

Process Safety Forum

Learning Brief #17 – Issued on 25th October 2016

Alton Towers Smiler Crash 2015

What happened?

- At 13:00 BST there was a problem with one of the trains so engineers were called in
- An empty test train was sent out but stalled out of sight of the engineers
- A train with 16 passengers on was then sent out
- The computer system halted the ride due to the stalled train
- Engineers believed this to be an error as they could not see the stalled train; there was a mistrust of fault signals
- They manually overrode the computer system
- This set the 16-passenger train in motion and into the empty carriage

Barrister Bernard Thorogood, prosecuting for the Health and Safety Executive (HSE), said the crash equated to: **A family car of 1.5 tons colliding at about 90mph**



How did it happen?

- It did *not* happen due to faults with the track, the cars, or the control system that keeps the cars apart from each other during operation; the HSE investigation found that there were no faults.
- There was a lack of detailed, robust arrangements for making safety-critical decisions
 - Engineers on the day had not read or seen the operating instructions for the ride
 - The manufacturer's manual said the ride should not be operated at wind speeds above 34mph
 - On the day of the accident, there were estimated winds of 45mph; the Skyride roller-coaster had been closed an hour earlier due to high winds
 - The staff did not know how to react to an emergency situation. Emergency services were not contacted until 17 minutes after the crash
 - The passengers were trapped at an angle of 45 degrees for several hours because there were no access routes readily available; the Fire Service had to build a special platform
 - The final passengers were freed four hours after the crash occurred
- Other contributory factors included:
 - Engineers reported that they “felt pressure” to get the ride “quickly back into service”
 - Management had set targets for downtime on rides "with bonuses linked to achieving acceptably low levels" Merlin Entertainments carried out their own internal investigation, completed in November 2015, which concluded that:
 - “A ride shutdown message was misunderstood by staff at the ride. This led to a decision to manually restart the ride, overriding the control system without appropriate safety protocols being followed correctly.”

However, the judge, Michael Chambers QC, rejected this finding with his opening statement in sentencing. "Human error was not the cause as was suggested by the defendant in an early press release...The underlying fault was an absence of a structured and considered system not that of individuals' efforts, doing their best *within a flawed system*."

Merlin Entertainments were fined £5 million

Judge Michael Chambers QC: Merlin Entertainments' safety procedures were “woefully inadequate” and a “shambles”, “...catastrophic failure to assess risk and have a structured system of work”

“This was a *needless and avoidable* accident...”



Key Learnings

Making Safety Critical Decisions

If an unplanned or unforeseen situation arose in your area, do you feel confident that you would know how to respond? Do you know what safety or emergency protocols to follow, who to contact and when? Are you aware of the possible emergency scenarios in your local area and their related Emergency Instructions?

The operators of the Smiler roller coaster didn't; the delay in their response is thought to have led to the life changing injuries suffered by some of the victims.

If you hold responsibility for a plant, building or facility, are the personnel in your areas equipped to make safety critical decisions? To use the words of Judge Michael Chambers QC, do you have a "structured and considered system" in place?

The engineers had not seen the operating instructions for the ride. Does everyone in your area have a good working knowledge (not just an awareness) of local procedures and instructions?

Emergency arrangements

You may work in the same building every day, carrying out a task you're familiar with – when was the last time you looked at the relevant Emergency Instructions? If you hold responsibility for a plant, building or facility, have the emergency procedures in your areas been tested through exercises and drills?

The theme park was not prepared for a crash scenario, access routes had not been planned – the Fire Service had to build a platform to reach the crash victims, extending the delay in getting treatment.

Responses to alarms and other instrument readings

The engineers did not believe the fault signal so they overrode the safety system.

ALL alarms and instrument readings must be treated as **genuine**. Decisions must be based on established facts, **not** assumptions. The cause of the alarm or spurious reading must be established **before** it is assumed to be faulty.

Time Pressures

The engineers stated that they felt under pressure to get the ride back up and running in as short a time as possible.

Pressure to get the job done in an unrealistic timeframe, real or *perceived*, is a major error trap. Decisions start being based on intuition and assumptions rather than logic and facts.

How can you reduce time pressures in your areas?

How are timescales, deadlines and due dates decided? If time pressure is a frequent error trap, do these decision processes need to be revisited?

Further reading

HSE, Alton Towers' owners fined £5million over Smiler crash:

<http://press.hse.gov.uk/2016/alton-towers-owners-fined-over-smiler-crash/>

The Process Safety Forum has been set up to provide an industry association platform whereby initiatives, best practice, lessons from incidents and process safety strategy can be distilled and shared across sectors, to influence our stakeholders (including the Regulators), and to drive the process safety management agenda. The Process Safety Forum consists of representatives from UKPIA, TSA, CIA, OGUK, CBA, RSSB, ENA, ECIA, UKLPG, BAMA, EIG, UKOPA, SWA, MPA, UKLPG, BAMA, SWA and SDF. For further details, contact: peter.davidson@tankstorage.org.uk.