

File 421442

August 18, 2021

David Tompkins
Manager of Facilities, Parks & Recreation
Township of Brock
1 Cameron Street East
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Re: Rick MacLeish Memorial Community Centre, Cannington
Roof Deck Assessment

Dear David:

We have completed a structural assessment of the wood roof deck at the Rick MacLeish Memorial Community Centre in Cannington. This investigation was completed as a follow up to our 2020 visual assessment in which we visually assessed the roof after wood residue and carpenter ants were observed on the floor of the arena (Photograph 1). For this follow up investigation, roofing materials were removed and a close examination of the roof deck was completed in representative areas.

We note we have also completed visual structural assessments of the building for the Township approximately every 3 years since 2011.

As noted in our 2020 report, we understand the Township is currently evaluating whether to replace the roofing materials. In that report, we recommended a follow up intrusive investigation be completed to more closely investigate the areas of concern and estimate the extent of the deterioration since the repair work would be completed in conjunction with the roofing replacement project.

SITE VISIT & OBSERVATIONS

We visited the site on July 21 & 22, 2021 to assess the roof deck in the area where the residue from the insect damage was present and at other representative locations. The roof of the arena is barrel shaped and framed with tongue and groove wood decking supported on 2x10 roof joists and glulam arched trusses. On top of the decking, there is a waterproofing membrane and metal roofing.

A contractor (Danval Contracting) was procured by the Township to supply and operate a boom lift and to remove roofing materials to allow for close examination of the roof deck from above.

We understand the residue and carpenter ants have only been observed on the floor of the arena in one location. We met with the community centre staff while on site and they advised no signs of wood residue

or carpenter ants have been observed other than the area previously identified. Community centre staff did note that one area of the roof at the south-east corner of the building has recently been actively leaking (Photograph 2). We understand active leakage has been an ongoing issue in the building.

Interior Assessment

We visually assessed the underside of the roof deck and wood joists from the ground and from a boom lift at various locations. Some close examination was completed however access for close examination was mostly limited due to the various cables and bracing present in the arena. Signs of water penetration were present throughout the arena (Photograph 3). In the area of the wood residue, ants were observed on the underside of the roof deck, and the roof deck had significantly deteriorated in localized areas (Photograph 4 & Photograph 5). We prodded the roof deck with a screwdriver and found the deck to be soft at multiple locations in the area where ants were present, and we were able to fully penetrate the roof deck at one location (Photograph 6). The roof deck and wood joists were prodded at additional representative locations in the arena and no other signs of significant deterioration were noted.

We measured the moisture content of the lumber deck at representative locations. Lumber is typically considered dry if the moisture content is at or below 19%. In the areas of the roof deck that appeared to be dry and did not exhibit signs of water leakage in the past, the moisture content was measured to be 10%-15%. At areas of the deck where there was evidence of previous water leakage, the moisture content measured was between 30%-60%. This reading is above what would be considered dry and is at levels that could potentially allow mold growth to begin.

Exterior Assessment

The existing metal roofing consists of corrugated sheets with exposed fasteners, fastened to the deck below. Each panel is approximately 3'-0" wide by 18'-0" to 20'-0" long and the panels have a profile that matches the curve of the barrel roof (Photograph 7). There are a total of five rows of panels across the width of the roof. It appears the metal roof has been painted in the past, possibly more than once, likely to prolong the life of the metal roof. Below the metal roofing is a bituminous built-up waterproofing membrane with a layer of roofing paper between the deck and the waterproofing. The waterproofing membrane had deteriorated (cracked) at various locations and the deck was visible through the waterproofing joints in localized areas.

The existing metal roof was removed at four locations (see markup attached). The existing waterproofing on the roof deck was removed in 1'-0" x 1'-0" squares at representative locations within the extents of the metal roof removal to closely review the condition of the wood deck.

In the area where the ants were present, six panels at the eaves were removed. Ants were present on top and within the joints of the decking. The roof deck was prodded from above and the areas of deterioration appeared to mirror the results of the investigation at the underside of the deck (Photograph 8). The extent



of the ants and the deteriorated deck is within approximately a 10'-0" by 10'-0" area. The moisture content measured was approximately 30%.

