Project Case History

Midwestern University: Tjernlund modulating draft inducers and automatic pressure controller helped solve chronic heating system problems

Operating problems began to surface soon after commissioning of heating systems in four buildings on the campus of Midwestern University in Downers Grove, Illinois. After months of repeated service calls and consultations with the mechanical equipment supplier

Tjernlund Specified Systems were used in four buildings on the university campus. Shown are two Auto-Draft® rooftop mounted inducers.

and boiler manufacturer, Facilities Manager, Kevin McCormick was convinced that each system was incorrectly designed and provided inadequate draft for the boilers to properly operate.

The Basic Sciences building had a unique set of challenges. It was one of two buildings converted from a central steam plant to an autonomous system. The mechanical room was in a separate structure, approximately five feet from the main building. The room contained four Raypak boilers and two 35-hp steam boilers.

The original design seemed simple enough. Each boiler was individually vented through the roof of the mechanical room. However, there were problems from the start with the initial design according to Tony Ranallo, Sales Engineer for Meilner Mechanical of Arlington Heights, Illinois. The first problem was that three sides of the taller main building had fresh air intake louvers. Flue gases from the shorter mechanical room roof drifted up and were entering the adjacent Basic Science buildings fresh air intakes.

The second problem was that down drafts off of the taller Basic Science building produced erratic draft for the boilers.

The only solution was to terminate the vents above the roof of the Basic Science building. However, stack lengths for the individual boilers would exceed Raypak specifications. Tim Troutt, Regional Sales Manager for Raypak, maintained the system would be improperly designed if individual vents were extended all the way to the roof of the Basic Science building.

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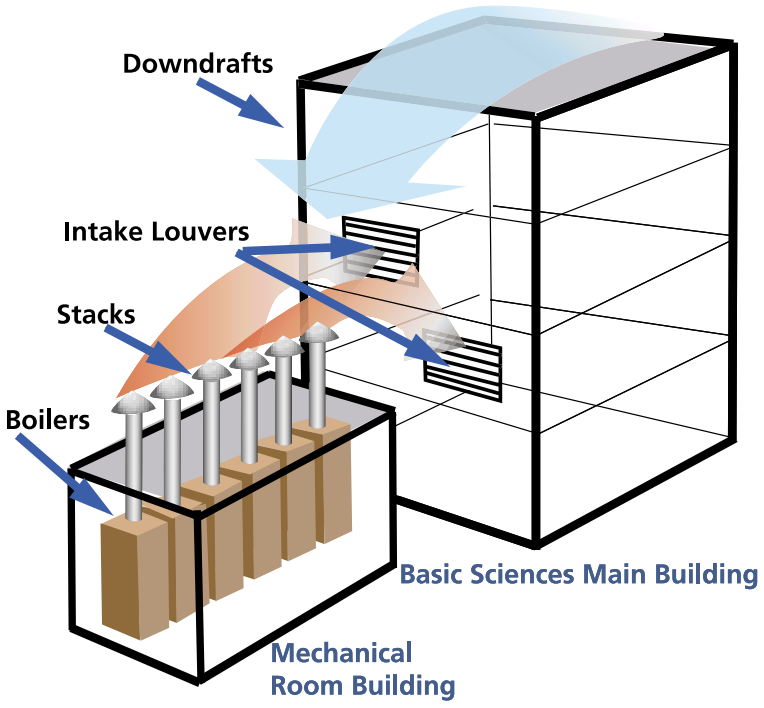


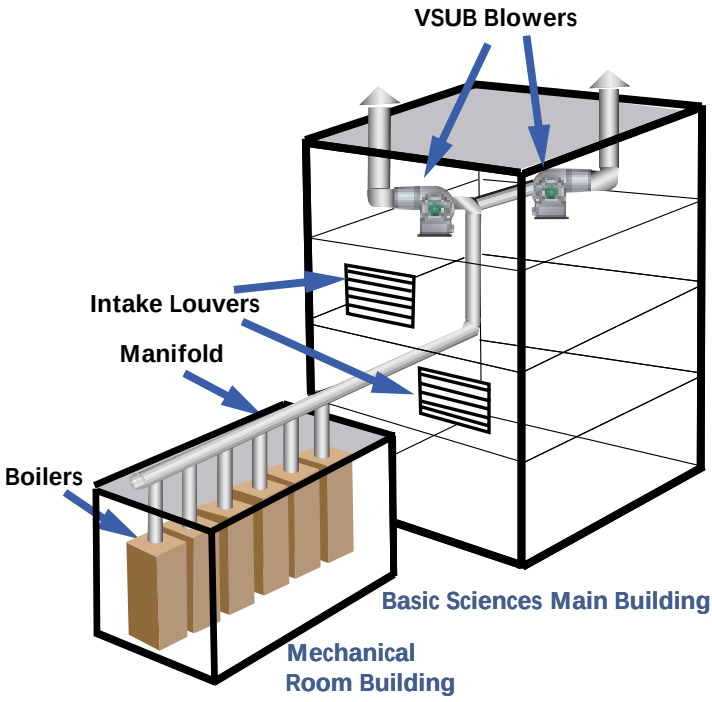
Before: **Flue gases were being sucked into openings in the building. Boilers were not operating properly due to inadequate draft and combustion air.**

"There was too much resistance and not enough draft or combustion air for the equipment to operate properly," Troutt said.

"The owner didn't want to have more chimneys degrading the the building's exterior appearance. Also, there was so much makeup air entering the building, they wanted a guarantee that they weren't sucking flue gases into the building," Ranallo said.

Troutt and Ranallo convinced McCormick the problem could be corrected by reconfiguring the stack and adding automatically controlled variable speed draft inducers made by Tjernlund Products. Components of the Tjernlund Specified System included a model VSUB Universal Blower, transducer, VFD and a CPC-2 Constant Pressure Controller. The CPC-2 automatically modulates the blower to maintain the draft set point that the boilers require to operate properly.

The decision was made to combine the stacks from the six boilers in a manifold on the mechanical room roof, then run a common stack through the main building's second story wall and up the interior to the roof.



After: By using modulating mechanical draft blowers and a redundant control system supplied by Tjernlund, combined with reconfiguration of the stacks, operating problems were corrected. By manifolding the stacks, there was minimal affect to the building's exterior appearance.

Because the Basic Sciences building housed many test animals used in experiments, constant temperature maintenance was of highest priority. McCormick felt that since the system had redundant boilers it should also have redundant mechanical draft. If the only fan failed, none of the boilers would run. The animals and experiments would be in jeopardy.

Top: A redundant constant pressure controller was developed and used as an extra measure to safeguard the building's valuable contents.

Bottom: Two VSUB Blowers, like the unit shown above, were used to cure a draft problem in the Basic Sciences Building.

In response to McCormick's concern, a request went out to Tjernlund for a totally redundant control system.

Tjernlund's R&D department created a redundant constant pressure controller that automatically switched to a second inducer/blower if the primary system faulted. The redundant controller (Model RC-1) is currently an accessory in Tjernlund's specified draft system package.

Two Universal Blowers, controlled by the redundant controller, were installed in a secondary "penthouse" mechanical room on the top floor of the main building where the single stack was teed and individual stacks were connected to each blower and then through the roof. The redundant controller automatically switches to the opposite blower every three days so each side of the system gets even use.

How have the heating systems at Midwestern University been performing since the first system was retrofitted with modulating draft systems four years ago? "They've been working great," McCormick said.

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