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TransAlta Tri Leisure Centre

Prepared for: TransAlta Tri Leisure Centre
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EXECUTIVE SUMMARY

Objective

To provide the TransAlta Tri Leisure Centre the information required to assess the present HVAC situation and to be able to make informed decisions on the replacement of the pool ventilation unit.

Goals

To provide a cost conscientious and effective solution to the TransAlta Tri Leisure Centre that will fulfill the requirements of the Tri Leisure Center and prevent further degradation of the building structure and to ensure a 100% customer satisfaction.

History

During the inspection process, it was discussed with Vivian Pratt that Nordic Mechanical Systems (NMS) would look at providing alternates to the existing ventilation unit. After looking into the direct fire make-up air option, it was found that this type of unit would actually add to the humidity problem of the pool. Even though this option provides the lowest initial installation cost, the operating cost would be very expensive. For this reason we decided not to include the direct fired make-up air option as part of this report.

The air handling unit which services the pool areas was installed new during the construction of the Tri Leisure Centre in 2002. The design intent of this ventilation unit is:

1. To provide a dehumidification function that will recycle the high humidity (Latent energy) taken from the pool area and reduce the cost of conditioning the outdoor ventilation air being introduced into the building.
2. Reduce the interior building humidity to a safe level that will not pose additional stress on the building envelope, causing premature failure of the building and its structural components.
3. To provide air quality that meets or exceeds ASHRAE Standards. To reduce mold, mildew, and toxic chemical levels that can build up and present environmental hazards to the pool staff often referred to as “sick pool syndrome”.

The present unit from our understanding has operated for a period of less than three years (up to 2005) with the dehumidification functions in working order. After this time the dehumidification function ceased to operate. Numerous operational issues have burdened the maintenance department with mechanical failures of the supply and return fans, VFD drives, mixed air dampers, exhaust air and outside air damper

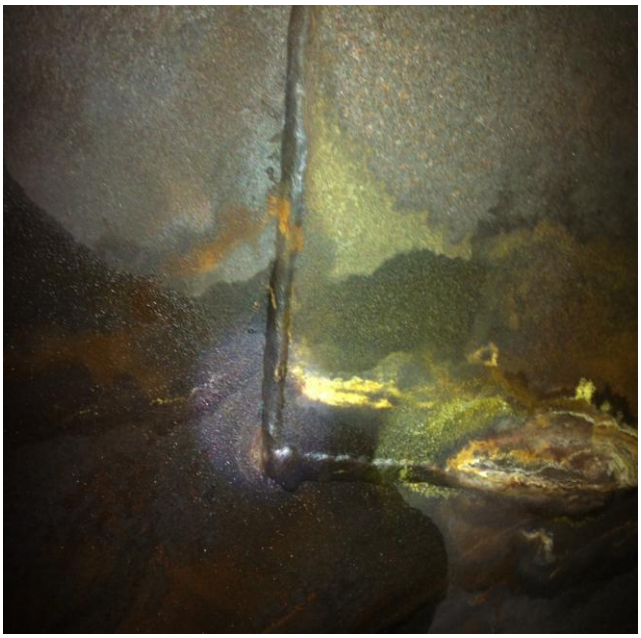
issues. These items are preventing proper operation of the ventilation unit which in turn is causing problems with air quality and condensation build-up within the building structure and within the ventilation unit causing premature equipment failure.

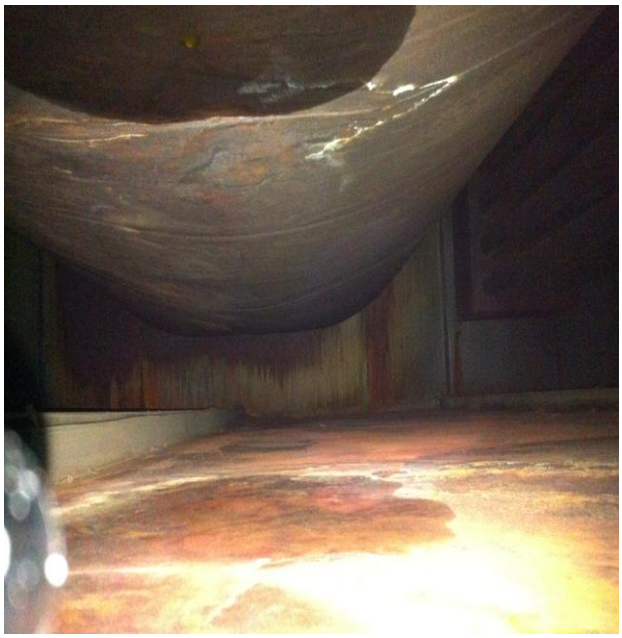
The unit has been a "White Elephant" and has burdened the maintenance department with high repair bills, down time, and aggravated operation for the last 10 years. As a general note, Engineered Air (supplier of existing unit) has said that the life expectancy of their ventilation units is between 8-12 years if properly equipped and operated. Other manufactures offer longer equipment life expectancies, but the operation of the equipment and facility has a lot to do with the increased life expectancy.

