The Case Against Torch-on

Summary

This document provides insight into the many issues associated with the use of SBS Modified Bitumen/Torch-on membrane for roofing purposes within BC:

- **Poor Return on Investment:** The initial installation cost of SBS/Torch membrane is currently similar to that of other locally available alternative flat/low slope membranes such as TPO, PVC and EPDM, collectively referred to a "single-ply" membranes. SBS/Torch-on, however, represents a much poorer return on investment in that it is only capable of providing a service life as little as half that of single-ply membranes.

- **Restrictive Warranties**: The service life provide by SBS Torch-on can be dramatically shortened when subjected to ponding water. For this reason, SBS/Torch-on manufacturer warranties contain clauses to render them void if a roof does not have a minimum 1% slope to its drains or it ponds water for relatively short periods of time. Single-ply membranes are unaffected by ponding water. For example, alternate uses for EPDM membrane are for pond and gutter lining, and PVC membrane is used as swimming pool liner.

- **Significant Fire Risk:** Installed using powerful propane torches, SBS/Torch-on caused fires have resulted in many millions in BC property losses and represents the threat of possible injury and death. More than 20years ago New York City made it a felony to use a propane torch on a roof, and the National Roofing Contractors Association (North America's largest) no longer recommends the use torch-applied membranes on combustible roof surfaces.

- **Contribution to Global Warming:** Of the available alternatives, the manufacturing of SBS/Torch-on has been evaluated as providing the greatest negative contribution to global climate change.

- **Non-Recyclable Product:** With SBS/Torch-on continuing to hold a 75% market share within BC (compared to less than 5% elsewhere), and SBS/Torch-on only being capable of providing a service life of 15years, the environmental reality is that every year 75% of the flat roofing being installed will be in a landfill within 15years to begin the leaching asphalt and "modifier" chemicals into the environment for decades and centuries.

As a Province we can and need do better concerning this issue. Given the current structure and financial interests within BC's roofing industry, leadership on this issue it not going to come from and it. The current level of SBS/Torch-on use within BC is incompatible with the BC Government's stated "Clean BC - Roadmap to 2030" climate and sustainability objectives and it is time for it to take initiatives regarding this issue.

1. **<u>SBS Modified Bitumen (i.e. Torch-on) Membrane</u>**

   - Asphalt based "SBS Modified Bitumen" (commonly referred to as "Torch-on") roofing membrane was introduced to the North American and BC markets in the late 1980s as a replacement for "Built Up/Tar and Gravel" (commonly referred to as "BUR") roofing.

   - SBS/Torch-on membrane is installed using powerful open flame propane torches.

   - After its introduction, SBS/Torch-on membrane rapidly came to dominate the BC flat/low slope roofing market. Ten years ago, SBS/Torch-on membrane reportedly accounted for up to a 90% market share of BC "flat/low slope" roofing membranes. Today SBS/Torch-on's market share has been reduced somewhat to 75% due to a slow increase in the use of "single-ply" TPO, EPDM and PVC membranes. The following information was provided in a November 2020 roofing presentation to PAMA (Professional Association of Managing Agents) by J. Pitre of Trimstyle Consulting Inc, an RCABC affiliated roofing consulting firm. During the presentation it was stated that these were the RCABC's most recent market share figures.

Better Understanding of Roofing Assemblies

Low sloped

- The roof membrane is the most important component of the roof because it is the waterproofing layer. Roof membranes can be divided into three major categories.

