

Roller Coasters

What scares you more:

1.) speeding at over 100 km/hr in a small open car, or 2.) careening around extremely tight turns on squeaky wheels?

“The first thrills us with high speed and dropoffs with zero gravity. In the second scenario, shakes and noises create a psychological fear that the car might leave the track. Both effects are by design.”—Yoshio Saegusa, TOGO. CO., LTD.

TOGO is the designer and manufacturer of Japan’s top roller coasters, including “BANDIT” in YOMIURI LAND as well as the popular “WHITE CANYON,” which is made of wood. According to Mr. Saegusa, BANDIT gives us the first type of thrill and WHITE CANYON gives us the second.

“BANDIT’s appeal is clearly its speed and change in G-force. Designed with a 70-meter drop in elevation, it can produce thrilling speeds of up to 110 km/hr. To minimize the sound of all this speed, its wheels are made of urethane rubber. In contrast, WHITE CANYON was designed not just for speed and G-force, but for visual and aural thrills as well.

Accordingly, it utilizes uncovered iron wheels and runs on a course strewn with tight junctions. This produces a lot of noise that can make us feel uneasy and give us the illusion we might fly off the track.”

As speed and style evolve, what kinds of roller coasters should we look for in the 21st century?

“The latest trend is linear roller coasters (which ride on an electromagnetic cushion). In the past, height was transformed into speed, which meant roller coasters had to slide down a steep slope from a high elevation. But linear motors allow us to produce an abrupt increase in speed (without going downhill).”

While it sounds exciting to accelerate to top speed right as soon as you hear the starting bell, Mr. Saegusa believes the popularity of such a roller coaster would be short lived.

“To build it would be costly. But the main point is that we enjoy the anticipation as we climb a slope very slowly, knowing we will eventually rush down very fast. It’s hard to explain these complicated feelings

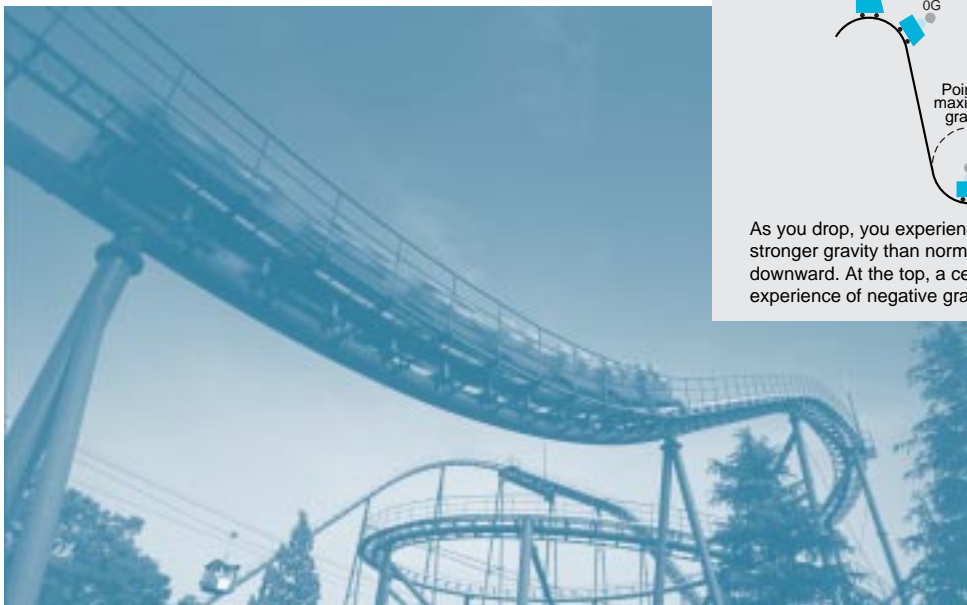
of fear and excitement, but I think they are the main reason we love roller coasters.”

Many roller coasters follow a “camel’s back” course where the main direction of travel is up and down, which changes the G-force.

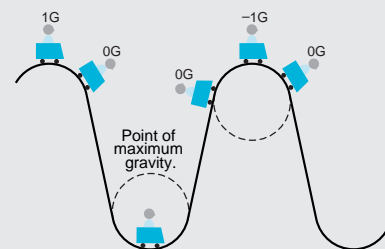
“In a camel’s back, we experience zero or even negative gravity after going over the top of the hump. We suddenly feel weightless. Immediately after that you bottom out in a trough where the G-forces suddenly increase. It’s this change that gives the ride its appeal. If there are more camel’s backs, the ride is usually more popular. In the future, there will continue to be roller coasters with camel’s backs, as well as some new thrills.”

A modern roller coaster can quickly get up to speed and suddenly make an abrupt turn, much like life in our current era.

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● Gravitational changes along a camel's back.



As you drop, you experience zero gravity. At the bottom, you experience stronger gravity than normal because of a centrifugal force directed downward. At the top, a centrifugal force is directed upward to create the experience of negative gravity.