Our Findings

This Report was prepared "without prejudice". Our field inspections were done in conjunction with repairs to the heating section of the roof top unit, and in no way are they to be considered as the final inspection listing all possible deficiencies. Our finding is focused on problem areas that required immediate attention and to provide a solution. Not all equipment has been inspected and additional issues may come to light with a more detailed inspection given the appropriate time frame. A conclusive commissioning/field testing report can be prepared but is beyond the scope of this report.

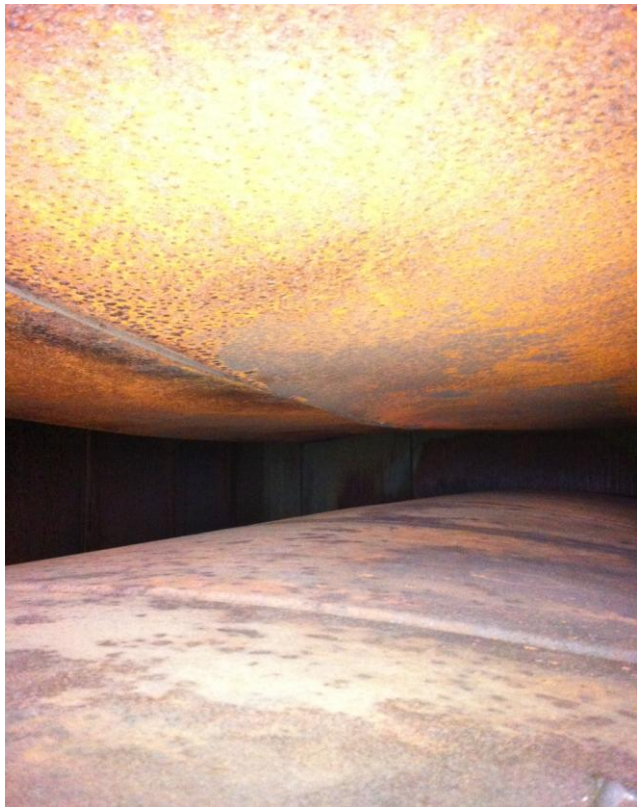
1. During the initial heating repair, numerous flame failures were noted and normal trouble shooting procedures were not successful. We determined that the heat exchanger needed to be inspected, as we suspected the pilot flame was being influenced by an outside source. Once the side panels were removed and access to the heat exchanger was gained, we found the source to our erratic flame

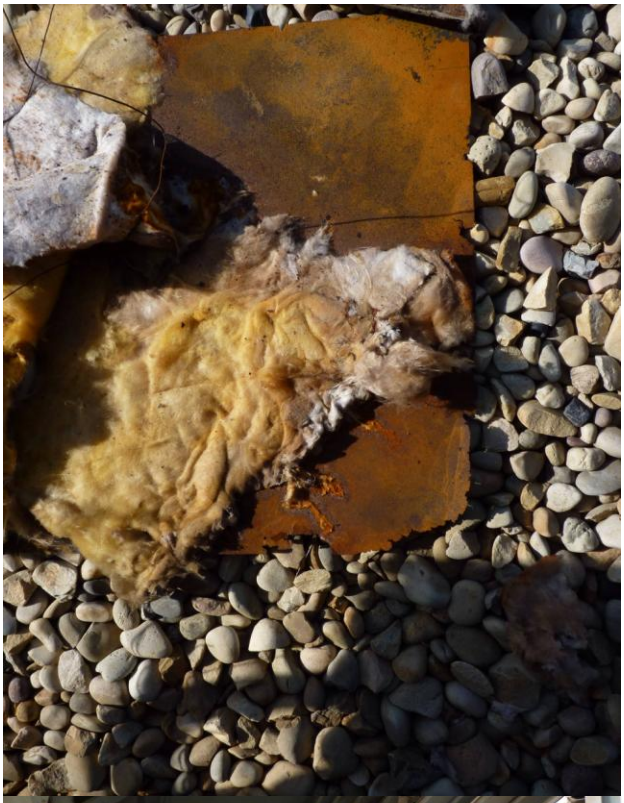




problem. We found numerous cracks and holes in the heat exchanger which was allowing the supply fan blower to blow discharge air into the heat exchanger causing the pilot flame to be moved off of the flame rod, causing the unit to trip.

