

## **"Doubling Down"**

By *William Avery*

Redundant, a big word with an even bigger meaning. By simple definition we find that redundant translates as exceeding what is necessary or needlessly repetitive. A twenty-first century definition may be expanded to include the phrase "doubling down."

What does the word redundant have to do with the amusement ride industry? It can be the difference between safety and tragedy. Think about it, the airline industry has employed a redundant operational philosophy since soon after the birth of aviation. Critical airplane functions are duplicated with a back up system that takes over if a primary mechanism fails. Imagine you are 35,000 feet aloft when the captain's voice quivers as he announces over the public address system the plane has lost power to a key control function followed by a sheepish revelation explaining why there is not a redundant safety system in place. Ah! Redundant, now comes the importance. In this scenario, you begin to appreciate the definition of redundant and the potential consequences when it is absent.

Amusement ride manufacturers have made significant strides improving safety restraint mechanisms in recent years. Many have redundant systems in place that include over-the-shoulder harnesses, lap bars and seat belts. The amusement industry is moving in the right direction but there is work yet to be done in this area. The amusement industry has witnessed passenger ejections that have killed and severely injured riders. Some of the ejections have included restraint failures where a single attachment point is relied on to lock the rider into their seat. History teaches us that reliance on a single attachment point for a locking mechanism is not enough.

Amusement ride safety can be simply stated: Keep the seat on the ride and the rider in the seat! Of course this is not the end-all to amusement ride safety --- but it captures a lot of territory. By keeping the seat on the ride and the rider in the seat it significantly reduces the possibility of a serious injury and/or fatality. Investigation and research on a number of amusement ride accidents reveals that serious injuries and fatalities are more often attributed to the rider leaving the seat than the seat leaving the ride.

Amusement rides that provide only one restraint source are statistically testing "father time." Operators should not feel comfortable by relying on their operating history. This may provide a false sense of security. I cannot recount the number of times I have heard, but we have operated this ride safely for 25 years with millions of riders without an ejection. The ride may have operated for twenty-five years with millions of riders but that may be the only parts of that sentence that are true. Amusement rides can be operated in an unsafe manner and "tempt fate" for years before being involved in an accident.

Ejections can happen anywhere at anytime on almost any ride. It can happen on more passive lower g-force rides as well. There have been incidents involving "wheels" and "kiddy rides." Amusement rides should be operated under the premise that "if it can happen it will happen."

The amusement ride industry needs to re-visit issues concerning restraint mechanisms with a methodical well thought out plan for corrective action. Operator's should contact the ride manufacturer regarding installation of redundant safety mechanisms such as restraints and in situations where there is not a viable manufacturer the operator can seek the guidance from a licensed professional engineer to assist them with their project needs. Appropriate standards, laws and/or manufacturer recommendations must be followed with respect to any modifications that are considered a design change. Working together as an industry this problem can be solved and we can all benefit from the reduction of serious injuries and fatalities by simply "doubling down."

When redundant safety restraint systems aren't utilized the importance of inspecting single piece units existing hardware and mechanisms that play a role in protecting the riding passenger are extremely important. In circumstances such as this the description of the inspector's findings with adjectives such as close, almost, pretty good shape, not bad or OK simply doesn't cut it! The mechanism should operate at the level on the day it was shipped new from the factory with no ifs, ands or buts! Even at this level there is a margin for error when one mechanism is relied upon. "Doubling Down," think about it --- it works.