



- Neuro-Knowledge Study

ROLLER COASTERS, THEME PARKS EXTRAORDINARILY SAFE, ACCORDING TO TWO COMPREHENSIVE, SCIENTIFIC STUDIES

- Exponent Study

American Association of Neurological Surgeons finds “no public health risk,” while Exponent Failure Analysis Associates confirms “roller coasters are safe.”

- Myth vs Reality

Scientists, Physicians, Engineers, Astronauts confirm safety of theme park rides ... Six Flags, Inc. announces continued reporting to medical groups to reassure public of its longstanding commitment to safety.

- Safety by Design

(WASHINGTON, DC) – The two most comprehensive, scientific studies to date on roller coasters, g-forces, reports of alleged brain injury, and overall theme park safety were unveiled today, confirming that rides are based on biomedical and biomechanical science and are extraordinarily safe and present no health risk to the public.

- Government Statistics

The studies were conducted by the [American Association of Neurological Surgeons](#) and [Exponent Failure Analysis Associates](#) and unveiled in a joint news conference today at the National Press Club in Washington, DC.

- Safety Home

“Today, real science has been heard,” [said Gary Story](#), President and Chief Operating Officer of [Six Flags, Inc.](#) “The public deserves the truth and we in this industry have a responsibility to assure the public with solid scientific evidence.”

“I have analyzed the data. I have studied the science,” [said Dr. Rhea Seddon](#), an emergency physician, former astronaut and mother of four children. “I am a doctor and I am a mother of four children. I know, without a doubt, that enjoying the thrills of an amusement park is one of the safest activities that I can enjoy with my family.”

“Our panel concluded that there is no proof that roller coasters cause neurological injury and there is no significant public health risk associated with amusement park attendance,” [said Dr. Robert Harbaugh](#), of the [American Association of Neurological Surgeons](#). Harbaugh explained that the panel assembled for the study included experts in cerebrovascular disease, neurological trauma, medical neurology, emergency medicine, clinical epidemiology, biostatistics, roller coaster engineering and astronautics. The panel reviewed and analyzed data on gravitational forces, injury statistics of the Consumer Product Safety Commission, literature on the physiology of acceleration, background literature on the types of neurological injuries that have been reported to be associated with park rides and the results of a national survey of neurosurgeons conducted by [Neuro-Knowledge](#), a program of the AANS.

Dr. Harbaugh reported that, “... the overall injury rate at amusement parks as reported by the Consumer Product Safety Commission is significantly lower that for exposure to other activities such as owning bunk beds, skateboards, sleds or bicycles,” and that, “... any claims that theme park related neurological injuries are increasing are not substantiated by the available evidence.”

On behalf of [Exponent](#), one of the world’s leading scientific engineering research firms, [Dr. Lee Dickinson stated](#), “Our study showed, on the basis of all known scientific evidence, that roller coasters are safe ... We looked in detail at g-forces, government data, Six Flags data and the medical literature. We did not find anything to suggest that a public health issue exists. In particular, g-forces on roller coasters

are not a problem and the available government data do not support a problem. For these reasons, Exponent concluded that, based on all available evidence, fixed-site amusement parks and roller coasters are safe.”

Both the AANS and Exponent found that, contrary to inaccurate reports in the news media, g-force levels have not increased on rides over the last 30 years. “The maximum g-forces on roller coasters have not changed for many years,” Dickinson said. “We found that the g-force levels on rides do not cause injuries.” In fact, Dickinson explained that Exponent conducted a variety of experiments and found that, “activities like being hit with a pillow, jumping on a pogo stick, or falling on an exercise mat all can create much higher peak g-forces than a roller coaster ... Other common activities, like being spun in a swing or sneezing created g-forces that are comparable to roller coasters.”

Dickinson said that, after examining data provided by the CPSC and by Six Flags, Inc., Exponent found that, “... fixed-site amusement parks are safer than other recreation and leisure activities. We found that the annual number of injuries on fixed amusement park rides is less than that for children’s wagons or for beach chairs or folding lawn chairs.”

Both Dr. Seddon and Capt. Robert “Hoot” Gibson explained that there is no comparison between g-forces of roller coasters and g-forces experienced on the space shuttle. The two former astronauts count eight shuttle missions between them.

“The brief second or two of gravitational forces experienced on a roller coaster is nothing like the modest level but long duration g-forces that we experienced as astronauts,” [Seddon explained](#). “Anyone who tries to compare the forces on a roller coaster to the ride on the Shuttle doesn’t really understand the physiology of g-forces.”

[Gibson](#), a former U.S.Navy “Top Gun” fighter pilot and space shuttle commander, said, “It sounds sensational to say a roller coaster pulls more g’s than a space shuttle. But it is a truly meaningless statistic. We could also state that a sneeze or skipping rope involves more g-forces than riding a roller coaster or the space shuttle.”

Gibson further explained, based on his own experience and educational background in engineering, that, “... even high sustained and repeated g exposures in jet fighters does not cause damage to humans. Comparing roller coasters to shuttle missions or fighter jets is absurd, meaningless, and unsubstantiated by science.”

The moderator of the news conference panel was Dr. Gregory L. Henry, former President of the American College of Emergency Physicians. [Dr. Henry pointed out](#) some of the inaccuracies of news media reports on the issue of ride safety, particularly reports generated by the “misinterpretation” of data by Dr. Robert Braksiek.