B.U.R.'s or Tar & Gravel (less than 5%)
2 ply's SBS (75%)
Single Ply's (20%)

Better Understanding of Roofing Assemblies

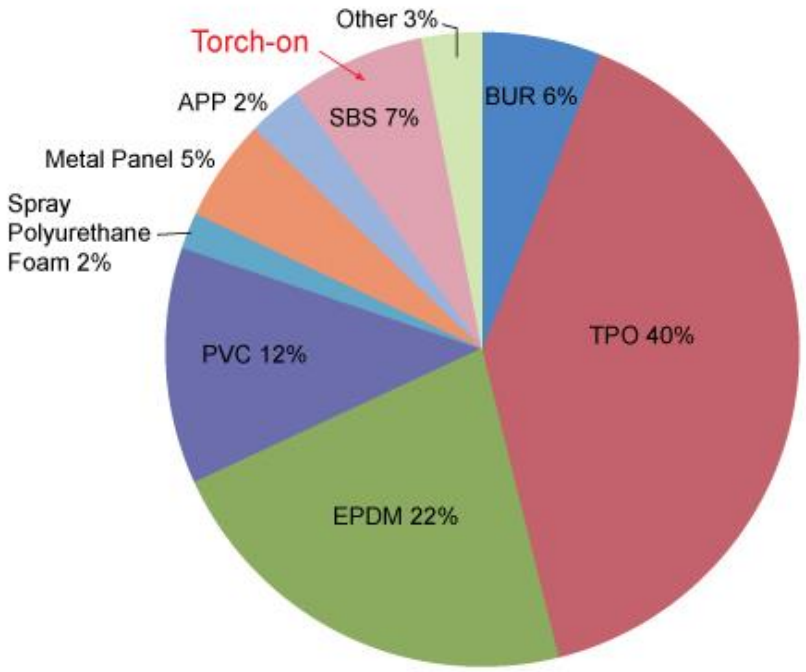
Low sloped- Single Ply

As mentioned, single ply roof membranes became more vogue after the rise of oil pricing in 1973.

Presently there are 3 main membrane types:

1. EPDM (70% BC market share)
2. TPO (25%)
3. PVC (5%)

- While SBS/Torch-on membrane may dominated the BC market, this is not representative of the rest of North America. While data for Canada is not available, the below information was developed by the US "National Roofing Contractors Association" (NRCA), North America's largest roofing association.



Product mix of new low-slope construction sales by roof system type. Source NRCA, 2016.

- Adjusting this NRCA chart to eliminate the non SBS/Torch-on and single-ply products to put the chart on a comparable basis to the percentages provided for the BC, US single-ply combined shipments accounted for a 91% market share as opposed to BC's 20%.

- The question is why BC is so opposite to the rest of North America? One response often heard is that BC has a marine climate and that SBS/Torch-on membrane is the better choice in this environment. To judge the validity of this response, one need only Google Map view Vancouver and Seattle and note the much higher number of white roofs seen in Seattle. Reportedly there are now only a handful of Seattle roofing companies still offering to install SBS/Torch-on membrane.

  Another interesting fact concerns the 2010 Vancouver Winter Olympics for which sustainability was a featured aspect. An RCABC magazine article titled "A Close Encounter with TPO" highlighted that of 24 roofing projects associated with the Vancouver Olympics, 23 were single-ply TPO installations, https://issuu.com/rcabc/docs/084553_rbcfall2010. While SBS/Torch-on was judged not to be compatible with the Vancouver Olympics' sustainability objectives, after the Games the BC roofing industry immediately reverted back to SBS/Torch-on being the dominant flat/low slope roofing membrane installed in BC.

2. <u>Issues Concerning SBS/Torch-0n Membrane</u>

- There are five main categories of concern pertaining to SBS/Torch-on roofing:

  - **<u>Poor Investment:</u>** While initial project costs can be similar, single-ply membranes provide much better value due to their being able provide much longer service lives than SBS/Torch-on. The following is from a 2014 "Facility Condition Report - Roofing" prepared for strata by a RCABC affiliated roofing consultant, "Newer asphalt assemblies are presently being observed as lasting only 15-18 years due a drop in asphalt quality". More likely than not the majority of SBS/Torch-on roofs being installed today will need replacement in less than 15years.

    Concerning single-ply membranes, one research study concludes "EPDM Easily Lasts More Than 30Years", https://roofingmagazine.com/epdm-service-life/, and another study concluded that 90mil EPDM can provide a service life of 50years or more. Extended services lives are also provided by TPO and PVC membranes with manufacturers offering combined material and workmanship "system warranties" of up to 30 years.

