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Press Release
For immediate release

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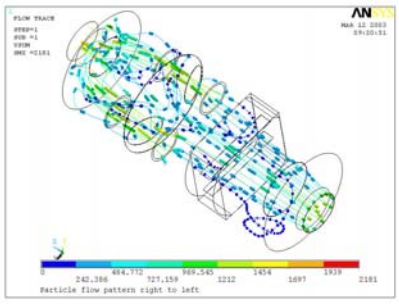
EXHAUST SILENCER AND STACK DESIGN INTEGRATION
Distributed Generation Power Plant – 29MW
City of Geneva, Illinois

Mississauga, Ontario Canada (February 20, 2004) – Silex Innovations Inc., a leader and innovator in the manufacturing of silencers and exhaust systems for power generation and gas compression markets, provides fully engineered exhaust solutions and system integrations.

Caterpillar Power Generation Systems was actively competing for its first installation of its large gas engine product line in North America when Silex offered to provide a solution for the supply and design of a complete exhaust system including a 65 ft discharge stack. The objective of the Silex proposal was to provide Caterpillar with a more cost effective system while increasing the performance characteristics of their current design. An engineering review of the complete system was required at the proposal stage to ensure that the structural and acoustical requirements for the installation would satisfy local code compliance. A SileNOX exhaust silencer was used to meet specific emissions requirements as required by Caterpillar and municipal bodies.

Each exhaust assembly was modeled in its entirety using Pro/ENGINEER software. The customer supplied 2D facility geometry was imported as a skeleton into the 3D Pro/ENGINEER environment to review the integration of the exhaust piping and support structure with building plans and elevations. By integrating the 2D and 3D environments a parametric model could accurately be constructed referencing exact column, wall and roof details.

The complete exhaust system was initially analyzed to determine the total backpressure on the Caterpillar G16CM 34 engine. A combination of empirical calculations and computational fluid dynamics (CFD) analysis was used to obtain the total exhaust backpressure. The volume of catalytic core elements required for emissions reductions could not be placed along the axis of the SileNOX body due to the spatial constraints of the building and subsequently required a



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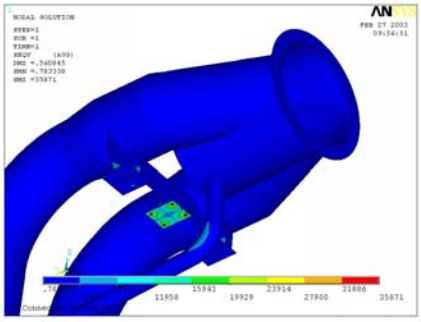
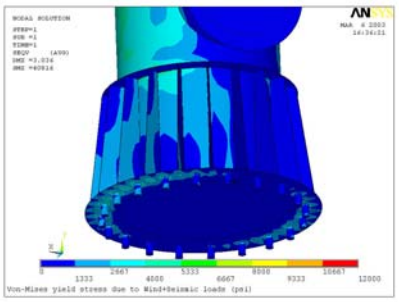
customized orientation. The unique flow geometries of the SileNOX silencer did not permit the use of standardized empirical formulae and as a result the silencer internal volume was meshed and analyzed using ANSYS CFD. Silex engineers were able to ensure a balanced flow across the catalytic core elements by plotting and reviewing the flow streamlines through the silencer body. The unique geometry of the transition elbows and Y-connector at the turbo outlets also demanded the use of CFD software to determine the pressure drop through these elements. The results of the flow analysis permitted a reduction of both the piping and stack diameter without sacrificing the performance criteria.



A design review of the exhaust and silencer support structure was conducted to determine the member size and configuration required to carry the operating and seismic loads into the building columns and roofline. Seismic loads were determined for the specific site and occupancy category of the facility in accordance with the Uniform Building Code. Operating loads consisted of component dead loads, live loads and thermal loads imparted by the multiple expansion joints located throughout the system. All structural calculations and selections were done using the applicable AISC standards and sections for allowable strength design.



Preliminary stack design was completed in adherence to the ASME STS-1-2000 standard for steel stacks. Two main design considerations for the stack were the vibrations induced by wind due to vortex shedding and the loading due to seismic activity. The critical vortex shedding velocity and corresponding maximum natural frequency were determined and compared to the resonant frequencies of the stack and inlet assembly. The unique geometry of the stack and inlet piping required the use of ANSYS FEA to determine its mode shapes, as standard empirical formulae did not apply once again. The stack geometry produced numerous natural frequencies below the critical value indicating that the fatigue caused by vortex shedding would become a required element of the design.

The acoustic treatments in the stack and horizontal inlet piping produced an unusually high center of gravity in comparison to a typical bottom inlet system used solely for exhaust dispersion. The resulting moment at the base of the stack due to seismic loading was much larger that the moment due to wind stagnation but similar in magnitude to the moment caused by wind loading with the inclusion of helical strakes. As a result of the engineering review helical strakes were incorporated into the design to combat the effects of vortex shedding. Internal stiffening rings were also included in the stack design to combat ovalling of the stack due to wind loading.

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The acoustic performance of the system was determined by using a boundary element method (BEM) software proprietary to Silex. The reactive elements of the SileNOX silencer coupled with the absorptive treatments in the vertical stack section were configured to meet the site-specific limits for sound pressure levels.

A multi-discipline approach to engineering and design allowed Silex to provide a complete exhaust system and stack to Caterpillar with increased cost savings and design confidence. Silex was successfully awarded the contract for the design and supply of five complete systems to be manufactured and supplied in 2003.

An aggressive design and fabrication schedule was required to facilitate the completion of a turnkey power generating facility. The project was completed during the summer of 2003 and the facility was commissioned earlier this year.

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