CIVIL ENGINEERING STRUCTURES

WATERPROOFING SOLUTIONS FOR BRIDGES, PARKING DECKS, AND CIVIL ENGINEERING STRUCTURES

SOPREMA®

SOPREMA®

100 YEARS OF EXPERTISE

CIVIL ENGINEERING STRUCTURES

WATERPROOFING SOLUTIONS

FOR BRIDGES, PARKING DECKS, AND CIVIL ENGINEERING STRUCTURES

Since its founding over 100 years ago, SOPREMA has been recognized worldwide for its bituminous waterproofing products applied to civil engineering structures.

Waterproofing civil engineering structures is essential, because it protects concrete and its steel reinforcement, while preventing its premature degradation. Waterproofing membranes are flexible and protect the concrete with its microcracks by moving with it, preventing water and de-icing salt from entering and corroding the steel reinforcement.

SOPREMA developed a wide range of accessory products to adapt to the various types of civil engineering structures, namely **bituminous waterproofing (the ANTIROCK and TRAFIKROCK lines)** and **liquid waterproofing (the ALSAN CIVIL line)**. Whether to waterproof or protect bridges, dams, parking lots, tunnels or civil engineering structures, our **bituminous waterproofing (ANTIROCK and TRAFIKROCK) and liquid waterproofing (ALSAN CIVIL) products** can be adapted to any design, regardless of the size or complexity of the works.

SAMUEL-DE CHAMPLAIN BRIDGE, Montréal (Canada)

MANOSQUE BRIDGE
Durance (France)

HIGHWAY
(Greece)

HIGHWAY
(Greece)

BITUMINOUS WATERPROOFING

SOPREMA has been using bituminous membranes covered with asphalt on civil engineering structures for over 100 years. Bitumen products modified with SBS polymers offer peace of mind thanks to their excellent durability, versatility and high resistance to harsh weather conditions. In addition, they can be installed on bridges, parking decks, and other civil engineering structures.

ANTIROCK and **TRAFIKROCK** products—which has been used and recognized worldwide for more than 30 years—include a choice of heat-welded membranes, primers, and SBS-based waterproofing accessory products.

BENEFITS

- Total adhesion to the substrate by heat welding;
- Mechanical strength to withstand the movement of the support;
- Resistance to chemical and biological agents (hydrocarbons, salts, etc.);
- Resistance to thermal shock and puncture.

DE LA BRESLE VIADUCT
Aumale (France)

MANOSQUE VIADUCT
Gréoux-les-Bains (France)

PRIMERS

PRODUCTS	DESCRIPTION	APPLICATION		BENEFITS
		MANUAL APPLICATION IN ONE COAT USING A SQUEEGEE	MANUAL APPLICATION IN ONE COAT USING A ROLLER	
 **GLACIROCK**	Self-leveling bitumen and polyurethane resin used as a single-component pore filler and primer on concrete surfaces prior to the application of ANTIROCK and TRAFIKROCK waterproofing membranes.	X		• Pore filler that blocks the air and water vapour pressure contained in the concrete • Reduction in blisters
 **ANTIROCK PRIMER**	Modified bitumen-based primer designed to prepare concrete and metal surfaces to promote the adhesion of ANTIROCK and TRAFIKROCK membranes.		X	• Easy to apply • Comes in a brown color, which helps to see if the product has been applied evenly on concrete or metal • Increased adhesion of ANTIROCK and TRAFIKROCK waterproofing membranes
 **ANTIROCK EMULSION PRIMER**	Solvent-free bitumen emulsion designed to prepare concrete and metal surfaces to promote the adhesion of ANTIROCK and TRAFIKROCK membranes.		X	• Easy to apply • Comes in a brown color, which helps to see if the product has been applied evenly on concrete or metal • Increased adhesion of ANTIROCK and TRAFIKROCK waterproofing membranes • Solvent free

MANOSQUE VIADUCT
Gréoux-les-Bains (France)

