

No. 32 Heathrow Express collapse

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A catalogue of design and management errors, poor workmanship and quality control were at the root of the catastrophic tunnel collapse at London's Heathrow Airport in 1994.

So said the Health & Safety Executive (HSE) in its final report on the Heathrow Express collapse. The HSE described it as "the worst civil engineering disaster in the UK in the last quarter century".

The report was the result of years of investigation by the HSE's specialist team and was published following the completion by of legal proceedings and largely guided by the case's outcome.

Investigators found the incident exhibited "all the hallmarks of an organisational accident. The collapses could have been prevented, but a cultural mindset focused attention on the apparent economies and the need for production rather than the particular risks," it said.

"Warnings of the approaching collapse were present from an early stage in construction but these were not recognised," it added.

Errors were made, it said, "leading to poor design and planning, a lack of quality during construction, a lack of engineering control and most importantly a lack of safety management."

The tunnels collapsed in the early hours of Friday 21 October 1994 and continued to fail over a number of days. The failure brought chaos to the heart of Heathrow Airport. Fortunately no one was killed or injured in the accident.

Recovery took nearly two years and cost around £150M - nearly three times the cost of the original contract.

Other projects using sprayed concrete tunnelling methods in the UK including the Jubilee Line Extension and the Heathrow Airport baggage tunnel were suspended and delayed.

Heathrow Express tunnelling contractor Balfour Beatty and its designer Geoconsult were subsequently fined a total of £1.7M - a record at the time for offences under Health & safety legislation.

"Such accidents must be prevented through effective risk management. The industry cannot simply rely on good fortune," said the report. "Risk assessment should be a fundamental step in the procedures adopted by all parties: it is inappropriate wholly to leave the control of risk to contractors."

The report highlighted the risk of safety dependent activities being influenced by contractual relationships. "Cases in point may be new forms of contract where roles are poorly understood and new technologies where people variously rely on others to understand, communicate and control the risks," it said.

To overcome this, the report said: "those involved in projects with the potential for major accidents should ensure they have in place the culture, commitment, competence and health and safety management systems to secure the effective control of risk and the safe conclusion of the work."

According to the HSE, a chain of events led directly to the collapse. This included a failure to check substandard construction over a period of some three months, grout jacking that damaged the tunnel plus inadequately executed repairs some two months before the collapse.