

## Lessons from other industries

# Passengers killed when their train crashed into wagons carrying flammable oil

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## Introduction

Thirty-three people died when the high-speed train they were on collided with wagons that had rolled down an incline during shunting operations. The wagons were carrying flammable oil, which ignited on impact. The flames and dense smoke prevented people escaping and made rescue impossible. It was reported that there were no injuries. People either died due to the fire or walked away unharmed.

Following the accident there were various attempts to pin blame on individuals. Whilst errors were clearly made the final conclusions were that the main failings were with the rail company. These findings led to a number of technical and procedural changes that were adopted widely across the industry. Also, regulations were updated regarding the carrying of dangerous goods on railways.

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## Introduction

The passenger train was on its daily scheduled route carrying passengers from a capital city to a ferry port approximately 300 miles away. Although it was only passengers on this train that died, the failings that led to the accident were all outside the control of the train's crew.

The wagons were from a goods train that was also on a daily scheduled run, which involved loading and unloading of cargo along the way. It used the same track as the passenger train. At one stop the goods train had to be shunted into sidings to allow the passenger train to pass. Whilst this was happening some of the wagons, which happened to be carrying a flammable oil, rolled down a hill directly into the path of the passenger train.

The collision caused a release of oil, which ignited immediately. The front carriages of the passenger train were engulfed in flames and dense smoke. Thirty-three passengers could not escape and died. In many cases their bodies were so badly burnt that they could not be identified.

## Investigation and analysis

This accident was subject to detailed investigation. At first, sabotage was suspected based on an anonymous letter received by the coroner<sup>2</sup>. However, this was quickly dismissed.

The next line of inquiry was with the driver of the passenger train. The accusation being that the train was travelling too fast.

However, it was found that the driver was highly experienced and had been in the job for 20 years<sup>2</sup>. The investigation noted that prior to the collision point, the curvature of the track significantly reduced the visibility of the section of track where the wagons were at the time of the collision. The driver had applied the brakes as soon as he saw the wagons but there was not enough time to stop the train. Also, the wagons had built up some speed so a collision could not have been avoided. It was concluded that the circumstances of the accident were entirely beyond the control of the passenger train's driver.

This left the handling of the goods train. The investigation found that the goods train had been operating on the same line as the passenger train. To allow the passenger train to pass the goods train had to move into sidings. It was too long to fit into one and so the train had to be split. The stationmaster advised the opportunity should be taken to optimise the arrangement of the wagons and that there was enough time before the passenger train would be passing by and in any case the signals would be set to stop any train entering that part of the track<sup>3</sup>. Six wagons with a brake car were left on the main line whilst some shunting took place.

Unfortunately, during loose shunting the six wagons left on the main line were hit by three loaded wagons and immediately started to roll down the track towards the approaching passenger train. They left the section of track protected by the signals and there was no other way of warning the passenger train.

The investigation found that the brake on the brake van had been applied, but failed due to the impact between the wagons. However, the brakes on the wagons had not. The two brakemen travelling with the goods train assisted with the shunting operation meaning the brake van was left unattended.

An initial investigation found the brakemen guilty of manslaughter. However, it also strongly censured the stationmaster because he had directed the shunting whilst the passenger train was approaching. A subsequent inquiry at a higher court acquitted the brakemen because it was recognised that they were working under instruction from a more senior person. The final verdict criticised the railway company for a lack of rules and regulations covering the circumstances at the time.<sup>4</sup>

## Lessons learned

The investigation into the accident made findings in relation to the handling of goods trains on tracks used by passenger

trains, being prepared in case hazardous events such as run-away wagons do occur and precautions when carrying hazardous materials.

Whilst it recognised that the people involved in the shunting of wagons from the goods train made serious errors of judgement it concluded that the railway company should be held accountable because its rules and procedures were inadequate; and that it was failing to enforce the ones that were in place (including some put in place following previous accidents). In particular, the procedures in place were not suitable for the section of track due to its gradient and dual use for passenger and goods trains.

Technological solutions were identified that could have prevented this disaster. Following the accident, devices were installed on railway track with significant gradient that would stop run-away wagons. Also, telecommunications systems were used that would provide warnings to approaching trains of hazards ahead.

Finally, it was recognised that the regulations in place for carrying flammable liquids had failed to keep up to date with changes in the industry.

### Where and when?

I imagine most people reading this paper have not heard of this accident. You may be surprised to know that it happened in Great Britain near a small town in North Wales called Abergele. The reason you probably have not heard of it is that it happened in 1868.

The fact that an accident like this happened over 150 years ago is probably not such a surprise but the nature of the investigation may be. Remember this was less than halfway into Queen Victoria's reign and less than forty years since Stephenson built the Rocket. But we had an inquiry that identified critical errors made by individuals but did not blame them for the accident. Instead it highlighted the failings of the company.

There is a memorial to victims of this disaster at St Michael's Church in Abergele. This is where they were buried in a mass grave. One reason that so many people died in this accident was that common practice at the time was to lock carriage doors. This meant the passengers could not escape from the fire.



### Conclusions

We often view health and safety as a relatively new idea. Something that was introduced in the mid-20th century and is still evolving to provide a better understanding of why accidents happen and how they can be avoided. We still see lots of examples where individuals are blamed for accidents, which means the underlying causes are overlooked. But the records of how the Abergele train disaster was investigated shows that lots of the so called 'modern' views on safety were already understood 150 years ago. This highlights how disappointing it is that even in the process industry in 2020 we still see examples of incident investigations that fail to reflect proven and accepted principles that explain why people make mistakes and how the risks can be managed by improved engineering and management systems.

The following quote from the Board of Trade's report of the accident may use slightly different language but clearly shows an understanding of the difference between direct and root causes of accidents:

"So far, the three men are seriously to blame, and their neglect has been the immediate cause of the accident, but men of that class cannot be expected to do their duties well if the railway companies do not give them the most convenient and best appliances, and do not look after them strictly and enforce their own regulations."

It is not entirely clear whether new rules and procedures were introduced as a result of this accident or whether the requirement was simply to apply and enforce those that existed. But technology changes included the introduction of 'catch points' on tracks with a significant gradient that will de-rail run-away wagons and use of 'electric telegraph' systems to control train traffic. Regulatory changes regarding carrying hazardous materials on railways were introduced to ensure additional precautions were in place (although this did take 13 years to implement).

### References

This paper has attempted to give a high-level understanding of the Abergele train disaster, with the main aim being to illustrate that safety was taken more seriously than we may assume in Victorian times. I recommend you take a look the following web pages for more information.

1. [https://en.wikipedia.org/wiki/Abergele\\_rail\\_disaster](https://en.wikipedia.org/wiki/Abergele_rail_disaster)
2. <https://www.historytoday.com/archive/great-train-crash-1868>
3. <https://www.historytoday.com/archive/great-train-crash-1868>
4. <https://www.bbc.co.uk/news/uk-wales-45224045>
5. <https://www.dailypost.co.uk/news/north-wales-news/how-fatal-error-led-one-15024834>