WATERPROOFING MEMBRANES

	PRODUCTS	DESCRIPTION	APPLICATION		BENEFITS
			MANUAL HEAT WELDING	AUTOMATIC INSTALLATION WITH THE MINI-MACADEN®	
BRIDGES	 **ANTIROCK STARTER**	Heat-welded starter membrane composed of SBS-modified bitumen and a non-woven polyester reinforcement designed to ensure the waterproofing of bridges.	X	X	• High elasticity • Simplified installation thanks to the MINI-MACADEN® • Approved by multiple DOT (Department of Transportation) agencies • Excellent tear and puncture resistance • High mechanical resistance • Ready for paving
BRIDGES	 **ANTIROCK**	Heat-welded membrane composed of SBS-modified bitumen and a non-woven polyester reinforcement designed to ensure the waterproofing of bridges.	X	X	
PARKING DECKS	 **TRAFIKROCK STARTER**	Heat-welded starter membrane composed of SBS-modified bitumen designed to ensure the waterproofing of parking decks.	X	X	• High elasticity • Simplified installation thanks to the MINI-MACADEN® • Excellent tear and puncture resistance • High mechanical resistance • Ready for paving
PARKING DECKS	 **TRAFIKROCK**	Heat-welded membrane composed of SBS-modified bitumen and a non-woven polyester reinforcement designed to ensure the waterproofing of parking decks.	X	X	
PARKING DECKS	 **TRAFIKROCK BASE**	Heat-welded membrane composed of SBS-modified bitumen and a non-woven polyester reinforcement. It should be applied as a first coat if the parking deck is located above a living area or if it is a multi-storey parking garage.	X	X	• High elasticity • High tear strength and puncture resistance • Simplified installation thanks to the MINI-MACADEN®

WATERPROOFING COMPLEMENTS

SAMUEL-DE CHAMPLAIN BRIDGE, Montréal (Canada)

PRODUCTS	DESCRIPTION	APPLICATION		BENEFITS
		APPLICATION USING A TROWEL	APPLICATION USING A BRUSH	
 **ANTIROCK SEALANT**	Sealant composed of fibres, mineral fillers and bitumen modified with SBS polymers. It is used as a waterproofing complement for details.	X		• Low solvent content • Excellent adhesion to most surfaces (no primer required) • Very good creep resistance at high temperature
 **ALSAN FLASHING**	Single-component polyurethane and bitumen-based waterproofing sealant for waterproofing flashings and hard-to-reach details.		X	• Superior protection against moisture • Easy to apply, which reduces labor costs • Risk of fire eliminated since no torch is used

HIGHWAY 25, Laval (Canada)

WELL AND QUICKLY DONE WITH THE MINI-MACADEN®

The **MINI-MACADEN**, developed by SOPREMA and CSA-certified, is a specialized piece of equipment which allows the automated installation of **ANTIROCK** and **TRAFIKROCK** heat-welded membranes.

Self-propelled and self-guided, it unwinds, welds and smooths the base sheet and cap sheet membranes.

BENEFITS

- **Fast:** With the MINI-MACADEN, it is up to 1,000 m² of thermofusible membrane per day, only requiring four workers.
- **Efficient:** It offers constant installation quality over the entire structure, minimizing the risk of bridging, voids and open side laps. No unrolling, relaxing, and re-rolling of membranes is required.
- **Economical:** It reduces labor and materials.
- **Versatile:** It can be used on bridges, overpasses, parking decks, and roofs at any time, regardless of temperature (as low as -10 °C (14 °F)) or wind conditions.
- **Safe:** CSA certified, it meets the highest safety standards.
- **Ecological:** It requires up to 75% less propane than mechanical installation.

REMARKABLE STRUCTURES

BITUMINOUS WATERPROOFING

GEORGE WASHINGTON BRIDGE
New York City (United States)

GEORGE WASHINGTON BRIDGE

PISCATAQUA RIVER BRIDGE

PISCATAQUA RIVER BRIDGE
Kittery, Maine (United States)

PMMA-BASED WATERPROOFING

Polymethyl methacrylate (PMMA) technology has been proven and used worldwide for over 10 years by the SOPREMA Group.

The **ALSAN CIVIL** line allows to install waterproofing systems in record time. Created to overcome the challenges frequently encountered of construction sites of civil engineering structure, PMMA-based systems are chosen for their quality and high performance, and also because they allow considerable time savings due to their speed of installation.

