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Dr. Michael Greenlee
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RE: North Boone Community
School District 200
Mechanical Upgrades 2022

Part One – Site Observations

The following observations were noted by AMSCO Engineering during a project site visit on Monday 2/19/24 to review the installation, fabrication and operating deficiencies experienced by the Owner related to the new unit ventilators. The site visit was scheduled after the intense cold temperatures so that the District could remove all temporary insulation and covers but was still cold enough to properly inspect for air infiltration.

General:

At this time, AMSCO Engineering observed that the outside air dampers on most unit vents were not initially adjusted correctly by the Manufacturer (Trane). In general, the dampers were not closing completely when required. This allowed cold outside air to enter the units which in turn can cause the internal freeze protection to disable the units.

A tight seal between the back of the unit vent and the wall is also required for the units to function correctly. The units are shipped with gasketing material on the back of the unit to provide an airtight seal between the wall and the unit. Due to poor existing wall construction, these gaskets are not adequate in all cases to provide a complete seal between the back of the unit and the wall.

During installation, AMSCO Engineering noted during three (3) separate site visits that many of the units were not installed properly. It was observed that the gaskets between the wall and unit we're not compressed adequately to provide a tight seal. The noted defects were subsequently corrected by the contractor prior to project completion. Unfortunately, these deficiencies could not be tested sufficiently at the time of installation in the warmer summer months. Outside air leakage is only apparent when the outside air temperature is significantly different than the inside air temperature.

Capron:

Cold outside air was leaking into at least three (3) units due to misadjusted outside air dampers. For these units, it was difficult to tell if other issues were also present for these units. One unit was not properly sealed against the outside wall which was allowing cold outside air to enter the unit. The remainder of the units seemed to be installed correctly and were adequately sealed to the outside wall.

Poplar Grove:

It appeared that all units were sealed properly to the outside walls and the outside air dampers were adjusted correctly. District personnel repaired damaged plaster behind the units before the new units were installed to ensure a proper seal between the unit and the wall. Damper adjustment modifications were made to the units by District personnel to allow the units to function correctly after the initial operational issues were discovered.

North Boone Middle School:

Similar to Poplar Grove, the units at this school were sealed properly to the outside walls and the outside air dampers were adjusted correctly. District personnel also adjusted the dampers at this location to allow for proper operation of the units.

Manchester:

Three (3) of the units in the upper level of the building were not sealed properly to the outside wall. It appeared that this was due to the existing wall construction. The wall construction in this section of the building consists of interior plaster on wood studs with a face brick veneer on the outside. The walls are not plumb and the interior plaster is rough, uneven and cracked in some locations. District personnel repaired damaged plaster behind some of the units before the new units were installed to ensure a proper seal between the unit and the wall.

Part Two – Start-up and Commissioning Services

General:

All of the units need to be tested to ensure proper operation. This can be accomplished by either commissioning or start-up. Having commissioning or start-up performed by a third party (not Trane) would allow for a more impartial review of the current equipment status.

Full Start-Up

Full start-up will test all devices (dampers, valves, sensors, etc.) and functions and will need to be completed by either Trane or an authorized contractor. Unlike commissioning, adjustments can be made during this testing process to address any deficiencies noted. Defective devices will need to be replaced under warranty at a later date by the Manufacturer.

Full Commissioning

Full commissioning will test all devices (dampers, valves, sensors, etc.) and functions of the units. To accomplish this testing, service personnel familiar with the operation of the unit vents (either Trane or an authorized contractor) and the control system (Johson Controls) will need to be present. Unlike start-up service, any deficiencies noted will need to be addressed at a later date under warranty by the unit vent manufacturer (Trane).

Partial Commissioning

In lieu of full commissioning or start-up, partial commissioning is an option. This process tests the function of the low limit thermostat and associated devices (valve, damper, etc.) for proper operation. This option will significantly reduce costs but would ensure the operation of the most vital components.

