

Engineering innovation: Theme parks and Playgrounds

Rides to scare the living daylights out of you

Sheer drops, hairpin bends and the ability to scare the life out of you are all essential qualities of a great rollercoaster. Add 'getting wet' to the equation and you've got yourself an impressive waterslide.

And there are plenty of these hair-raising contraptions to feed our thrill-seeking cravings.

You can virtually fly on AIR, the newest rollercoaster at Alton Towers. It straps you face down in a horizontal position before sending you off on a terrifying journey. Or if you fancy going over to the States to have a go on Drop Zone, the world's tallest free falling rollercoaster, you'll be dropped 80 metres at speeds of more than 100 kilometres an hour.

But while we're all jumping on these rides and having a great time there are a number of people wondering how they might make the rides a bit faster, a bit taller or a bit scarier. When they've had an idea they'll design it. Then someone will make it, test it and make sure it's not going to collapse or send a thrill-seeker flying through the air. They're engineers and they're involved every step of the way.

Making yourself understood

One of Britain's leading waterslide manufacturers, Design and Display, uses Glass Reinforced Plastic (GRP) to make its slides, and follows the British Standard for waterslides over two metres high (BS EN 1069). One of the company's engineers, Alan Curtis, says the design nearly always begins with the routing - the path that the rider is going to take. Often this will start with a hand drawing before using Computer Aided Design (CAD) to make sure the design can be understood by other engineers.



Sliding on something wet and slippery

Let's concentrate on waterslides.

When someone has a design idea an engineer must draw it to a certain standard. Using a few laws of physics they'll also be able to answer some of the 'will it really work?' questions. But even once it's designed there are still countless considerations and decisions to be made...

What's the waterslide going to be made from? The material of the slide, obviously, must be water tight. It has to be strong enough to carry your weight. There must also be a smooth finish - not just to make you slide faster, but because you don't want to scratch your backside.

The slide must then be held in place. Again, the supports must be strong

enough to carry the weight of the rider, and also the weight of the slide.

When the materials have been chosen the whole ride has to be joined together. If you're making a small slide to sit on the side of a pool then it can probably be made in one big mould. But it would take a rather impressively-sized mould to make a slide 25 foot high - it needs to be made in bits. So each bit must be joined, and joined smoothly so the rider doesn't feel the bumps. ➔



And then there's the constant flow of water. Pumps need to push about 175 cubic metres of water round the slide every hour. That's a fairly powerful pump - especially if you have sections where the rider travels upwards. If the pump fails, and the water stops moving, someone could get stuck. Or the friction could pull their swimming shorts off. ■

Realising the dream

The theme park engineers are focused on two major factors: excitement and safety. The slide must be fun to ride and safe to use. To make sure this is possible, certain British Standards must be met. British Standards don't limit the designer's creativity with rules and regulations - they provide guidelines to make sure the designer's dreams CAN be achieved.

Trying to stay on track



If it's a rollercoaster you're thinking about designing then a fresh can of worms is opened.

Riders need to be safely and comfortably strapped into a cart, which has to travel along tracks. The ways people are strapped in are constantly changing. For example, AIR at Alton Towers straps people in horizontally, face down. Other rollercoasters leave the rider's legs dangling. Each design has different safety considerations.

And there are a whole host of other theme park rides. The popular waltzers, for example, spin round at frightening speeds. How fast can they go before the joints break and the pods are sent spinning into the candyfloss machine?