



Prolonging the Life of your Roofing System

Sometimes it's all about the icing on the cake

Roofing systems make up the top covering of a building, providing shelter and protection against rain, snow, sunlight, fluctuating temperatures and other adverse conditions. In other words, the roof is an integral part of the building envelope and shouldn't be neglected.

Given that most roofs aren't built to endure decades upon decades of exposure to the elements, there comes a time in every building's lifespan when the roof—or components of the roof—will need to be replaced. As Stephen Epp, Project Engineer with RJC Engineers, tells his clients, imagining your roofing system as a multi-layered cake can be a helpful way to understand its components.

"Cake is a universally understood dessert that can have just as many different options as a conventionally

insulated commercial roof system, and the layers correlate nicely," he says. "Think of the icing on top of the cake as the waterproofing membrane, and the top crust of the baked cake as the overlay sheathing to support that membrane layer. On the inside, the moist layers of cake are your insulation layers."

Continuing further down, Epp compares the bottom crust of the cake to the air vapour barrier and the plate the cake sits on to the structural deck. Not only does it create a nice, relatable image of an otherwise complicated system, seeing the roof like a multi-layered cake also helps illustrate the point that building owners don't always need to replace the entire system when undergoing a replacement project.

“With the right conditions, it is possible to replace just the icing and leave the rest of the delicious cake all the way down to the plate,” he says. “This prolongs the life of the components that are still functioning optimally, potentially saving your team considerable time and money.”



“Skinning” vs. Full Replacement

With proper installation and regular maintenance, low-slope commercial roofs tend to have a typical life expectancy of approximately 20 to 25 years in the Canadian climate. When the time comes for a life-cycle replacement project, Epp advises proactive building owners to consider whether the roof has been performing as it should.

“If the roof is generally aging but still functioning as intended with no major leak events or concerns, your team could consider an approach referred to as skinning,” he says. “This approach includes removing and replacing just the waterproofing component of the roof, leaving the insulation layers and the air vapour barrier intact. So, when using our layers of cake analogy, skinning would replace just the icing and the top crust, leaving the bulk of the delicious cake as it was.”

According to Epp, skinning can save substantially on demolition costs, labour costs, and on new material costs for replacing the entire assembly. While each skinning project is unique, owners could anticipate up to 20 to 25 years of additional performance from their existing roofs depending on the circumstances. That said, skinning should only be considered if the

underlying layers of the cake are in good condition and fully adhered to the existing structure that also must be in good condition.

“When eating cake, you normally consider the type of plate holding it,” Epp explains. “If a heavy cheesecake is placed on a flimsy paper plate, you could have issues. If an ice cream cake sits on a paper plate too long, the plate can get mushy.”

The structural deck must be able to support both wind uplift loads, the weight of the roof itself, and loading from rain or snow. There is also the opportunity to add insulation for increased thermal performance, or a tapered insulation package to improve drainage. Insulation may even be added on top of the existing system, then a new waterproofing membrane installed.

“The key is to ensure the existing roof is in good condition, not saturated, and fully adhered to a solid structural deck below,” he says. “The air vapour barrier and insulation will remain in place, and it may act as the substrate for your new roof system.”

Testing your Roof’s Condition

To determine a roof’s condition and adhesion, a series of exploratory openings and wind uplift tests may be conducted. As Epp points out, if there are isolated areas of saturated materials, these can be replaced on a case-by-case basis.

“If the roof is not fully adhered to the deck below, owners may consider applying mechanical fasteners through the existing system before the new roof system is installed,” he says, adding that one of the biggest indicators that a roof may not reach its intended service life is drainage. An insufficient number of drains forces water to travel a long distance before it reaches a drain, increasing the chances of ponding water. Meanwhile, a lack of slope at the membrane level can also lead to water ponding. Membranes are not typically intended to remain submerged for extended periods of time and seams in the membrane can prematurely fail through exposure to repeated freeze thaw cycles of the water ponding on top of it.”

In any roof replacement project, Epp says owners should review the number of drains, how far the water needs to travel, the slope of the deck and note if there are any major obstructions in the flow path.

“The number of mechanical units and roof mounted equipment is also a good predictor of service life,” he adds. “Roofs with a lot of equipment typically equates to many visits by maintenance workers.”

Of course, traffic on the roof increases the risk of material being dragged across the roof, or sharp tools being dropped, or even workers inadvertently dragging their feet across the roof leading to punctures, scrapes, gouges, or granule loss. While roof membranes are designed to accommodate this type of activity, small incidents can become big problems over time. Owners may want to consider increasing the membrane thickness or adding sacrificial walkways around units where the highest traffic is expected.

There are many nuances when it comes to roof maintenance and replacement. As building operators know, each property is unique and comes with its own set of challenges. Having a third party perspective from a roof consultant is always recommended before entering into a costly project.

For more information on preserving the life of your commercial roof, or for cake recommendations, visit rjc.ca or contact Stephen Epp directly at sepp@rjc.ca.

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