Part Three - Recommendations

AMSCO recommendations:

The interior surface of the exterior walls behind the noted units will be repaired by first removing the unit to provide access to wall finishes located behind the units. The entire wall surface behind the unit will be covered with a sheet metal panel sized to match the unit vent. This panel will be sealed to the inside surface of the outside wall. The unit will then be reinstalled and the unit gaskets will be able to properly seal against the smooth surface of the sheet metal instead of the rough, uneven plaster surface.

Capron School

The majority of the issues experienced at this building would be corrected with proper start-up or commissioning. The unit that was observed to be leaking will be removed and reinstalled to allow for repairs to the interior surface of the exterior outside walls to ensure that the unit gaskets seal properly. When start-up or commissioning is complete, the gasket seals on the units with misadjusted outside air dampers should be verified. Further improvements to these units is not anticipated.

Poplar Grove School

Full start-up or commissioning should be performed to ensure proper operation of the outside air dampers. No modification of the unit vent installation or wall construction repairs are required/recommended.

North Boone Middle School

Full start-up or commissioning should be performed to ensure proper operation of the outside air dampers. The exterior wall construction at this building is in good condition and additional repairs are not required/recommended.

Manchester School

Full start-up or commissioning should be performed to ensure proper operation of the outside air dampers. At a minimum, the three (3) units that are currently leaking should be removed and reinstalled to allow for repairs to the outside walls to ensure that the unit gaskets seal properly.

District Recommendations

To provide improved protection against outside air infiltration into the units, more extensive wall repairs (modifications) are recommended by District personnel. For units installed on plaster walls, this will include removal of the unit, removal of plaster finishes and installation of insulation and the installation of a duct sleeve to connect the outside louver to the back of the unit vent. Units installed against masonry walls will be removed and a duct sleeve will be installed to connect the unit to the outside louver. The units will be reinstalled after the wall repairs and duct sleeves are completed.

Capron:

To provide enhanced protection, all units would be removed and reinstalled to allow for additional wall improvements and the installation of duct sleeves to avoid outside air leakage into these units.

Poplar Grove:

All units would be removed and reinstalled to allow for additional wall repairs to further reduce the chance of outside air leakage into the units.

North Boone Middle School:

All units would be removed and reinstalled to allow for additional wall repairs to further reduce the chance of outside air leakage into the units.

Manchester:

To provide enhanced protection, all units except the units in the lower level of the building would be removed and reinstalled to allow for additional wall repairs to avoid outside air leakage into these units. The units installed in the lower level are already ducted to the outside air louvers. Existing wall construction defects do not affect these units.

Part Four – Budget and Timeline

Start-up services for all units:

Start up service for all units by an authorized contractor: $24,560

Manufacturer's start up service for all units: $?

Commissioning services for all units:

Full commissioning for all units: $$22,000

Partial commissioning for all units: $5,600

Building Improvements Budget Summary

AMSCO recommended wall improvements:

Capron: 1 unit, $3,000

Manchester: 3 units, $9,000

Total: $12,000

District recommended wall repairs:

Capron: 17 units, $65,000

Middle School: 16 units, $48,000

Manchester: 9 units, $39,000

Poplar Grove: 6 units, $30,000

Total: $182,000

Project timeline:

Start-up/Commissioning

Start-up or commissioning should be implemented as soon as possible after school is done for the year. This process can be completed in less than a week. This will allow sufficient time for any required warranty repairs to be implemented prior to the start of school in the fall.

Building Improvements

Building improvements may be implemented as soon as start-up or commissioning is completed.

AMSCO recommended improvements can be completed in approximately two (2) weeks. Proposals would be solicited from mechanical contractors to perform the necessary repairs during the summer.

District recommended repairs will require the majority of the summer to be completed. Due to the cost of the repairs, the work would need to be publicly bid to mechanical contractors and awarded at the June Board Meeting.

Please call if you need any additional information.

Sincerely,

Daniel K. McCurdy