ACTION NOTE

ROLLER COASTER BRAKING SYSTEM

A recent accident in South Shields involving a 1986 Pinfari Zyklon Roller Coaster occurred when a moving car ran into a stationary car in the station causing a number of minor injuries. An HSE investigation of the accident is under way.

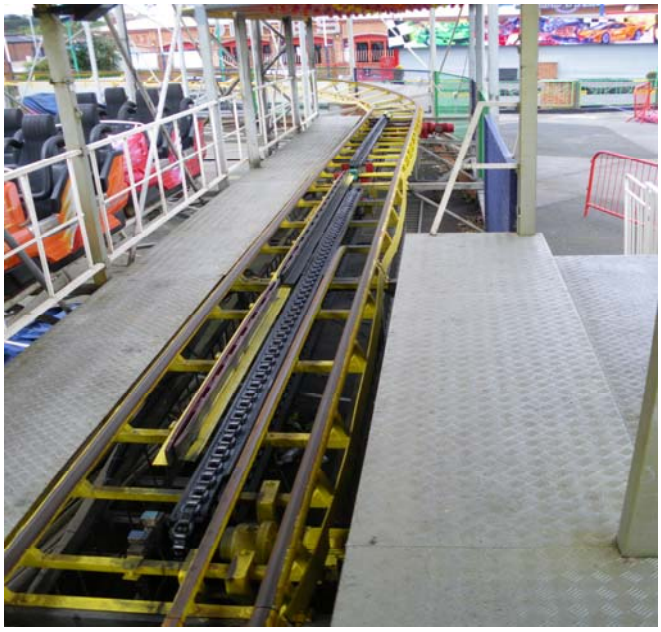
Problem:

The ride involved in the accident is a Pinfari Zyklon Roller Coaster **but it is possible that similar brake control systems may have been fitted to other coasters.** A general view of the station area is at Fig 1.

Fig 1:

Cars arriving back in the station are, under normal conditions, slowed and stopped by a chain brake system. In certain circumstances however ie when the car is carrying more than average weight or running in wet conditions this chain brake may not be sufficient to bring the car to a complete stop and a secondary air brake is used. This may be operated either manually or automatically. A general view of the braking area is shown at Fig 2.

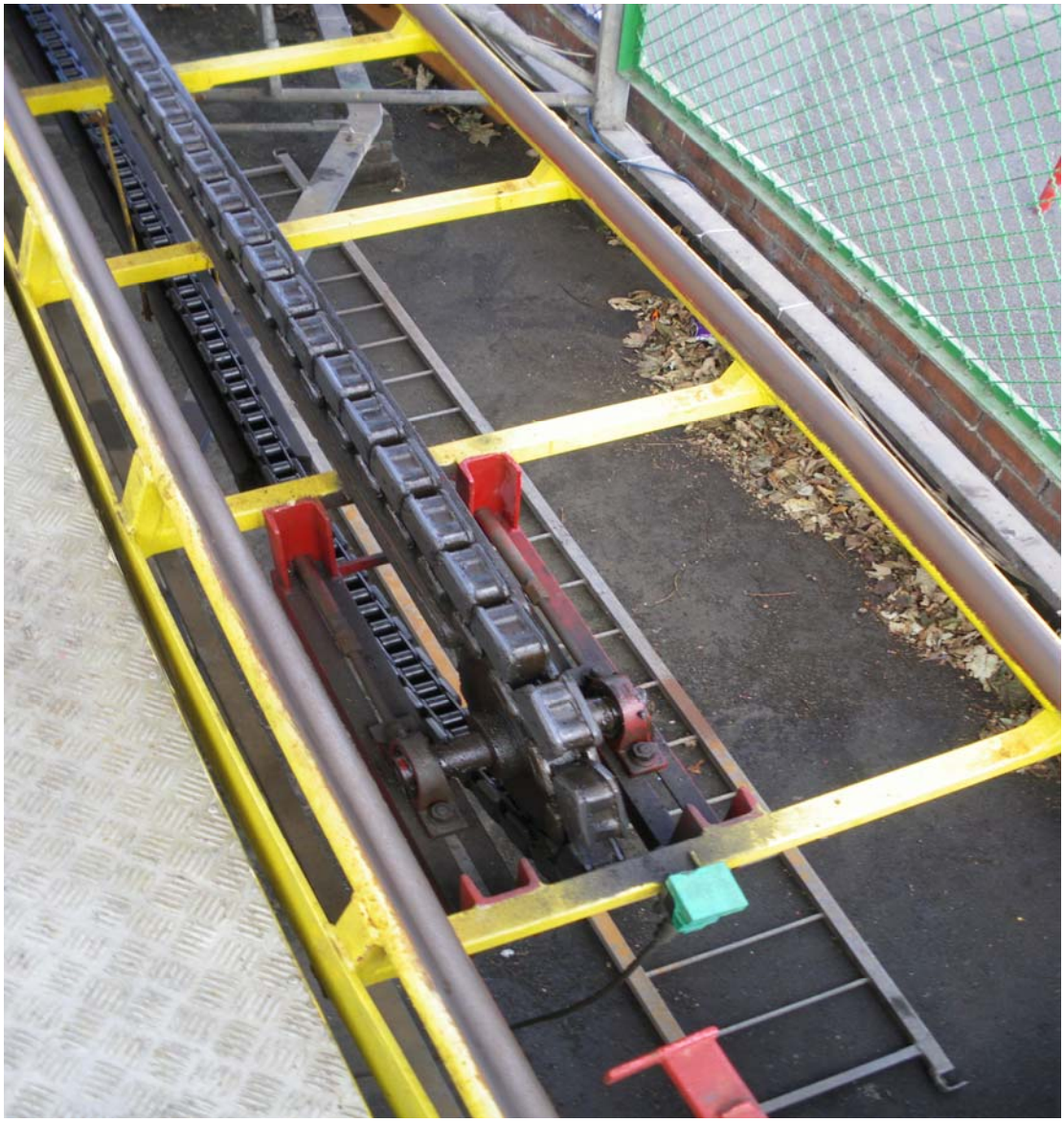
Fig 2.



The coaster involved in the accident had a retro fitted automated secondary air brake, operated by proximity sensors fitted to the track in the braking area. An example of such a sensor is at Fig 3 and Fig 4 shows one of the pair of sensors fitted to the track.

Fig 3

Fig 4.



The sensor was set to operate the secondary air brake when the car passed it and functioned when a piece of metal plate attached to the car passed within 40mm of it.

Fig 4 is a photo taken underneath a car showing the metal plates which engage the chain brake system and it is also these plates that operate the sensors when necessary

Fig 4.

Early indications from the investigation suggest that the secondary air brake did not come on because the sensors were not functioning correctly and did not recognise the car passing them. The sensor was fixed at a suitable distance from the plate on the passing car.

Action required:

Action required at this point is:

1. Controllers using roller coasters with such sensor controlled systems should ensure that this secondary braking system is working correctly.

2. Testing of this system should form part of the daily checks on the ride and the tests should be conducted with realistic load weights in the cars.

3. Controllers should discuss with their ride inspectors the feasibility of changing this single sensor system to a parallel wired reserve sensor system or to a system able to detect state changes across pairs of sensors.

HSE Action:

1. The investigation is ongoing. Any further information regarding this will be promulgated as necessary.

Any further information required can be obtained from M Sandell on 07527002689.

M Sandell
HM Inspector of H&S

Dated: 25 September 2009