2. During our inspection of the heat exchanger section we found that the wall and ceiling panels which are essentially a structural component of the roof top unit were so badly corroded that the inside metal



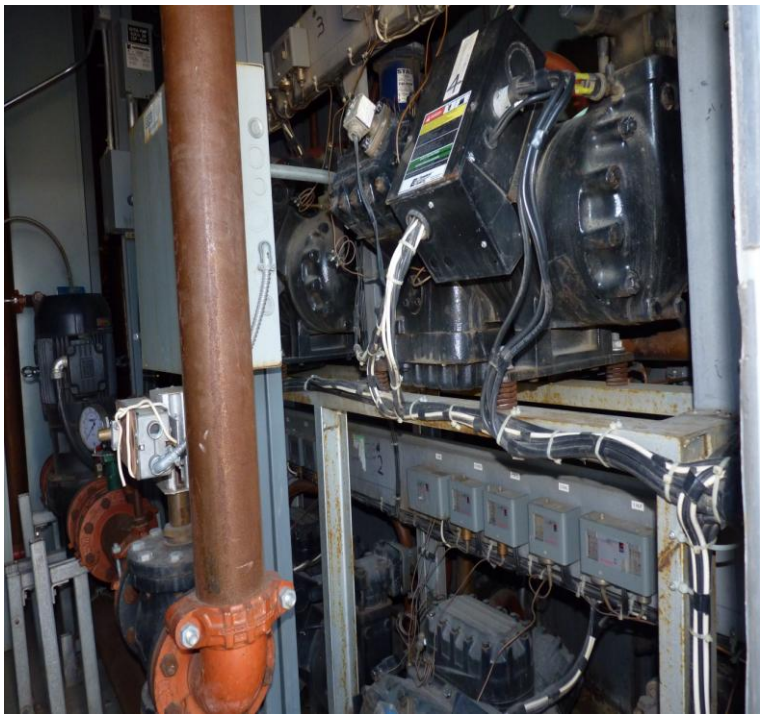


liner collapsed and fell to the ground. Corrosion of the heating section is severe and requires all panels to be replaced. Basically rebuilding the heating section from the ground up. Given the state of other repairs required for this unit this option is not financially attractive.

3. In addition to the heating section the mixed air damper section has dampers that are bent and rusted and are not providing a tight shut off, as result of frozen linkage and a defective damper

motors. In addition, moisture damage has aged these dampers beyond economical repairs.

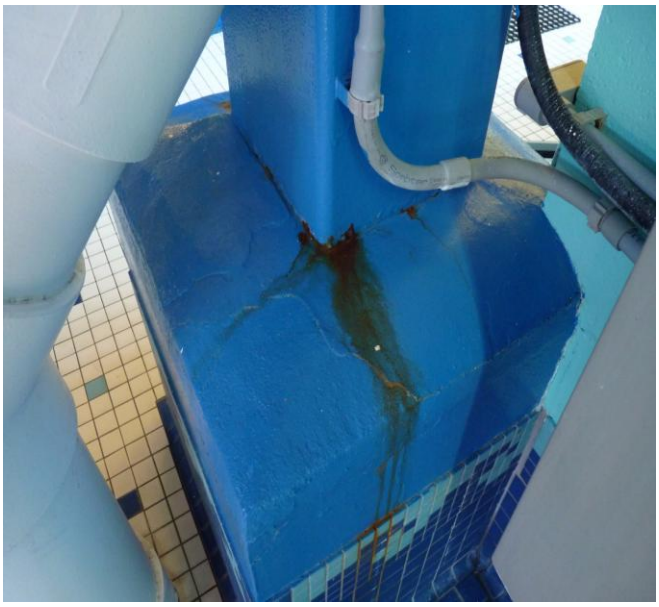
4. The reheat coils are losing their protective hirisite coatings. As you can see in the picture long strings of this coating is coming off. Since there are two coils within 5 feet of each other and the other coil is ok I suspect a problem with the application of the protective coating during the manufacturing process.
5. The return air duct fiberglass liner is saturated with water and is growing mold and becoming a virus trap. This condensate is also causing the duct work to corrode and become unsightly as this duct work is above the public viewing area. This duct section will need to be replaced to remedy this problem.
6. The dehumidifier section of the roof top unit is defective and loses refrigerant. This section has not operated for 7 years, and we assume it is too expensive to repair. No additional time was spent in investigating or troubling shooting the refrigeration system.