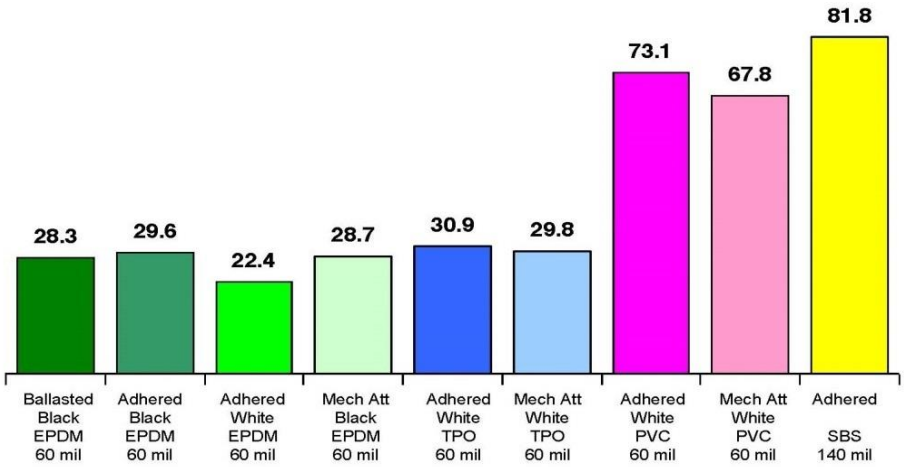
  - **<u>Inferior Warranties:</u>** One reason for SBS/Torch-on providing a short service life is that it does not stand up well when subjected to ponded water. Due to this reason SBS/Torch-on manufacturer warranties are short and voidable if a roof does not incorporate sufficient slope or has areas that allow ponding water to stand for any length of time. From the Soprema website:

- "*SOPREMA will not be held liable in the following cases"* one of those being, "*Insufficient positive slope or inappropriate drainage, causing premature loss of granules"*.

- *In all cases, roofing systems must have a minimum slope value of 1%. Premature granule loss due to stagnant water is not considered a defect of materials provided, but a result of insufficient slope. It is therefore not covered by the warranties.*

None of the single-ply membranes are affected by standing water and as such do not have this type of restriction associated with them. In fact, the greatest alternate use for EPDM membrane is pond and gutter lining. Prior to being used for roofing, PVC membranes were first used as swimming pool liner. This is to emphasize the point that single-ply membranes are in fact more suitable for BC's West Coast Marine Climate than is SBS/Torch-on membrane.

- **Most Environmentally Harmful:** Of the available alternatives, SBS/Torch-on roofing is the most environmentally harmful product to both produce and dispose of. The following table highlights that SBS/Torch-on is the most harmful membrane to produce in terms of "Contribution to Global Climate Change". See: https://epdmroofs.org/wp-content/uploads/2018/04/2010_05_30_LifeCycleInventoryAssessmentOfSelectedLowSlopeRoofingSystemsInNorthAmerica.pdf



Global Warming Potential (GWP) for Widely-Used Low-Slope Roofing Systems
Kg CO^2 Equivalent per M^2 of Installed Membrane
Source:"EPDM Roofing Association Life Cycle Inventory & Assessment.." The GreenTeam, Inc. (2009)

As shown by the below table, in comparison to the single-ply membranes, SBS/Torch-on needs to provide a much longer service life (i.e. of nearly 55years) to reach a carbon footprint breakeven point. The table further shows that only the

service lives provided by TPO and EPDM membranes are of sufficient length to exceed their calculated breakeven points.

