RELIABLE COVERAGE WITH SEAMLESS INTEGRATION

Setting New Safety Precedents with Machias Elementary School's BDA Addition

Case Study

SEAN RAWLINGS, PROJECT MANAGER FOR ABSCO SOLUTIONS:

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OVERVIEW

Machias Elementary School, located in Snohomish County, was built in 2011 and houses 500+ students and staff. The 72,300 SQFT school lies nestled at the base of a mountain, in a densely forested area. Machias Elementary was designed and constructed to reflect the surrounding rural environment with a strong focus on sustainability.

In the Spring of 2019, the Snohomish County Fire Marshal's office executed an annual survey at Machias Elementary School, and determined that there was significant radio signal interference. Both the remote location and construction materials created enough radio frequency interference that first responder radio communications would be adversely affected.

To ensure the safety of students and staff, the school district published an RFP for selection and award of installation services needed to facilitate the retrofit installation of an Emergency Radio Communication Enhancement System by a qualified installation contractor at Machias. Following national code, officials required Bi-Directional Amplifier (BDA) signal boosting technology as part of the life safety solution. Following review and qualification of installation proposal submissions, the Snohomish School District selected Absco Solutions, a certified ELITE Gamewell-FCI Engineered Systems Distributor (ESD) from Lynnwood, WA, to design and install a comprehensive BDA life safety solution. "We were excited about this project because it was a great opportunity to serve our community," states Morgan Campbell, Senior Account Executive for Absco Solutions.

THE CHALLENGE

The facility is architecturally stunning. The structure is a two-story steel framed school building that features three wings, salvaged concrete, and repurposed arched roof beams. The latter were implemented as exposed structural columns preserved from the original elementary school's 1950's gymnasium. Inside, the facility showcases an open beam structure with a unique slatted wood floating ceiling throughout the common areas. Both floors house core mechanical chases with 18" wide plexiglass windows that expose the building's inner workings floor to ceiling to help students better understand the mechanical aspects of the school. Large glass panels with metal accents encase the entire school, providing natural light and an eye-catching exterior. In addition, the building has a unique, contoured floor plan, with no two areas alike. The roof features an extensive 100Kw solar power array supportive of the district's commitment to an eco-friendly footprint for the project. As a design jewel within the community, the district required that all architectural elements and aesthetics be preserved. Therefore, antennas and cabling would need to be concealed but still provide code compliant results. The project had to be completed during the summer vacation period and had a very critical timeline of 8 weeks from award to completion.

THE SOLUTION

Absco Solutions chose the Gamewell-FCI Bi-Directional Amplifier (BDA) life safety system for its code compliance, ease of installation and guaranteed radio signal coverage. These Class B BDAs are high

QUICK FACTS

Needs

- Achieve 99% radio wave coverage with code compliant technology
- Preservation of unique architectural elements and concealed cabling
- Fast and efficient installation to meet tight deadlines
- Must integrate seamlessly with existing fire safety system

Benefits

- Lifesaving, reliable two-way radio coverage for first responder
- Expertly placed signal boosters for 100% coverage
- Zero impact on architectural aesthetics
- Expert installation and maintenance by a local life safety focused company

gain, high power, band-selective signal boosters that deliver reliable performance in even the most challenging RF environments. Honeywell's BDA life safety technology is the only NFPA 72/1221 and UL 2524 compliant In-building 2-Way Emergency Radio Communication Enhancement System (ERCES) on the market to date, and with proper design and installation provides 99%+ reliable two-way radio signal coverage inside buildings, tunnels and other structures. In this case, Absco would be able to ensure full radio coverage despite the school's densely forested location and architecturally challenging construction.

Using the several hundred data points collected from their iBwave survey, Absco and the design team devised a configuration consisting of 17 interior DAS antenna with unique installation techniques to preserve the school's aesthetics. To hide unsightly coaxial cables, Absco disassembled the slotted ceiling. Ceilings in the library and art rooms consisted of exposed wood beams, so Absco purposefully included in their design strategically located stick antennas featuring higher gain and performance in areas hidden from view.

The basement held a long concrete access tunnel that ran most of the length of the building. Radio signal in these areas was particularly poor. Absco ran coax cable through the common library wall and was able to isolate the concealed mechanical chase to run the riser through that area. They were able to encase all cable with a 2-hour blanket without opening up walls or making any modifications to the building.

The BDA Control unit was placed in the mechanical mezzanine area. To maintain a 2-hour rating, Absco constructed an enclosure in the large mechanical mezzanine on the 2nd floor. Using the roof's solar array as an RF shield between the DAS below, conduit was installed out to the roof edge. Absco technicians then placed the donor antenna onto the roof. To ensure the donor antenna would be positioned for maximum signal, they custom fabricated a 16ft rigid aluminum antenna mast and mount with a NEMA4 terminal cabinet to house the critical system grounding devices and lightning suppressor.

"Ensuring we maintained all of the existing aesthetic features of the facility while providing exceptional RF coverage throughout the entire space without a single installation element overtly visible was a key objective for us going into this project. I am proud of the creative solutions our team came up with and the finished product is second to none," states Sean Rawlings, project manager for Absco Solutions. Upon completion, testing showed 100% radio frequency coverage throughout the entire building and surrounding property.

The success of this first-of-its-kind BDA installation prompted district representatives to expand BDA life safety technology throughout their community. Absco Solutions will be leading the cause by conducting county-wide symposiums for fire officials in Snohomish County.

"The Snohomish County fire marshal was a great partner throughout the project. He was aware of the overarching concept of BDA and what it facilitates in terms of enhanced radio coverage and consistency in mission critical communications," comments Sean Rawlings. "We were able to provide a new solution to an old problem and create a road map for future BDA installations," adds Tom Whitaker, Director of Sales, Absco Solutions.

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