

HVAC ASSESSMENT Hanover High School

BOILER ROOM:

- ?? The heating plant consists of two Clever Brook Scotch Marine fire tube boilers. Each boiler is original condition to the building and appears to have been installed in approximately 1965. Each boiler is of the 100-horse power design and is provided with a single fuel natural gas burner. The boiler shell were noted to be contaminated slightly and rusting in various sections however it did not appear that either boiler is nearing a catastrophic failure at this time. Each boiler is of the heating hot water design and generates low pressure/low temperature heating hot water which is distributed out to the building through two individual base mounted pumps. Each boiler is provided with all operating and safety controls including a single low water cut off as well as operating aquastats and a firematic switch. We could not locate an emergency shut off switch which should be located at the exit door of the boiler room. The boilers were originally operated on #4 fuel oil and the fuel oil heaters, pumps, and distribution supply and return piping are in place however, have been abandoned. Oil trim heating presently exists around the boiler for the heating of the fuel oil however it is not being used at this time. General assessment of each boiler does suggest that they have been reasonably well maintained and are serving their intended purpose however, the boilers should be opened and examined internally on the fire tubes to verify that there are no refractory problems at the rear or front door and also the fire tubes should be inspected for pitting. An outward opinion does suggest that the boilers are in average condition.
- ?? The breeching is of the welded black steel design and is insulated with what appears to be either calcium silicate or asbestos insulation with a canvas jacket. The insulating material should be examined for the presents of asbestos. There were no signs of external gas leakage or water stains around the breeching and the general condition appeared good. A single clean out was provided in the breeching however, barometric dampers were not. The condition of the breeching appears consistent with the age of the boilers and no catastrophic failure appears eminent.
- ?? The chimney is of the masonry type and extends to an adequate height above the roof to maintain proper combustion and discharge of combustion gases. There were no signs of extensive water leaks, stains or cracks on or around the chimney. The condition of the chimney is also consistent with the age of the building and no recommendation for improvement are made.
- ?? Combustion air for the boiler room is provided through two individual openings, one high and one low combustion intakes within the boiler room. One duct extends to approximately 12" above the floor which is provided with a motor operated damper. The second duct discharges above a door exit way and is also provided with a motor actuated damper. It does appear that the size of both intakes are smaller then what

would be recommended for this size power plant and consideration should be given to upgrading to providing larger combustion louvers.

- ?? Presently existing within the boiler room is a recirculating fuel oil system which includes floor-mounted gear driven pumps, distribution piping, and heaters. The entire system is abandoned in place and is no longer in use. Consideration should be given to a complete removal of this system.
- ?? Heating hot water is distributed throughout the building by a primary and standby base mounted end suction heating hot water pump. Each pump is showing slight signs of contamination on and around the impellers and housings and one pump was noted to have either a defective impeller or bad baring as indicated by a loud scraping noise in the impeller housing. It does appear that each pump is original condition to the building and based purely on age consideration should be given to upgrading at this time.
- ?? Heating hot water piping is distributed throughout the entire building through a schedule 40 black steel fiberglass insulated distribution system. The piping throughout the boiler room is covered with a canvas jacket which was noted to be damaged in many locations and many sections were stained. It does appear however that the insulating material is adequate. Various sections of the piping should be removed and examined internally for the presents of corrosion and if found should be remediated. Many of the valves throughout the boiler room were noted to be corroded with extensive rust stains and generally in need of replacement. Considering the age of this system the piping system and valves are considered average with no apparent catastrophic failure near.
- ?? The automatic temperature control system is of the pneumatic type and is provided with a single tank with duplex compressors and motors. It was noted that there was slight oil leaks on and around the compressed air storage tank however both compressors and motors appear to operate satisfactorily. It does not appear that the oil staining on the tank is of serious concern and no catastrophic failure appears apparent. The air storage tank was also provided with an automatic blowdown which discharges to an adjacent floor drain and the entire system appears consistent with the overall building age. Adjacent to the air storage tank is a refrigerated air dryer mounted on an adjacent wall. It appears that this refrigerated air dryer does operate and the system is also provided with oil/water separators with various regulators providing both day and night operating pressures. The refrigerated air dryer was provided with a blowdown line however, it discharges approximately 12" below the unit on to the floor. This condition should be upgraded. The automatic temperature control boards within the boiler room appear to be original to the building and are extremely antiquated and do not appear to operate. Considering the overall age and general condition of the automatic temperature control system consideration should be given to a general upgrade to include a current technology direct digital control system.