FIGURE 1. ROLE OF SERVICE LIFE

	Membrane	System	Global Warming (Kg. CO^2)	Min. Service Life to Achieve Equivalency[1]
EPDM	60 Mil Black	Ballasted	28.3	19 Years
EPDM	60 Mil Black	Adhered	29.6	19.8 Years
EPDM	60 Mil Black	Mech. Att.	28.7	19.2 Years
EPDM	60 Mil White	Adhered	22.4	15 Years
TPO	60 Mil White	Adhered	30.0	20.7 Years
TPO	60 Mil White	Mech. Att.	29.8	20 Years
PVC	60 Mil White	Adhered	73.1	49 Years
PVC	60 Mil White	Mech. Att.	67.8	45.4 Years
SBS	140 Mil	Adhered	81.8	54.8 Years

[1]Using a comparative service life of 15 years for the lowest GWP system (fully adhered white EPDM)

The implication here, is that a first installed SBS/Torch-on roof will have been in a landfill for some 40 years (along with two other replacement roofs for shorter periods of time) before the first roof will have reached its calculated 55year carbon footprint breakeven point.

- **Non-Recyclable:** While recycling is not generally available in BC, it can potentially be done for single-ply membranes. Currently, the best opportunity for recycling is Duro-Last PVC where old membrane can be recycled into a variety of products such as gymnasium flooring. One recent Fraser Valley re-roof project resulting from a fire saw four tons of Duro-Last PVC returned to the US for recycling. For the 2012 London Summer Olympics, where PVC was widely used, the requirement was that installed PVC membranes needed to incorporate a minimum of 30% recycled material.

  Recycling is not currently or nor is it likely to ever be an option for SBS/Torch-on. Once in a landfill SBS/Torch-on commences to leach asphalt and "modifier" chemicals into the environment for decades and potentially centuries thereafter.

- **Fire Risks:** SBS/Torch-on roof fires are a common occurrence. When noticed quickly, most are extinguished by the roofing crew. A smaller number require the assistance of the local fire department to extinguish but never receive any press coverage. The smallest number are the truly large fires that have received media coverage. Following are pictures of three of these.

2018 Kelowna “Waters Edge” Strata Fire

2015 Vernon Federal Government Office

2013 New Westminster Columbia Street Fire

Perhaps the most dangerous fire threat posed by SBS/Torch occurs with respect to reroofing projects. The issue involved is that of torch flames being allowed to lick down into old, dry attic space to then smolder for hours before erupting. This is suspected to have been the case concerning the above pictured 2013 New Westminster Columbia Street fire, said to be the City's largest in over 100years. This fire wasn't noticed until it had finally erupted around 3:00am in the morning and ended up leveling two historic buildings. This was also the case regarding a 2004 Abbotsford Mennonite Church fire which didn't erupt until approximately 10:00pm resulting in the total loss of the building. In this case, a 2010 BC Supreme Court decision assessed a $2.3million judgment against the roofing company involved, for details see: https://www.bccourts.ca/jdb-txt/SC/10/02/2010BCSC0223.htm

Other relevant points concerning SBS/Torch-on fire risk:

- Over 20years ago New York City banned the use of propane torches on roofs stating that: "The penalty for violating these rules, built into the rules themselves, became arrest for reckless endangerment of property. Further, anyone sanctioning the illegal use of propane on roofs, including board members, lawyers, engineers, or architects, attorneys who draw up contracts, managing agents and roofing companies, can all be subject to arrest", see: https://www.thefreelibrary.com/New+law+affects+entire+roofing+industry+in+city.-a063017880

- Within the past several years, in recognition of the fire risks involved with SBS/Torch-on roofing, the NRCA finally took the position of no longer supporting its use on combustible roof decks.

While there remain valid uses of SBS/Torch-on membrane for such things as waterproofing below ground concrete walls and other concrete surfaces, there are simply no valid reasons for needing to accept the fires risks associated with installing it over combustible roof surfaces as is now formally recognized by the NRCA.

3. <u>Need for Legislation to Restrict the Use of SBS/Torch-on Within BC</u>

- Materials used for roofing are significant with respect to the issue of Climate Change. It is estimated that building construction accounts for up to 39% of the factors contributing to Climate Change. By comparison vehicles are estimated to contribute 22%. As well, its estimated that buildings cover up to 25% of a typical town or city's land area. As such, within the context of fighting Climate Change, the materials we use for roofing, and in particular flat/low slope roofing, matters and SBS/Torch-on is simply not a product that should be being installed in BC.