DE LA BRESLE VIADUCT
Aumale (France)

BENEFITS

- Quick curing: fully dried after one hour
- Optimal waterproofing between the deck and the bridge flashings as well as on irregular surfaces
- Available in spray version
- Available in two colors (blue and grey) to facilitate the application of a second coat
- Resistance to temporary vehicle traffic (if paving cannot be completed on the same day)
- Application possible at high and low temperatures
- Compliance with ASTM C957 Standard
- Compliance with the AREMA North American Ballast Test Standard for railway structures

PRIMER

PRODUCT		DESCRIPTION	APPLICATION	BENEFITS
			SQUEEGEE OR ROLLER	
	**ALSAN CIVIL P70**	Two-component translucent primer used to improve the adhesion of ALSAN CIVIL 773 systems and ANTIROCK membranes on concrete and steel substrates.	X	• Compatible with ALSAN CIVIL 773 and 773 SP membranes as well as ANTIROCK and TRAFIKROCK membranes • Fast curing (30 minutes) • Can be used for small repairs (with silica sand)

WATERPROOFING COMPLEMENTS

PRODUCTS		DESCRIPTION	APPLICATION		BENEFITS
			USING GRAVITY	MIX WITH PMMA RESIN ACCORDING TO DIRECTIONS	
	**ALSAN CIVIL Z71**	Very-low-viscosity two-component resin used to seal microcracks on concrete surfaces.	X		• Low viscosity • Quick curing • Resistance to temperature variations • Compatible with ANTIROCK and TRAFIKROCK systems
	**ALSAN RS CATALYST POWDER**	Dibenzoyl peroxide-based reagent in the form of a white powder.		X	• Ensures the curing of all PMMA-based ALSAN CIVIL and ALSAN RS resins • 25 kg format also available for large projects

SAMUEL-DE CHAMPLAIN BRIDGE, Montréal (Canada)

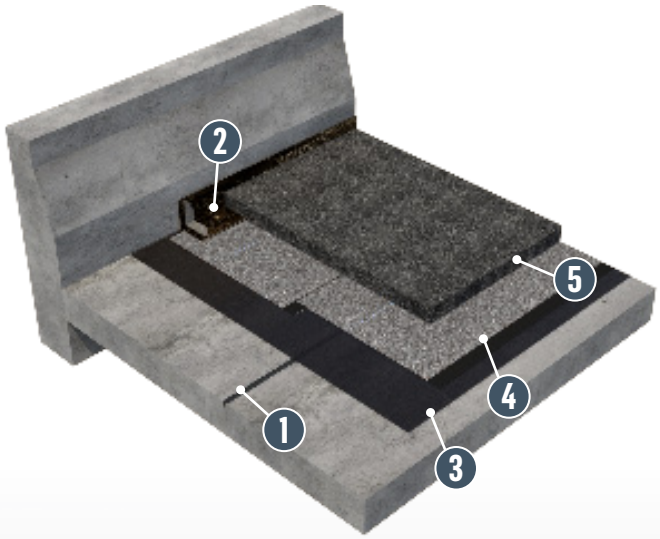
WATERPROOFING MEMBRANES

PRODUCTS	DESCRIPTION	APPLICATION		BENEFITS
		SQUEEGEE OR ROLLER	SPRAYING USING A PUMP FOR TWO-COMPONENT PRODUCTS (1:1 RATIO)	
 **ALSAN CIVIL 773**	Two-component high-performance waterproofing membrane.	X		• Quick curing • Available in two colors (blue and grey) • Resistance to temporary vehicle traffic when applied in two coats with a saturation of aggregates • Application possible at low temperatures
 **ALSAN CIVIL 773 SP**	Three-component high-performance spray-applied waterproofing membrane.		X	• Quick curing • Available in two colors (blue and grey) • Resistance to temporary vehicle traffic when applied in two coats with a saturation of aggregates • Application possible at low temperatures • Quick spray installation, ideal for larger surfaces and areas harder to access

BASIC SYSTEMS

ANTIROCK BASE

1. **Crack sealer:**
   - ANTIROCK SEALANT
2. **Details and flashings:**
   - ALSAN FLASHING
3. **Primer:**
   - ANTIROCK PRIMER
4. **Waterproofing membrane:**
   - ANTIROCK
5. **Surface layer:**
   - Asphalt pavement



