Rotary Kinetic Energy Storage For Universal Studios

Mechron Power Systems

2437 Kaladar Ave.
Ottawa, Ontario
Canada
K1V 8B9

(613) 733-3855

www.mechron.com

Universal Studios designs and operates some of the most advanced roller coasters in the world. One of the best-known roller coasters is Universal's Incredible Hulk© Coaster. One of the unique features of this ride is at the start where the coaster launches upward, accelerating from rest to 40 mph in 2 seconds.

The power required to perform this is tremendous; 2 MW of power is required for a period of 4 seconds. If this power were taken directly from the utility, the costs would be staggering. A new substation would be required. It has been said that if this power were taken directly from the utility, the lights would dim throughout the Orlando area.

To address this difficult requirement, Mechron came up with an innovative solution. Because of the short duration of the peak load, the most economical means of satisfying the power requirement was to design a means of storing continuous power from the utility, reducing the continuous power draw to under 40kW. The solution was a rotary kinetic energy storage device.

The rotary kinetic energy storage device is essentially a very large motor-generator set with a large flywheel for energy storage. The coaster called for three units in parallel, with a fourth as backup. Each unit included a 300 hp variable frequency motor and a 10,000 lbs. flywheel for energy storage. The magnitude of each device required special provisions, including the use of extremely robust bearings and a highly reinforced containment structure. The containment structure was constructed of 1.5" thick steel with 1' thick stiffening ribs. The entire structure was grouted to a 40,000 lbs. inertial block to isolate vibration. Among the other requirements was rapid maintenance to minimize downtime.

The Incredible Hulk© Coaster continues to operate reliably since 1999.