VOCATIONAL TRAINING AREA:

- ?? These areas were provided with two individual air-handling units which were located exposed within one of the shop areas. Each air-handling unit is provided with a direct source of outside air for ventilation, heating hot water coil with valve control, filter mixing box, and a supply fan. Each unit freeblows in to the two individual shop areas through a supply diffuser directly at the air-handling unit. Return air is draw directly at each air-handling unit and is mixed with a source of outside ventilation air for redistribution. Each air-handling unit is original condition to the building and approximately 45 years old and as we understand it each system does operate and maintain reasonable ventilation and space temperature control however, considering the generalized age of each piece of equipment and the general poor condition consideration should be given to an overall upgrade at this time.
- ?? It was noted throughout the vocational training areas that there were numerous spaces both internal and external that were not provided with any means of either heating or ventilation air. This condition is non-code compliant and should be improved upon.
- ?? Also located within the woodworking shop was an overhead dust collection system. The dust collection system is made up of a combination of galvanized sheet metal and flexible rubber hose. All major pieces of equipment were connected to this dust collection system which communicates to an outside mounted dust collection unit discharging all exhaust air directly to the outdoors. It was noted that the system was extremely antiquated and has been modified to serve various pieces of equipment over the years. As we understand it the system does operate however it was considered to be in very poor condition and consideration should be given to an overall upgrade at this time.
- ?? It was also noted that there were central exhaust systems located throughout the vocational areas which consisted of wall mounted exhaust registers communicating to roof mounted exhaust fans through a galvanized sheet metal exhaust system. It does not appear that these systems are operating at this time and consideration should be given to generalized upgrade.

KITCHEN:

- ?? The kitchen is provided with a single wall stainless steel exhaust hood located over the cooking equipment. The kitchen hood is mounted at the proper height however, it is undersized for actual cooking area served as it was noted that many pieces of cooking equipment extended beyond the boundary of the hood. The hood is provided with standard incandescent lighting which was not vapor tight is non-code compliant. Fire protection was installed throughout the hood as well as cleanable cartridge type filters. The general condition of the hood would be considered average however, considering it's undersized nature and the lack of vapor tight lighting consideration should be given to a complete replacement of the exhaust hood at this time.

- ?? Make-up air for the kitchen was through a series of the ceiling diffusers located in the soffit within the kitchen area. It was noted that the ceiling diffusers in this make-up air system were slightly dirty and contaminated however they were not damaged and they do appear to operate. It was noted however that considering the size of the exhaust hood and the amount of make-up air actually provided to the kitchen area it appears undersized and consideration should be given to increasing the overall amount of mechanical make-up air provided to the kitchen area.

CAFETERIA:

- ?? The cafeteria is provided with four individual wall mounted classroom unit ventilators located along the exterior wall. Each classroom unit ventilator is provided with a heating hot water coil with valve control, a source of direct outside ventilation air, filters, and a supply fan. It was noted that each unit ventilator was extremely contaminated many of which were damaged and showing extensive surface contamination. Each unit ventilator freeblows into the space which is intended to maintain general space temperature control as well as ventilation control. It appear that the unit ventilators are providing a source of make-up air to the kitchen exhaust hood however this amount of exhaust air does not appear adequate for the size of the kitchen hood provided. There were no supplementary exhaust systems provided within the cafeteria itself. Considering the very poor condition of all heating equipment located within the space consideration should be given to an overall upgrade at this time.

GYMNASIUM:

- ?? This area is provided with two individual air-handling units located within the space high at the ceiling. Each unit is of the free blow design and distributes ventilation air through a supply diffuser at the discharge of the air-handling unit. Return air is also draw directly at the air-handling unit which does relate to very poor distribution throughout the entire space. The air-handling unit was noted to be slightly dirty however they were not damaged and do appear to operate in a satisfactory manor. Each air-handling unit appears to be original condition to the building and is provided with a heating hot water coil with valve control, supply fan, filters, and a direct source of outside ventilation air. All equipment does appear to be consistent with the overall age of the building and based purely on age consideration should be given to upgrading at this time.
- ?? It was noted that there was no supplementary pressure relief located at the ceiling to relieve excess space pressure when additional outside air is introduced into the system. This condition should be improved upon. Observations of this space did not indicate that there were any secondary means of exhaust ventilation air to maintain a minimum amount of ventilation and this condition should be improved upon.

LOCKER ROOMS:

- ?? The locker areas were recently renovated, approximately four years ago, and were provided with single zone air-handling units exposed within each locker room. Each air-handling unit is provided with a direct source of outside ventilation air, heating hot water coil with valve control, filters, and a supply fan. Each air-handling unit distributes through a single zone distribution system all of which is exposed within the space and provides heated and ventilated air throughout the entire locker areas. All systems were noted to be clean, they were not damaged, and do appear to operate in a satisfactory manner. Each air-handling unit is also provided with a return air system all of which is functioning and the entire system is maintaining excellent ventilation control and temperature control as well.
- ?? Also located within the locker areas was a central exhaust system which consists of a galvanized sheet metal exhaust system located at the ceiling exposed within the space which communicates to exhaust fans. All systems do appear to operate in a satisfactory manner.
- ?? Also located within each locker area was exposed fin tube radiation located along the exterior walls. This fin tube radiation was a bare tube and fin arrangement which has a corrugated metal grill located over it. The entire installation is dangerous to the space occupants and it was also noted that the fin tube radiation was not provided with any automatic temperature controls. This fin tube radiation should be completely upgraded however, all ventilation systems located within the locker rooms are considered in very good condition and no recommendation for improvement are made.