MAIN USES

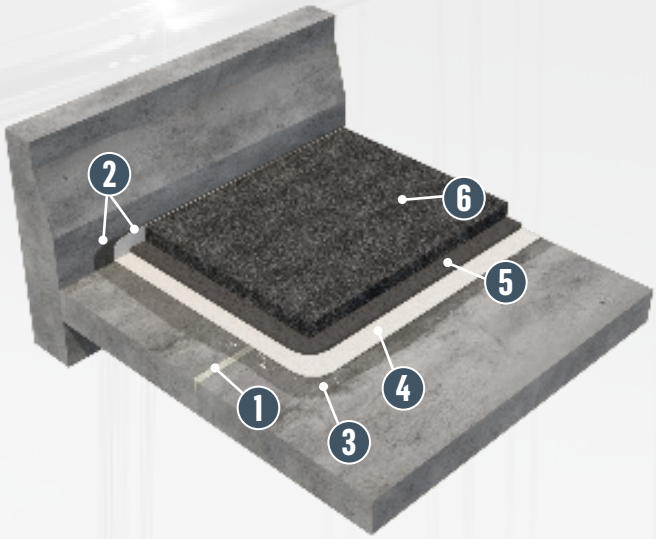
- Bridge and overpass decks
- Parking decks (TRAFIKROCK membrane)
- Civil engineering structure repairs

BENEFITS

- Technology proven worldwide for over 30 years
- Low acquisition cost
- Accessibility for applicators
- Easy installation thanks to the MACADEN

ALSAN CIVIL BASE

1. **Filler:**
   - ALSAN CIVIL Z71
2. **Details and flashings:**
   - ALSAN CIVIL P70 (primer)
   - ALSAN CIVIL 773 (membrane)
3. **Primer:**
   - ALSAN CIVIL P70
4. **Waterproofing membrane:**
   - ALSAN CIVIL 773 (one or two coats)
5. **Tack coat:**
   - Bituminous coating
6. **Surface layer:**
   - Asphalt pavement



MAIN USES

- Concrete or steel bridge and overpass decks
- Parking decks
- Civil engineering structure repairs

BENEFITS

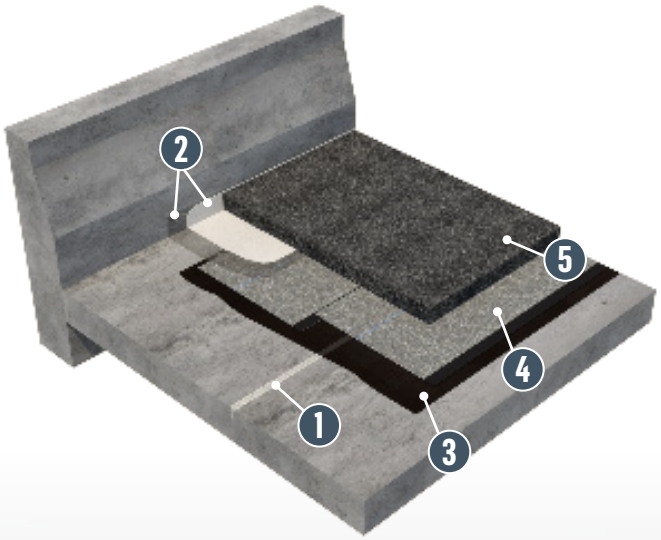
- Short curing time (1 hour) allowing a quick return service
- Membrane can be temporarily exposed to vehicle traffic without adversely affecting its performance when the system is applied in two coats with a saturation of aggregates
- Quick installation
- Easy to seal uneven surfaces and flashings
- Meets the standards and requirements of railway works

For more details on the components of the systems, refer to the technical documentation relating to the products presented.

