger train No. 21 was still in the block.

After leaving the rails the engine turned over on its right side on the eastbound track and plowed into the bank on the north side of the track, coming to rest 121 feet west of the point of derailment. Fireman Davis was instantly killed and Engineman Dalzell was painfully injured.

Engineman Dalzell stated that as soon as he got on the engine again after it started ahead, he set the tank brake as tight as he could by hand; while he was doing that, Fireman Davis was opening the steam valves which apply steam pressure to the reversing cylinder. After opening the steam valves (one at the fountain on top of the boiler head, and another one lower down at the side of the boiler on the right hand side, a short distance below and at the rear of the injector), Fireman Davis went out on the running board and

closed the air valve leading from the main reservoir to the reversing cylinder, so as to prevent steam from blowing through. While he was doing this Engineman Dalzell said that he got up alongside the boiler and saw that both steam valves were open; at the same time he felt of the pipe leading from the valves and found it cold, - with no steam flowing through it. He said that after the fireman came in off the running board and told him that the air valves were closed and everything all right to operate steam pressure in the reversing gear, he made two or three efforts to reverse the engine, but was unsuccessful, as there was no steam flowing into the reversing cylinder. As the engine was then entirely beyond control and Engineman Dalzell was deprived of all means of checking its speed, he and Fireman Davis climbed back onto the rear of the tender and awaited the derailment, which occurred a brief period thereafter.

The primary cause of this accident was loss of air pressure from the power cylinder of the reversing gear, due to the breaking of an air connection between the main reservoir and the reversing cylinder. It was impossible to locate this break after the derailment, as the right side of the engine was pretty badly stripped in the accident, and the air pipes were torn from both ends of the main air reservoir on that side.

A very material contributing cause of this accident was Engineman Dalzell's inability to get steam pressure into the power reversing cylinder after his air pressure failed. There is some reason to believe that the failure of the steam connection was due to the pipe being closed by a blind gasket, in obedience to instructions contained in the following bulletin signed by Master Mechanic Hicks of the Santa Fe Railway at San Bernardino. The Los Angeles & Salt Lake Railway engines are taken care of in the Santa Fe engine house at San Bernardino:

***ALL ENGINEMEN:**

*Engines with the Ragonet reversing gear are being equipped with Garlock packing in the piston heads, instead of cast-iron packing rings, - a blind gasket is to be applied in the union near the fountain to close steam pipe leading to reversing gear.

*With soft packing it is important that steam shall not enter reverse gear cylinder except when needed in emergency caused by failure of the air. In such emergency, blind gasket can be removed, and its removal should be reported upon arrival at terminal so that gasket will be replaced and cylinder packing examined.

Kindly be governed by the above so that you will thoroughly understand how to operate this device in case the air fails.

On Sunday, February 4, the steam connection to the reversing cylinder on engine 3703 was examined in San Bernardino by Inspector Crisp of the Locomotive Inspection Division of the Commission. At that time the steam valve at the fountain on top of the boiler head was found so tightly closed that Mr. Crisp had to use a wrench to open it. Engineman Dalzell stated positively that this valve was open at the time of the runaway. At the time of Mr. Crisp's inspection there was no blind gasket in the steam line, but the union where the gasket would have been inserted was covered with crude oil and dirt, and was so loose that Mr. Crisp easily separated it with his fingers. Inspector Crisp stated that the union came apart so easily that he suspected it had been tampered with. Subsequent to the accident, Roundhouse Foreman Kemplin at San Bernardino removed a gasket from the steam line to the reversing cylinder on Los Angeles & Salt Lake engine No. 3704. This engine is similar in all respects to engine 3703.

From evidence obtainable subsequent to the accident it is not certain that Engineman Dalzell was correct in his statement that the steam valve at the fountain was open at the time of the accident, neither is it certain that there was a gasket in the steam line. However, one or the other of these things must have been true, as the steam power to the reversing gear was not available for use in the emergency.

Engineman Dalzell entered the service of the Los Angeles & Salt Lake Railroad Company as hostler's helper in 1905; he was promoted to fireman in 1906, and to engineman in 1911. His record is good. At the time of the accident he had been on duty about 11 hours, after approximately 12 hours off duty.