“As former President of the American College of Emergency Physicians, I and many of my colleagues are concerned about the misinterpretation of CPSC data by Dr. Robert Braksiek,” Henry said. “Unfortunately, the news media were quick to accept and report Dr. Braksiek’s loose, casual observations based on flawed data, unsubstantiated by any sound research.”

Dr. Henry explained that he has been an emergency physician for 30 years, and has worked in emergency rooms located near theme parks. “I can assure you absolutely – based on my lifetime experience and research and based upon the work presented here by the AANS and by the experts of Exponent – roller coasters are not a public health risk. Again, I say that with absolute confidence in the medical research.”

Both the AANS and Exponent studies noted flaws in CPSC data on amusement parks and suggested the need for a better system of data collection. The International Association of Amusement Parks &

Attractions, the industry's trade association, has already implemented a national reporting program of all incidents requiring more than normal first-aid treatment.

“Last year, IAAPA initiated a voluntary incident reporting process,” [said Clark Robinson](#), President of the association, who explained that data from parks is being collected by an independent auditing firm and is expected to be released later this year when two years' worth of data can be compared. “The industry is in the best position to accomplish this task,” Robinson said. “I would point out that parks have a long history of reporting incidents to state and local bodies throughout the country and working with government officials and inspectors in a partnership to ensure the safety of our guests.”

Robinson and Story both noted that the industry has a decades long history of supporting state regulations for ride standards and inspections.

“We've been very supportive and appreciative of our partnerships with state officials and inspectors around the country,” [Story said](#). “Virtually every state with a theme park has established standards of ride operation, maintenance, inspection and the reporting of injuries to state officials. There are only a handful of states that have yet to adopt these types of standards, and most of those have no theme parks. The industry will continue to be proactive in asking those states with parks to adopt reporting and inspection regulations.”

Story said that Six Flags would continue to support and participate in the association's reporting program, but that his company was also initiating further, detailed reporting programs with the AANS and with the [American College of Emergency Physicians](#).

“We will remain vigilant in our commitment to monitor and ensure ride safety in the future,” Story said. “I am pleased that the AANS and Exponent studies point to no adverse trends today, and we will continue to monitor our safety records in order to reassure our patrons of our commitment to their safety.”

“Six Flags and Neuro-Knowledge, a program of the American Association of Neurological Surgeons, are pleased to announce that a prospective, ongoing research effort is being developed for Six Flags to report any head injury data from all Six Flags properties to a monitoring board assembled by Neuro-Knowledge and the AANS,” Story said. “In addition, this board will develop and implement a national hospital and physician-based surveillance program to identify and track the occurrence of non-traumatic brain injuries.”

“I am also pleased to announce,” Story continued, “that Six Flags is currently in the midst of discussions with the American College of Emergency Physicians to develop a similar program for Six Flags to report any non-head injury data for analysis and monitoring. I am pleased that Dr. Greg Henry has agreed to assist us in this effort.”

The AANS and Exponent studies were commissioned by Six Flags, Inc. last year, in the wake of increasingly sensationalized, unsubstantiated media reports. Both studies were conducted in complete independent fashion, a requirement agreed to in writing by Six Flags, Inc. and the two research organizations.

“Throughout our history, Six Flags has relied on the biomechanical and biomedical sciences to ensure the safety of our rides,” Story said. “That commitment, scientifically verified in the two studies released today, shall never waver, as nothing is more important to us than for our guests to have a safe, pleasurable time in our parks.”

The two studies:

* ["Fixed Theme Park Rides and Neurological Injuries:" Expert Panel Consensus Report](#). This report was written by the Neuro-Knowledge program of the American Association of Neurological Surgeons (AANS).

* ["Investigation of Amusement Park and Roller Coaster Injury Likelihood and Severity"](#). This report was written by Exponent Inc.

A summary of how these new studies clarify the [myths versus the realities](#) of amusement park safety is provided.

We also explain how [Safety is Designed](#) into all of Six Flags' operations.

Background information is provided on recent [media coverage](#) of another report, by University of Pennsylvania researchers Douglas Smith and David Meany in the Journal of Neurotrauma: ["Roller Coasters, G Forces and Brain Trauma: On the Wrong Track?"](#)

Statements by the participants:

[Dr. Gregory L. Henry, M.D. FACEP](#) [Statement](#)

Clinical Emergency Physician

Clinical Professor, Department of Emergency Medicine, University of Michigan Medical School

Past President of the American College of Emergency Physicians

[Dr. Robert E. Harbaugh, M.D. FACS, FAHA](#) [Statement](#)

American Association of Neurological Surgeons (AANS)

Professor, Dartmouth Medical School

AANS Board of Directors

Director, AANS Neuro-Knowledge Program

[Dr. Lee Dickinson, PhD. P.E.](#) [Statement](#)

Physical Engineer, Exponent

Director, Exponent's Washington DC office

Former member of the National Transportation Safety Board

[Dr. Rhea Seddon](#) [Statement](#)

Former NASA Astronaut, Physician

Assistant Chief Medical Officer, Vanderbilt Medical Group

One of the first six women astronauts

Three flights on the space shuttle

[Robert L. Gibson USN \(Ret.\)](#) [Statement](#)

Former NASA Astronaut and Test Pilot

Five Shuttle Missions.

Graduate of the Navy fighter weapons school ("Top Gun")

[Clark Robinson](#) [Statement](#)

President, International Association of Amusement Parks and Attractions ([IAAPA](#))

Gary Story Statement

President and Chief Operating Officer, Six Flags

Chairman-elect, IAAPA

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