Details

Title UNDERSTANDING G-FORCES (IAAPA)
Type Safety/Regulatory Issues

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G-forces refer to the force of gravity, and one G is equal to the normal pull of earth's gravity on the body. Amusement ride manufacturers have collected and studied relevant data on g-forces for years, subsequently applying this biodynamic knowledge to the design and construction of rides to make them as safe as possible. While technological advances have led to the development of faster and more thrilling rides, overall g-force levels have not dramatically changed in the past two to three decades because riders' tolerance levels have not changed.

When discussing the effects of g-forces on a person who is on a ride, one must consider the duration of the g-force, as well as a multitude of other variables. When it comes to the higher–g sections of amusement rides, exposure often lasts fractions of a second. Therefore, the rider does not experience any adverse effects because the force is extremely brief. Blackouts and other health issues associated with Gs require exposure to g-forces which are either greater in magnitude or of much longer duration than those achieved by today's amusement rides.

A study by Murray Allen, MD, Ian Weir-Jones, P. Eng, Ph.D., and several other doctors and engineers was published in the November 1994 edition of *Spine*. The study "found that in one event of daily activity, the vector acceleration of 10.4 g was experienced uneventfully." We go through our everyday lives with our bodies exposed to far greater gravitational pull than that of any amusement park ride; we just don't realize it, or even think about it.

Everyday Gravitational Forces

Sneeze		2.9
Cough	3.5	
Crowd jostle	3.6	
Slap on back	4.1	
Hop off step	8.1	
Plop down in chair	10.1	