

## Secure Stack®

**Location:** Edmonton, Alberta, Canada

**Engineer:** Hemisphere Engineering

**Mechanical Contractor:** Priority Mechanical Ltd.

**Security Chimneys Representative:** Wesmech Sales Ltd.

**Product:** Model CIX

One of the most challenging aspects of emergency generator applications is the selection and design of the exhaust system. A single error in judgment or a miscalculation of back pressure or pipe expansion can have far-reaching consequences for the facility and its operations.

Dennis Staniland knows that planning for the safe removal of exhaust from an emergency generator is a painstaking, multi-tiered process. As project engineer at Hemisphere Engineering, Staniland headed up the design for the installation of a new emergency generator at the University of Alberta (UA) in Edmonton, Alberta, Canada. The generator was needed to provide back-up power to the University's newly renovated Chemical and Materials Building (CME), which housed critical laboratory spaces, and the new Donadeo Innovation Centre for Engineering (ICE), an adjacent facility designated for future expansion of the university's communication infrastructure.

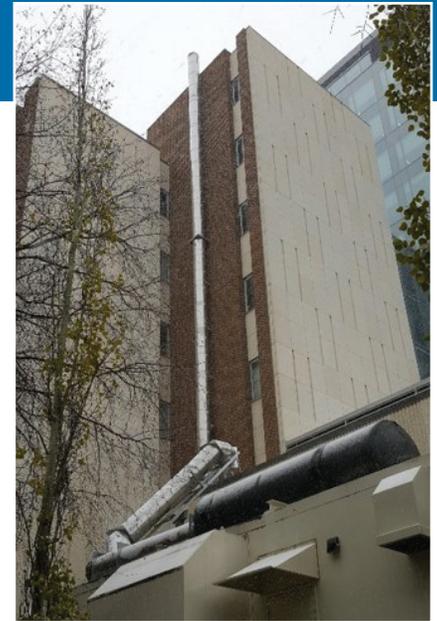
"The biggest challenge we faced was how to deal with combustion exhaust from the diesel engine. The University has a lot of critical research and experimentation that takes place in the CME building and all that would be ruined if they lost power," said Staniland.

In addition to the critical nature of the application, the exhaust design was demanding in terms of location, installation logistics, and schedule. A modular duct system from Security Chimney helped the design and installation teams navigate these challenges.

### "Plug and Play" Solution

Despite hope that the exhaust ductwork could be discreetly routed inside and out the rooftop of the CMS building, existing ductwork and infrastructure eliminated this as an option. Instead, the exhaust system would have to be anchored to the exterior of the 7-story building, giving rise to more concerns about the weight and appearance of the duct. Field-welded carbon steel was considered, but was quickly ruled out for several reasons.

"Weight was a major factor. Carbon steel would have required substantial rigging mechanisms to lift the pipe. Secondly, carbon steel requires welding, which changes the whole approach. We wanted the backside of the duct to be fairly tight



CIX Installed onsite



Secure Stack® Product Family

to the building, which would have been very difficult to weld. And we would have needed another set of trades people to insulate and clad the stack, adding time to our schedule," said Staniland.

All this led the design team to another option: Secure Stack® CIX stainless steel duct from Security Chimneys. The decision to use Secure Stack helped simplify the design and installation of the exhaust vent, while keeping it as visually unobtrusive as possible.

Certified for commercial chimney and diesel exhaust applications, Secure Stack modular, venting systems are made with thick-gauge 304 or 316 stainless steel material that is corrosion resistant so no additional cladding is needed. The double-wall systems arrive at the jobsite, already pre-insulated with high quality, densely packed mineral fiber insulation in thicknesses to suit the application (1", 2" or 4"). The components assemble quickly and easily, thanks to a unique self-centering flue design and coupling figuration that requires only one locking band and a standard, high-temperature silicon sealant for a secure connection. No field-welding is required.

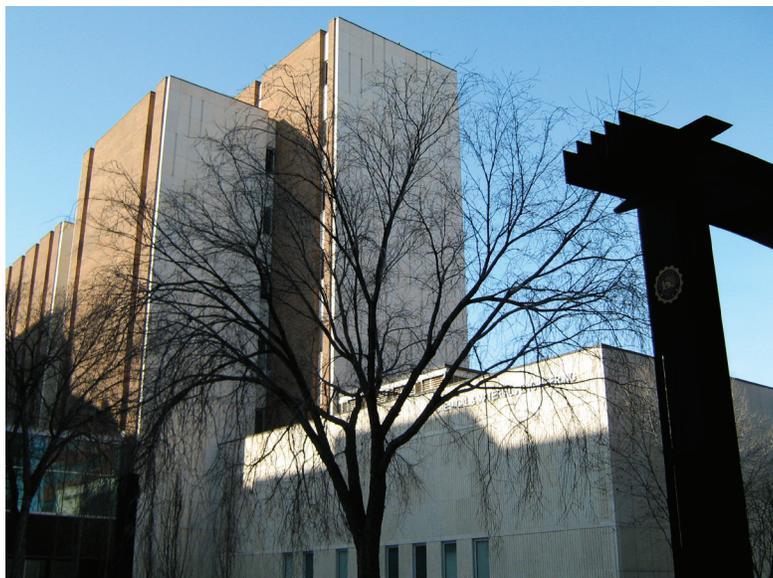
"The best part about Secure Stack is that it comes with all the mounting hardware, which makes it a plug and play sort of installation," said Staniland.