HYBRID SYSTEMS

ALSAN CIVIL SBS 1

1. **Filler:**
   - ALSAN CIVIL Z71
2. **Details and flashings:**
   - ALSAN CIVIL P70 (primer)
   - ALSAN CIVIL 773 (membrane)
3. **Primer:**
   - ANTIROCK primer
4. **Waterproofing membrane:**
   - ANTIROCK
5. **Surface layer:**
   - Asphalt pavement



MAIN USES

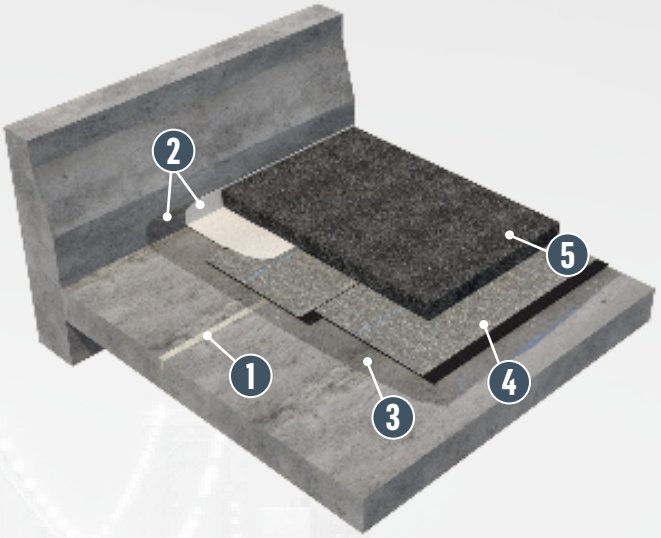
- Bridge and overpass decks
- Parking decks (TRAFIKROCK membrane)
- Civil engineering structure repairs

BENEFITS

- Allows simple waterproofing of structures at low cost that is easy to apply and flawless on details and flashings.

ALSAN CIVIL SBS 2

1. **Filler:**
   - ALSAN CIVIL Z71
2. **Details and flashings:**
   - ALSAN CIVIL P70 (primer)
   - ALSAN CIVIL 773 (membrane)
3. **Primer:**
   - ALSAN CIVIL P70
4. **Waterproofing on deck:**
   - ANTIROCK
5. **Surface layer:**
   - Asphalt pavement



MAIN USES

- Bridge and overpass decks
- Parking decks (TRAFIKROCK membrane)
- Civil engineering structure repairs

BENEFITS

- Saves time when installing bituminous waterproofing systems, while facilitating waterproofing application on details and flashings.

For more details on the components of the systems, refer to the technical documentation relating to the products presented.

SAMUEL-DE CHAMPLAIN BRIDGE, Montréal (Canada)

CASE STUDY

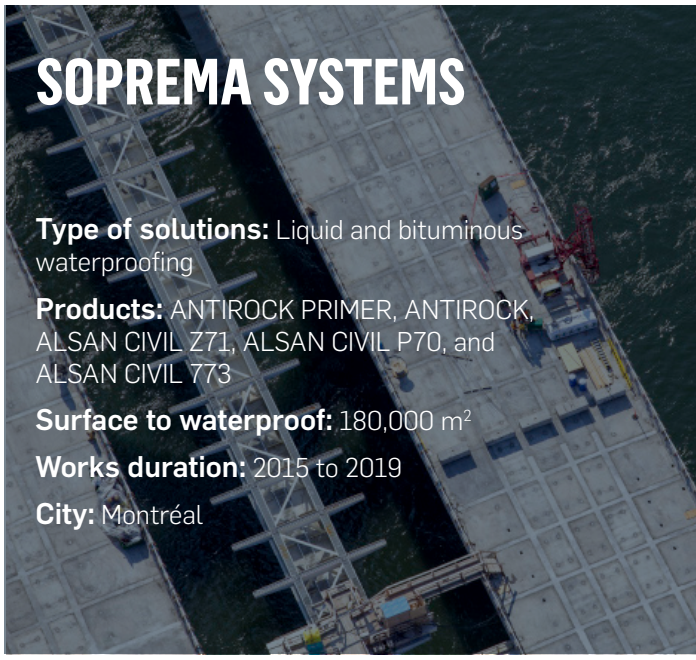
WATERPROOFING OF THE SAMUEL-DE CHAMPLAIN BRIDGE COMPLETED BY SOPREMA

After 53 years of constant crossings, which represents about **50 million vehicles a year**, and seasonal de-icing salt spreading, the bridge had reached the end of its useful life.