WEIGHT ROOM:

- ?? The weight room is a small area located adjacent to the locker rooms and this area is provided with wall mounted fin tube radiation which is noted to be slightly dirty, contaminated, and slightly damaged. The fin tube radiation was not provided with any means of automatic temperature control. This condition should be improved upon.
- ?? The space was also provided with a central exhaust system which was exposed within the space. This exhaust system was noted to be slightly dirty and contaminated however, it does appear to function adequately. This exhaust system communicates to a roof mounted exhaust fan and as we understand it good ventilation control is maintained. Located on the opposite wall from the exhaust system is a supply grille which ties into the central ventilation system of the locker rooms however, this supply diffuser was blocked off with cardboard and is presently not providing any means of make-up air to the space. This condition is non-code compliant and should be improved upon.

AUDITORIUM:

- ?? The auditorium is provided with an overhead distribution system which provides a

source of supply ventilation as well as heating for the entire space. The duct distribution system is of the galvanized sheet metal design and provides supply air to a series of ceiling diffusers located within the ceiling plain. It does appear that by the size of the diffusers and the number of the diffusers that the overall supply being provided to the auditorium is undersized for its present application and population. This condition is non-code compliant and should be improved upon. At the time of this visit it was not possible to locate the air-handling unit however we were advised that a single air-handling unit serves this auditorium and is provided with a heating hot water coil with valve control, supply fan, filters, and a mixing box with direct outside ventilation air. As we understand it this air-handling unit is also consistent with the overall are of the building and based purely on age consideration should be given to upgrading at this time.

?? Located under the stage are two individual exhaust registers which communicate to roof mounted exhaust fans through a galvanized sheet metal exhaust system. It was noted that the exhaust registers were dirty and slightly contaminated however they were not damaged. As we understand the exhaust ventilation system does operate however at the time of our visit the systems were not operating and we could not verify this condition.

?? Located at the rear of the stage was a continuous link of fin tube radiation located along the exterior wall. This fin tube radiation was extremely contaminated and dirty and the overall condition would be considered very poor. We could not locate any means of automatic temperature control for this fin tube radiation. It was also noted that the stage area was not provided with any means of either exhaust or supply ventilation air and this condition is non-code compliant and should be improved upon.

CORRIDORS:

?? The individual communicating corridors were provided with wall mounted recessed convectors located throughout each corridor area. Each corridor convector was provided with a wall mounted thermostat for the control overall space heating. It was noted that the convectors were not damaged however, they were slightly dirty but as we understand it the systems do operate in a satisfactory manor and maintain reasonable space temperature control. It was noted that all equipment was consisted with the overall building age and based purely on age consideration should be given to upgrading at this time.

?? It was noted that there was no supply air exhaust ventilation air provided to any of the communicating corridors. This condition is non-code compliant and should be improved upon.

ENTRANCES AND VESTIBULES:

- ?? The individual entrances and vestibules were provided with wall mounted cabinet heaters which appear to be controlled through built in return air thermostats. All cabinet heaters do appear to function adequately and maintain reasonable space temperature control. The units were noted to be slightly dirty however they were not damaged and do appear to operate in a satisfactory manor. It was noted that all equipment was consistent with the overall building age and based purely on age consideration should be given to an overall upgrade at this time.
- ?? It was noted that the main vestibule entranceway adjacent to the administration area was provided with an inadequate amount of heat. The only heat which could be identified appeared to be a series of fin tube radiation located over the main entrance doors. With no vestibule interlock and without adequate fan forced heaters high amounts of cold infiltration air do circulate throughout the entrance lobby as well as the immediate corridor areas opening into this entrance vestibule. Consideration should be given to adding a vestibule interlock as well as fan forced heaters on each side of the door entrances to prevent this cold infiltration air.

