



Lineator™ and SOLV™ Case Study: SkyVenture Montreal



Challenge

SkyVenture, an indoor freefall simulator, provides novice and experienced thrill-seekers the experience of the free-fall portion of their sky jump. Skydivers fly in a large-scale wind-tunnel powered by blowers that generate a 175km per hour airstream. The Owners of SkyVenture Montreal were building a new dedicated facility for its first Canadian location and were eager to keep to its grand opening schedule. To achieve the required wind speeds, their blowers needed to use four (4) 350HP Variable Frequency Drives (VFDs).

As part of the approval process for a new building, the Consulting Engineer had to submit a Load Profile to Hydro Quebec – the profile lets the utility company know what the load will be on their distribution system. When Hydro Quebec learned that four (4) 350HP Variable Frequency Drives (VFDs) would be running on what they considered to be a small transformer (1500kVA), they asked for analysis showing that the harmonics generated by the VFDs would be properly treated. Hydro Quebec wanted to ensure it would meet their specific limits for voltage and current distortion before they agreed to their connection request.

Using SOLV™, Mirus' exclusive harmonic analysis software, the consulting engineer ran a simulation by inputting information on the VFDs and the harmonics solution they were intending to use – the drive manufacturer's basic treatment for harmonics – a 3% line reactor. The result of the simulation: voltage distortion at the Point of Common Coupling (PCC) was 8.2%, well above the IEEE Standard 519 harmonic limits, and current distortion exceeded the Utility limits.

Solution

With help from Power-Quality Concepts, the local Factory trained Mirus Representative, the consulting engineer ran more simulations using SOLV - this time with two (2) 700 HP Lineators as the harmonics solution – each Lineator would power two (2) 350HP VFDs.

The simulations found that by using the specified Lineators, harmonic distortion decreased dramatically and met IEEE Standard 519 limits for both voltage and current. Using Lineators also offered greater efficiency resulting in a shorter payback period as a result of the energy cost savings.



SkyVenture Montreal's consulting engineer submitted the SOLV report which simulated the Lineator solution that proved it complied with IEEE Std 519 limits and met Hydro Quebec's requirements for connection. Hydro Quebec responded quickly with an approval to proceed and completed the hook-up of the SkyVenture building.

Results

- SOLV™ Provided the Proof – By using Mirus' proprietary harmonic analysis software, SkyVenture, was able to accurately and quickly perform simulations that calculated current and voltage distortion levels. By using the software SkyVenture quickly learned their original solution would not suffice – saving them time and money.
- Lineator Reduced Harmonics Caused by VSDs – Mirus' passive harmonic filter solved the harmonics problem created by SkyVentures four VSDs. In addition to meeting IEEE Std 519, Lineators save energy by lowering harmonic losses upstream often justifying the installation on relatively short paybacks.
- IEEE Std 519 Compliant – Using SOLV in combination with the specified Lineators demonstrated the Lineator solution was well within IEEE Std 519 limits. And SOLV is capable of generating the IEEE Std 519 compliance reports required by the utility.
- Faster Utility Hook-up – By proving the performance of Lineators with their four (4) VSDs through detailed reports, SkyVenture Montreal achieved faster acceptance and ultimately a faster hook-up – which greatly benefited their bottom line.

About Mirus International

Mirus designs and develops world class power quality improvement products for mission critical operations. Their uniquely specialized product line includes highly efficient harmonic filters, transformers, autotransformers and Data Center power distribution equipment. Comprised of a leading team of power quality experts, Mirus' solutions minimize disruption to the power supply, improve reliability and adhere to the strictest of regulatory requirements while also saving energy. Proven to perform, Mirus products are available globally and are real-world tested in its own Harmonics & Energy (H&E) Lab.