

SAFETY SCIENCE



What Goes Up Must Come Down—Carefully

(NAPSA)—As anyone who has ever climbed a slope knows, getting to the top is only half the struggle. Getting down is the other half and it can be even more difficult than the climb to the summit.

Now, imagine that it's not a person climbing the mountain but rather a train full of passengers. In fact, two railways in the United States are designed specifically to climb mountains—one at Mt. Washington in New Hampshire and the other ascending Pike's Peak in Colorado.

Both are "cog" railways, which means the train actually climbs a third rail, or rack, with gearlike teeth cut into it. A mating gear on the engine engages the rack and propels the train up steep slopes.

When it's time to come down, the same amount of energy that was used to get the train and passengers to the top now has to be controlled and dissipated in order to get them to the bottom safely. Again, the gear and rack positively connect the train to the rails, but now the drive system has to reverse roles and dissipate energy rather than deliver it.

There are a number of ways to accomplish this, but when it was time for the Manitou & Pike's Peak Railway to upgrade the drive systems on its workhorse Unit 24, a 216-passenger railcar, it chose to install an advanced hydrodynamic drive system built by Voith Turbo of York, Pa. The system consists of a Voith torque converter with adjustable guide vanes, a Voith retarder and a Voith turbo control electronic package.



A special motor converts a descending locomotive's energy into electricity.

Unit 24 is a diesel-electric railcar, which means a diesel engine drives a generator that produces electricity to power the motors that actually propel the car. On the way up, the motor drives the cog gear through the torque converter and the transmission and retarder in a normal fashion.

On the way down, however, everything is reversed. The energy of the descending railcar drives the cog wheel, which in turn feeds power back through the torque converter and transmission/retarder to the electric motor.

Both the torque converter and the transmission/retarder are specially modified versions of standard models that Voith supplies to railroads around the world. It's only in places such as Pike's Peak, Mt. Washington and Switzerland where their function has to be modified to make sure that everything—and everyone—that goes up also comes down safely and comfortably.

Learn more at www.voith.com.