Above the location where the arena staff reported the leak, two adjacent roof panels at the second row above the eaves were removed (Photograph 9) and the waterproofing was removed at various locations. No ants were present, and no signs of deck deterioration were noted. The wood moisture content measured was approximately 30% in the areas of water staining.

One panel was removed at two other locations selected at random; one on the west side of the building at the eaves (Photograph 10) and one at the north end of the building on the top of the roof (Photograph 11 & Photograph 12) At both locations, no signs of deck deterioration were noted, and no signs of water leakage were noted. The moisture content measured was between 5%-10%.

CONCLUSIONS & RECOMMENDATIONS

Our conclusions and recommendations are as follows:

- We confirmed ants are present within the roof deck and have contributed to the deterioration of the roof deck in a concentrated area measuring approximately 10'-0" by 10'-0".
- We did not observe ants at any of the other inspected locations, and we understand there is no history of ants/residue falling to the rink floor in other areas of the building. We therefore believe the extent of insect damage is limited to the 10'-0" x 10'-0" area noted.
- The wood deck in the area where the ants were observed has significantly deteriorated and must be replaced.
- The remainder of the wood deck was found to be generally in satisfactory condition.
- The ongoing water penetration through the existing roofing system has allowed water to soak the wood deck to varying levels throughout the arena roof, however based on our observations, this does not appear to have led to rot, mold growth, or other deterioration that presents a structural concern at this time, other than in the area noted above.
- The existing metal roofing and waterproofing membrane is in poor condition and requires replacement, as previously noted in our 2020 assessment report.

The estimated quantity of deck removal and replacement is 100 square feet. If the Township proceeds to procure a contractor to replace the roofing materials, we recommend a quantity of 250 square feet of deck replacement be carried to account for any hidden deterioration that may be discovered during construction and for the replacement of any excessively wet areas that are found during construction. We estimate the cost to replace this area of deck to be \$30,000 to \$35,000 assuming the work is completed as part of a larger roofing replacement project.

To address the deteriorated decking, the following work would be required during construction:



- Expose and assess the roof deck to verify the extents of repair with the contractor and determine if any other areas of the wood deck have deteriorated and require decking replacement.
- Hire an insect extermination service to confirm the extent of the ants and remove the ants as required.
- For the ice and water shield to properly adhere to the roof deck, the deck must be dry. Therefore, once the deck is exposed, sufficient time must be provided to allow the deck surface to completely dry prior to installation of a new ice and water shield. After a reasonable amount of time has elapsed, any areas of the roof deck that still contain excessive moisture should be removed and replaced to facilitate the installation of a new ice and water shield.

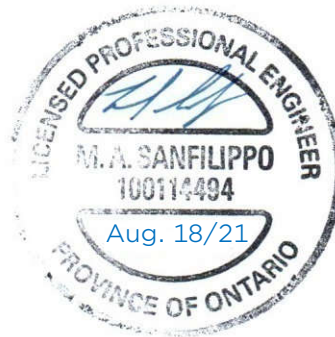
We trust this is satisfactory for your purposes at this time. If you have any questions or require any additional information, please do not hesitate to contact us.

Yours truly,

Tatham Engineering Limited



Patrick Costello, B.A.Sc., EIT
Intern Engineer
PC/MAS:pc/mas



Michael Sanfilippo, B.Sc.Eng., M.P.L., P.Eng.
Senior Engineer, Project Manager





Photograph 1: Wood residue on the arena floor due to ant damage above



Photograph 2: Reported roof leak at south-east corner of the building





Photograph 3: Area of water staining at north end of arena



Photograph 4: General area of ant damage seen from below





Photograph 5: Ants observed at underside of roof deck



Photograph 6: Area of deck deterioration where instrument fully penetrated roof deck





Photograph 7: Overview of existing metal roof



Photograph 8: Area of ant damage and deteriorated roof deck from above





Photograph 9: Roof deck exposed at reported roof leak at south-east corner of building



Photograph 10: Exposed roof deck at randomly selected location at west side of building





Photograph 11: Overview of exposed roof deck at randomly selected location at north end of building



Photograph 12: Close-up of exposed roof deck at north end of building

