



Using Factory Grade® Technology to Ensure Critical Infrastructure Reliability

Thrill seekers get more than they bargained for at amusement park

HIGHLIGHTS

OVERVIEW

Quality issues on new critical cable system identified with Factory Grade® technology

CHALLENGE

New cable system reliability under media microscope based on previous outages leaving park guests stranded on rides

RESULTS

IMCORP's Factory Grade® technology proven 100% effective in identifying standard issues in multiple new cable systems and providing Precision Reliability™ feedback to clients

Frequent power outages were being experienced at a prominent amusement park in a major metropolitan area. These outages culminated early in the afternoon on Father's Day with the park near capacity and with temperatures nearing 100°, leaving some riders stranded high above the ground for hours, creating negative publicity for both the park owners and the servicing electric utility. Rather than risk continued outages and downtime due to repair cycles, the utility decided to replace the underground cable system along with several transformers. Previous experience predicated that newly installed cable and accessories alone are not a guarantee to reliable system performance. With this knowledge, the utility requested that IMCORP assess the workmanship of the newly installed cable system with its Factory Grade® technology. IMCORP's technology had proven 100% effective in the past in identifying defects in newly installed cable systems by providing Precision Reliability™ feedback.

Since the repair work had to be coordinated around the amusement park's operating hours, this job presented many challenges, including navigating personnel and equipment through narrow passageways and tight access areas without incident. With tight deadlines, crews removed and replaced cable sections, installed accessories, and performed Factory Grade® assessments to ensure the complete system was defect free before energization.

Working with the utility and contractor crews, IMCORP assessed all cable segments. Initial results found 10% of the segments required some type of repair in order to meet performance standards and issues found at terminations were repaired during the assessment procedure. In some cases, the root causes were typical cable workmanship issues, such as improper semiconductor cutbacks or contamination, but in another case, a cable was found to have an insulation defect that would have likely caused an immediate or near-term fault had the Factory Grade® assessment not been implemented. In this instance, the defective section was cut out and repaired with a back-to-back splice. After all repairs were completed by the contractor, the cables were re-assessed to ensure the quality of the repairs, confirming each component met the IEEE and ICEA performance standards. A total of five defects were identified using IMCORP's Precision Reliability™ feedback, assisting in the prevention of future unplanned outages. Today, park visitors can enjoy the rides without fear of power loss and being left stranded. Fortunately, the utility and park owners can now stay off the reliability and media spotlight rollercoaster.



The Manufacturers' Standards



Component Standard	Testing Frequency	Thresholds*	
		Sensitivity	Voltage
Terminations IEEE 48	50/60 Hz	5pC	≤ 1.5 U ₀
Joints IEEE 404	50/60 Hz	5pC	≤ 1.5 U ₀
Separable Connectors IEEE 386	50/60 Hz	5pC	≤ 1.3 U ₀
MV Extruded Cable ICEA S-97/94-682/649	50/60 Hz	5pC	≤ 4.0 U ₀ ^a
HV / EHV Extruded Cable ICEA S-108-720	50/60 Hz	5pC	≤ 2.0 U ₀

* No partial discharge should be observable above the sensitivity threshold up to the voltage threshold

^a200 V/mil

