

SAFETY NOTE

ZIP WIRE AND FAN BRAKE ACCIDENT

An accident occurred in September 2011 involving a zip wire with an integral fan brake resulting in a person being seriously injured when they failed to stop before they hit the fixed end of the ride.

The ride

The ride consists of a high tensile steel wire rope (SWR) 208m in length, descending to the ground from a height of 36.5m. The SWR was double connected securely at both ends. A double wheeled pulley carriage system is safely fixed to the SWR and runs along it. The rider hangs below wearing a full body harness which is connected to the pulley carriage with twist lock karabiners and adjustable webbing straps. See photo below:



Photograph showing the zip wire [modified].

Operation

The rider is given a safety briefing and then puts on the body harness before ascending the launch tower. They are then attached to the pulley carriage using the karabiners. When instructed they step out from the launch pad and slide down toward the ground at a speed somewhere in excess of 35mph. During the last 26m of their ride a braking system should bring the rider to a controlled stop at the landing area before they contact the end framework structure.

The accident

At the time of the accident, the correctly equipped and connected rider descended the SWR but the braking system failed to function correctly. This meant the rider passed through the landing zone, still travelling at considerable speed and hit the 'A' frame over which the SWR passes before it is terminated.

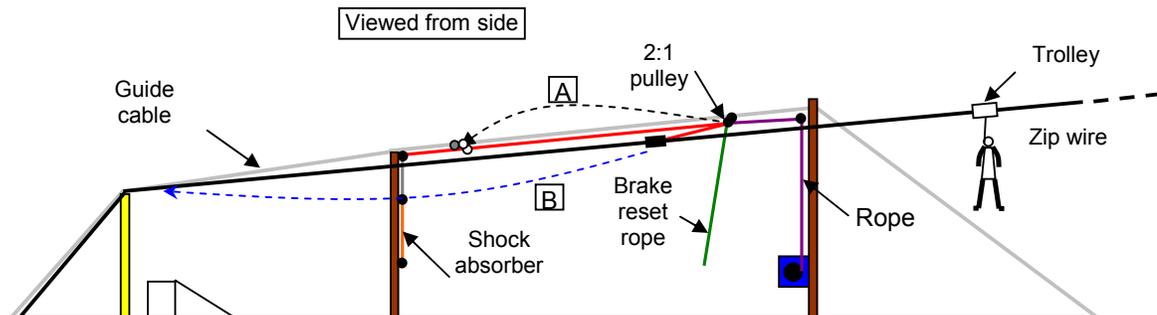
The braking system

As the pulley from which the rider is suspended reaches the last 26m of the SWR it meets a running block on the SWR which is attached by a fibre rope to a parallel run of rope (guided by a SWR) which is in turn connected to a fixed post at one end and a spring loaded fan brake at the other. As the pulley from which the rider is

suspended pushes the running block along the SWR, this in turn pulls rope from the spring loaded fan brake drum which slows the whole assembly. See photos and diagram below.



Photograph showing the rope as it is pulled out of the fan brake and connection from the brake block on the zip wire to the fan (from below).



In order for a person to descend and stop safely the running block must be at its proper start position (in this case approximately 26m from the end of the SWR). The rope must be correctly wound back around the drum on the fan brake. There must also be no obstruction to the pulley, the running block or to any other moving part or the brake may not function correctly and slow the rider to a safe speed.

In some set ups it is possible for the process of resetting the braking system to be automated but in any case and given the hazard presented to riders if this fails, it is considered necessary for there to be a system in place for physically checking that the brake has actually reset correctly and an emergency arrester system.

Recommended action

Operators of zip slide equipment should ensure that the following are in place and that they are regularly checked to ensure they remain effective and valid:

- A risk assessment for the operation of the slide which takes into account and controls the serious risks presented by the failure of all components.
- A manual for the maintenance and operation of the equipment and all of its component parts. This should include detail of lifespan and replacement cycles for components.
- A system of checking that the braking system is set and effective prior to every slide. No slide should begin until positive confirmation has been received at the launch point from the person checking the brake that it is set correctly.
- A training regime for all operators and ride staff.
- An emergency passive backup system to absorb some or all of the energy in the event the braking system does not operate correctly.

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