THEME PARK SAFETY - As theme parks unleash a new generation of coasters, some lawmakers point to a rise in serious injuries and claim we're heading for disaster

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In the rush to design and build the fastest, twistiest and tallest amusement park thrills, roller coaster engineers are designing new generations of hyper-coasters that put more force on the body than astronauts feel at liftoff.

Federal regulators and lawmakers say that the new super roller coasters carry a lethal price. They leave some riders screaming in delight, others screaming in pain.

The U.S. Consumer Product Safety Commission, the agency that oversees dangerous toys, says that the number of serious injuries that require treatment at an emergency room because of theme park rides increased 24% from 1974, to 9,200 in 1998.

The agency hasn't finished compiling 1999 figures, but there were six deaths on amusement park rides last year, including four at three separate parks in one week in August.

Rep. Edward Markey, D-Mass., says the speed of the new roller coasters seems to be the cause of many injuries. He wants to close a loophole Congress opened in 1981 that gave the safety commission jurisdiction only over mobile carnival rides, and not those at fixed-site theme parks.

"That's wrong. That's stupid. But it's the law," Markey says. "The consequences of rider or operator error were serious enough when the average speed of a new coaster was 55 mph, as it was 10 years ago.

"Today, the average has soared to over 70 mph, and the consequences of error are proportionately more serious."

The House Commerce Committee plans to hold hearings on the issue this summer.

The new high-speed thrill rides first appeared in 1989 when Cedar Point, a theme park in Ohio, put its 200-foot-high Magnum XL-200 into operation. Four years later, Six Flags in Gurnee, Ill., introduced the first roller coaster that flipped riders on their sides rather than the traditional way of riding standing or sitting down.

Since then, more than two dozen giant roller coasters have been installed in theme parks around the country.

This year, Jazzland, a theme park in New Orleans, plans to open with four roller coasters, including the giant Mega Zeph, which travels a twisting 4,000-foot rail at 60 miles an hour.

And Six Flags in Largo, Md., recently launched its Superman Ride of Steel, which park publicists say hurls riders "on an incredibly steep climb, high into the air, before speeding down a dizzying 70 degree, high-speed drop over more than one mile of sleek steel track."

John Graff, president of the International Association of Amusement Parks and Attractions, a trade group representing the 450 theme parks in the United States, said increased federal regulation isn't needed, and the new rides aren't unsafe.

Graff says he knows from personal experience.

"I'm 65 years of age, and I've been elbowed out of the way by women in their 70s to get on," he said.

Graff said theme parks have an "extraordinary safety record" of providing fun and fantasy to the 300 million who went to amusement parks last year. Theme park attendance has increased 3 percent a year over the last decade.

He said last year's six deaths were coincidence, and not an indication of systemic problems in theme parks. The new rides are carefully engineered using computer simulation and testing to ensure they are safe, Graff said, and advances have been made in safety harnesses and horse collars to keep riders safer.

"Safety is our highest priority because people will stop going to amusement parks if they are not safe," he said.

William Avery, an industry safety consultant who runs Avery Safety Consulting in Orlando, Fla., says expanding the powers of the safety commission over amusement parks isn't as important as establishing consistent federal standards.

"What you really need is one set of standards to follow,' Avery said. "The problem is that when you go from state to state they are playing off different sheets of music" with differing requirements.

Avery, who worked as safety director for Busch Gardens and Sea World before establishing his private business, said lawmakers are wrong to blame the new generation of faster and steeper roller coasters.

In many cases, he said, the roller coasters falling at a breathtaking 70 degree angle, while traveling at 100 miles an hour, cause fewer injuries than rides going much slower.

"Speed is not the correlation to injuries. The correlation (to injuries) is the change of direction. It's when you have the transition of forces -- the inversions, and loops -- you rapidly create a whip, or throw people from side to side," he said.

Exactly how many people are injured on these rides is unknown.

The Consumer Product Safety Commission says it only counts emergency room treatments from hospitals, so many injuries occur that are undocumented. Of the 43 deaths on amusement park rides since 1987, the largest number -- 11 -- were on roller coasters.

Theme parks have always sold the fantasy of danger, but Avery said new technologies and competition in a saturated market for theme park customers are making the fantasy experiences more real.

"In the past there were rides that created a sensation to make the rider think they had to hold on for dear life," he said. "Today, there are many rides where one must hold on to reduce the potential for bodily injury."

Brain strain

Japanese doctors warned recently that riding monster roller coasters may increase the risk of developing blood clots on the brain's surface, based on the experience of one 24-year-old woman.

The otherwise healthy woman developed headaches after spending the day riding several roller coasters at a Japanese amusement park, including one ride called the Fujiyama, one of the highest, fastest roller coasters in the world, according to Dr. Toshio Fukutake, who reported her case in the journal Neurology.

After enduring headaches for four days, the woman sought medical attention and underwent tests. First diagnosed with tension headaches, she was given muscle relaxants, but her condition did not improve.

Finally, after two months, doctors used magnetic resonance imaging and discovered two clots on the surface of her brain, called subdural hematomas. Such clots can compress the brain and may lead to permanent brain damage, seizures and even death. They also can cause difficulty in walking and changes in mental ability.

"Although it is rare for people to develop subdural hematomas after riding roller coasters, it can happen," said Fukutake, a neurologist on the faculty of Chiba University School of Medicine in Japan.

"Giant roller coasters, which are higher and faster than typical roller coasters, may be more dangerous. Managers at amusement parks and people who enjoy these rides need to be aware of the potential health risks," Fukutake said.

He noted that three other cases of people developing such clots after riding roller coasters have recently been reported, "and we suspect that many cases may be overlooked."

Such clots are extremely rare in young women and are most often seen in older men suffering from alcoholism, hypertension or diabetes. The clots may also develop as the result of head trauma, falling to a sitting position, severe sneezing or coughing and straining from heavy lifting.

Fukutake speculated that his patient's clots "may have been caused by the up-and-down, back-and-forth motions of the roller coaster or the acceleration force may have been strong enough to rupture veins on the surface of her brain."

The woman's subdural hematomas were removed in surgery. After the operation, her headaches stopped, and eight weeks later she remained free of symptoms.

To learn more

See the Consumer Product Safety Commission at www.cpsc.gov and the International Association of Amusement Parks and Attractions at www.iaapa.org.

Roller coaster enthusiasts have several sites, including a database of all roller coasters in the United States at www.rcdb.com.