Rej Boutin, General Manager of Priority Mechanical Ltd., the mechanical contractor on the project, confirmed that Secure Stack helped facilitate the University of Alberta installation.

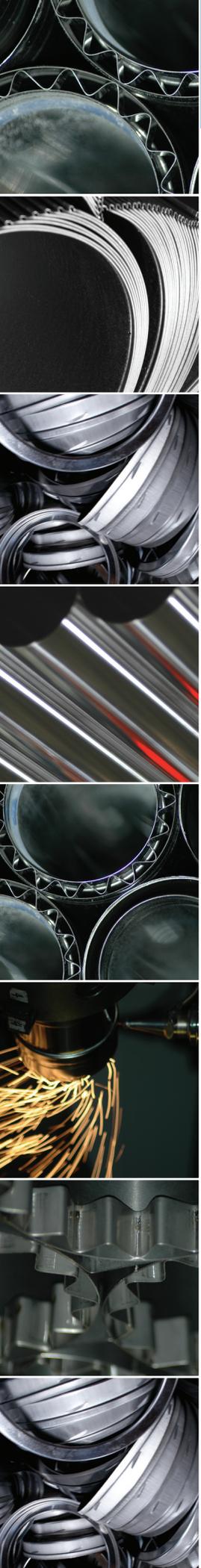
"The modular design and interlock system made it very efficient to install. Field positional welding would have required three times the effort and manpower. Steel pipe of this size is extremely heavy and awkward to maneuver and would have necessitated a crane to lift and place, which in turn creates safety issues for all parties including the user groups and impacts schedule," said Boutin.

Because the Secure Stack is much lighter weight, Priority Mechanical was able to use a simple swing stage platform to transport and support two workers while they installed each piece of duct in the sleek, unobtrusive 160-ft. vertical installation. Amazingly, the contractor was able complete the installation in just a few days over winter break.

Working with Wesmech Sales Ltd, the Security Chimneys representative in Alberta, Priority Mechanical was able to deliver an engineered solution that added value to the building owner. Wesmech Sales provided support throughout the life cycle of the project, ensuring success for all parties involved.



**University of Alberta, Chemical and Materials Building**



## Taking the Edge off a Complex Design Process

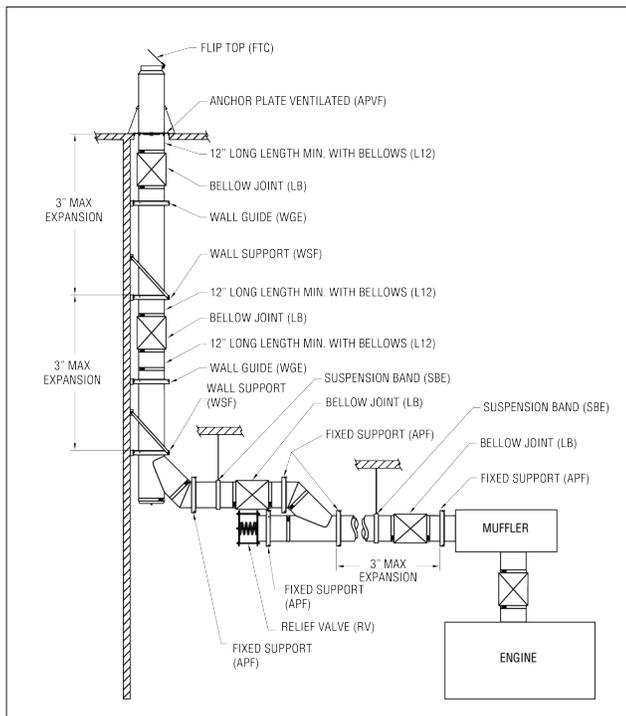
Emergency generator systems must be carefully designed to compensate for significant thermal expansion. In a climate like Alberta's, diesel engine stack temperatures can rise rapidly from an ambient temperature as low as  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) all the way to  $760^{\circ}\text{C}$  ( $1400^{\circ}\text{F}$ ). The duct system must be able to accommodate these sudden changes in temperature and subsequent expansion. The engineer must account for this expansion in his design, along with critical back pressures, and system resistance.

"Combustion stack design is an iterative process. Since you don't know the diameter of the pipe when you begin, the process starts with an assumption about the diameter of the pipe," explained Staniland.

These assumptions are the just the starting point for a series of calculations the engineer must make before finalizing the design. It is a painstaking process that would be even more difficult if not for the well-documented product information and support Staniland received from Security Chimney. The manufacturer's easy-to-navigate online catalogs made it easy cut and paste information directly into the CAD drawings.

"This helped take all the guesswork out for the contractor," added Staniland.

The University of Alberta project reflects the challenges and the complexity of an emergency generator application. It also illustrates the many ways that modular, stainless steel duct can help unburden the engineer, contractor, and ultimately the owner of some of these challenges and concerns.



**CIX – Diesel application**

For more information and literature please visit: [www.securitychimneys.com](http://www.securitychimneys.com)