7. Supply air ducting does not cover all the exterior walls, diffuser placement is incorrect and conditioned air is not being effectively used to your benefit. A new ducting layout is essential and vital for the correct operation of your pool space. Presently supply air is being blown across the water surface, compounding the problem of adding more moisture to the pool area by evaporating pool surface water. Some of the supply air is short circuited back to the return air duct due to the poor placement of supply air discharge grills.

8. Building humidity levels have not been able to be kept within safe levels over the last 7 or 8 years due to the mechanical issues with the roof top unit, and have caused problems for the pool structure. High humidity levels have caused condensation to build up with in the steel support columns and they now shows signs of drainage at the base of these columns. Requires additional time to investigate.

9. The roof deck is rusted, and in one place has perforated the roof deck. Additional time is required to investigate the source of the leak, and determine if the leak is condensate or an actual roof leak. A Q deck patch is needed to be welded in place and painted with epoxy. A roofing contractor will need to be consulted for pricing.



10. Paint on the roof deck and beams are discolored indicating corrosion is forming under the paint. A painting contractor should be consulted to look further into this issue.

11. Possible moisture migration through to the outside is a cause of concern that requires additional time to research a solution. The wall vapor barrier will need to be repaired and the exterior wall refinished.

Course of Action

Over the last 10 years high humidity levels, incorrect air diffuser placement and equipment failure has placed a toll upon the building mechanical and its structure. For the TransAlta Tri Leisure Center to continue to provide services to the tax bases of the municipalities, it will require immediate repairs to reduce future structural and mechanical damages. The order in which to perform these repairs in our opinion is as follows:

1. Install a new roof top ventilation unit that is properly specified to provide a long service life. Installing this unit will control the humidity levels and reduce the damaged caused by condensation. Controlling the humidity will allow the facility to function correctly without the fear of causing more damage as time goes on while still budgeting for future repairs. The energy recovered from the dehumidification process will be pumped into heating the pool, reducing your gas consumption for process.

2. Properly maintaining your existing ventilation units and keeping them functioning properly. If the ventilation units fail then humidity levels will increase, building air pressures are not maintained and condensation occurs, starting the damage cycle over again, eliminating previous gains done after the repairs are completed.

3. Pool area ducting layout is absolutely crucial, it is vital for the airflow to fully cover all exterior walls and glass with sufficient air flow to prevent condensation on the these surfaces. Air changes per hour must be sufficient to prevent "sick pool syndrome" affecting the occupants of the pool area. Air flow across the pool surface must be very low to prevent evaporation of the pool water and lowering the water temperature, thereby increase gas consumption and energy required to reduce the humidity levels. New fabric ducting installed in place of the old ducting will be less expensive to install, create advertising space, and portray a fun recreational atmosphere with the rich color choices available.

4. Setting up safe guards to prevent accidental over dose. Excessive chlorine will attack all metals within the building envelope and roof top ventilation units. Also contributes to sick pool syndrome affecting the occupants of the pool. Chlorine monitors can be installed that will alert the staff in such a condition occurs.

5. Repairs to the roof Q-deck and membrane to eliminate roofing leaks. Perform an infrared scan during the winter months to determine the points of water migration.

6. Sandblasting, repairing and painting of all corroded surfaces during the shutdown period.

Conclusion

This report details some of the issues that were found during our recent site visit. With the heating season just round the corner and long delivery times on equipment (24 weeks plus), it is imperative that an action plan be implemented as soon as possible. Control of the humidity levels within the pool structure in very important to the longevity of its structure and to protect the Tri Municipalities investment. The structure of this facility is degrading by the day and requires extensive mechanical and structural repairs to bring it back to its original state. Temporary repairs to the heat exchanger will need to be done to carry the rooftop unit into the heating season until an action plan is implemented.

Just a note about your power consumption, you can expect your power usage to go up, presently you are not using the dehumidification functions of your roof top ventilation unit, therefore you are not using any power to operate the compressor section, hence no power consumption. So over all you can expect an increase in power consumption and a reduction in natural gas consumption. This is a necessary cost that will reduce your building maintenance cost and protect your building from damaging condensation issues.

Respectfully Submitted

Larry Cox

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