ADMINISTRATION AREA:

- ?? The administration area is provided with varying lengths of fin tube radiation located along the exterior wall of each exterior space. All exterior office radiation appears to be controlled by a single thermostat which appears to relate to very poor automatic temperature control in the various spaces. It was noted that the fin tube radiation was slightly dirty and slightly contaminated however it was not damaged and does appear to operate adequately and is capable of maintaining reasonable space temperature control. It does appear that all equipment is consistent with the overall age of the building and generally consideration should be given to upgrading at this time.
- ?? There was no central outside ventilation air provided to the administration area. It appears that all ventilation air is provided through the use of operable windows. It was noted that there were many internal spaces such as corridors and conference rooms that were not provided with any means of either mechanical or natural ventilation air and this condition is non-code compliant and it should be improved upon.
- ?? The administration area was provided with a central air-handling unit which is of the 100% recirculation type located in an adjacent storage room. This air-handling unit is of the vertical discharge design and provides air-conditioned air through a single zone to all occupied areas. Each occupied space is provided with a single supply diffuser all of which were noted to be slightly dirty and contaminated however they were not damaged and do appear to operate in a satisfactory manor. All ductwork is of the galvanized sheet metal design and is insulated with a vinyl vapor barrier. This air-handling unit is also consistent with the overall age of the building and as we understand it does operate in a satisfactory manor. Since this unit is of the 100% recirculation type it does not meet the requirements of the mechanical ventilation and cannot be considered a ventilation source. The air-handling unit is provided with a

direct expansion cooling coil which communicates to an outside grade mounted air-cooled condensing unit. The overall system is considered in average condition and does maintain reasonable space temperature control and based purely on age consideration should be given to upgrading at this time.

PUBLIC TOILET AREAS:

- ?? The public toilet areas were provided with wall mounted exhaust grilles which communicate to roof mounted exhaust fans through a galvanized sheet metal exhaust ductwork system. Generally all grills were slightly contaminated and dirty however they were not damaged and they were noted to be antiquated. At the time of our visit the exhaust fans were not operating however as we understand it they are capable of operating. It does not appear that the code required amount of ventilation air is being provided at this time. It was noted that there was no mechanical supply ventilation provided to any toilet space however the entrance doors to each toilet area were provided with a louver. This louver is undersized for the amount of exhaust required and generally consideration should be given to an overall upgrade to the entire exhaust and make-up air ventilation system for all toilet areas.
- ?? The toilet areas were also provided with a limited amount of fin tube radiation which was noted to be contaminated and damaged in many locations. It does not appear that any thermostats were provided for this fin tube radiation and it does appear that all systems run wild and could generally over heat the spaces. Considering the very poor condition of all fin tube radiation and lack of control consideration should be given to an overall upgrade at this time.

CLASSROOMS:

- ?? The classrooms are provided with wall mounted classroom unit ventilators along the exterior wall. The unit ventilators are provided with the heating hot water coil with valve control, an outside air intake for general ventilation air, filters, and a supply fan which distributes heated and ventilated air to each space which is controlled through a wall mounted pneumatic thermostat. In each case the units were noted to be slightly dirty and slightly damaged however it does appear that all units are consistent with their age and considered in average condition. At the time of our visit many of the unit ventilators were not operating. The spaces were also provided with individual exhaust registers located on the wall at the opposite side of the unit ventilators which communicate to roof mounted exhaust fans through a galvanized sheet metal exhaust system. These exhaust registers were noted to be in good condition and were not dirty however at the time of our visit it did not appear that these exhaust system were operating. It does appear that all equipment and system are consistent with the overall age of the building and based purely on age consideration should be given to an overall upgrade at this time.

COMPUTER CLASSROOM LAB:

- ?? This area is identical to a typical classroom however in addition this space was provided with two individual window air-conditioning units. These air-conditioning units were noted to be slightly dirty and as we understand it is quite loud when they do operate. Although these units do serve their intended function consideration should be given to a more current technology air-conditioning system sized adequately for the application served.

MEDIA CENTER:

- ?? The media center was provided with three individual wall mounted classroom unit ventilators located along the exterior wall of the space. The unit ventilators were each provided with a heating hot water coil with valve control, a source of outside ventilation air, filters, and a supply fan which provides through the unit mounted discharge grille heated and ventilated air to the entire space. The unit ventilators were noted to be slightly antiquated however they were generally clean and not damaged and do appear to operate and maintain adequate temperature and ventilation control.
- ?? Located on the opposite side of the classroom unit ventilators was a single exhaust grille located approximately 8" above the floor which is intended to provide the code required of ventilation exhaust air. This grille was noted to be clean however antiquated. It does not appear that the grille is of adequate size for the area served and consideration should be given to an overall upgrade of the exhaust system.
- ?? Both the supply and exhaust ventilation systems for the media center were noted to be extremely antiquated and undersized for the application that they served and based purely on age and the undersized nature of the equipment consideration should be given to a complete upgrade at this time.
- ?? Also located within the media center were three individual window mounted air-conditioning units. These air-conditioning units were noted to be slightly dirty and as we understand it is very loud when they do operate. As we understand it these units do maintain reasonable space temperature control when required however considering the very crud application of these window air-conditioning units consideration should be given to providing a more current technology central air-conditioning system for the entire media center.