Because of weather conditions and time constraints, **two different technologies were applied on the 3.4 km structure:** heat-welded membranes made of SBS polymer modified bitumen (ANTIROCK line) and polymethyl methacrylate (PMMA) membrane (ALSAN CIVIL line).

Snow and rain showers restricted the application of the ANTIROCK products. SOPREMA therefore suggested another technology that was better suited to the site's weather conditions: ALSAN CIVIL P70 primer and ALSAN CIVIL 773 waterproofing membrane, two PMMA-based products.

The liquid membrane, manufactured in Québec, **can be sprayed even in cold weather**, which considerably **speeds up execution**. In addition to **drying very quickly,** it **can be applied on irregular** surfaces, unlike other technologies.



SOPREMA SYSTEMS

Type of solutions: Liquid and bituminous waterproofing

Products: ANTIROCK PRIMER, ANTIROCK, ALSAN CIVIL Z71, ALSAN CIVIL P70, and ALSAN CIVIL 773

Surface to waterproof: 180,000 m²

Works duration: 2015 to 2019

City: Montréal

WATERPROOFING COMPLEMENTS

SOPREMA is constantly working towards improving its civil engineering offer in order to provide accessory products for the waterproofing of structures. Including damp-proofing products, insulation panels, and waterproofing membranes for small structures, SOPREMA's offer is innovative and perfectly aligned with market requirements and current standards.

SILANE-BASED WATERPROOFING

ALSAN CIVIL SN 471 and **ALSAN CIVIL SN 474** products are silane-based water-repellent agents that penetrate concrete, thus providing protection that prevents concrete structures from absorbing moisture and chlorides.

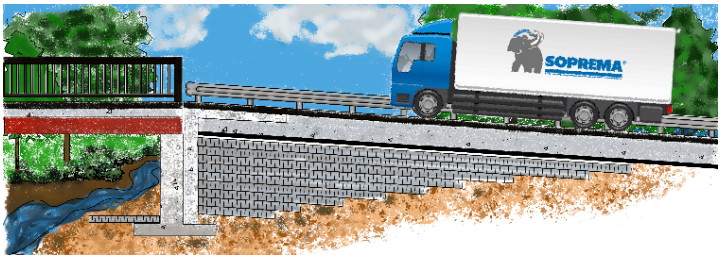
BENEFITS

- Easy application, both vertically and horizontally
- Strong penetration into concrete substrates
- Reduced absorption of chloride ions, such as de-icing salts used in winter, and water (heavy rain, splashing water, etc.)
- Two versions offered: 100% silane and 40% silane (water-based)

PRODUCTS		DESCRIPTION	APPLICATION	BENEFITS
			SPRAYER OR ROLLER	
	**ALSAN CIVIL SN 471**	100% silane water-repellent agent	X	• 100% active ingredients • Effective in protecting denser concrete
	**ALSAN CIVIL SN 474**	40% silane water-based water-repellent agent	X	• 40% active ingredients • Low volatility

INSULATION OF CIVIL ENGINEERING STRUCTURES AND ROADS

SOPRA-XPS insulation products are used to insulate the storm sewer and aqueduct pipes that are less than two metres deep. They can also be employed to insulate and reinforce structures where the ground is rather unstable, for example under roads and abutments of bridge approaches.



BENEFITS

- Quick installation
- Increase the service life of the pavement structure
- Reduction in thermal bridges
- Reduction of operating costs (replacement of frost-riven materials)

REQUIRED APPROVALS

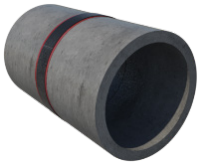
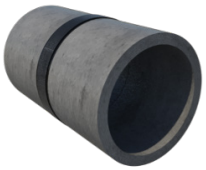
The entire SOPRA-XPS product line complies with the Canadian Standard CAN/ULC S701.1 and the American Standard ASTM C578. In addition, SOPRA-XPS 60—which is generally used under roads—meets the requirements of the MTQ (Québec Ministry of Transportation) (Volume VII, Chapter 14, Standard 14301, Type A).

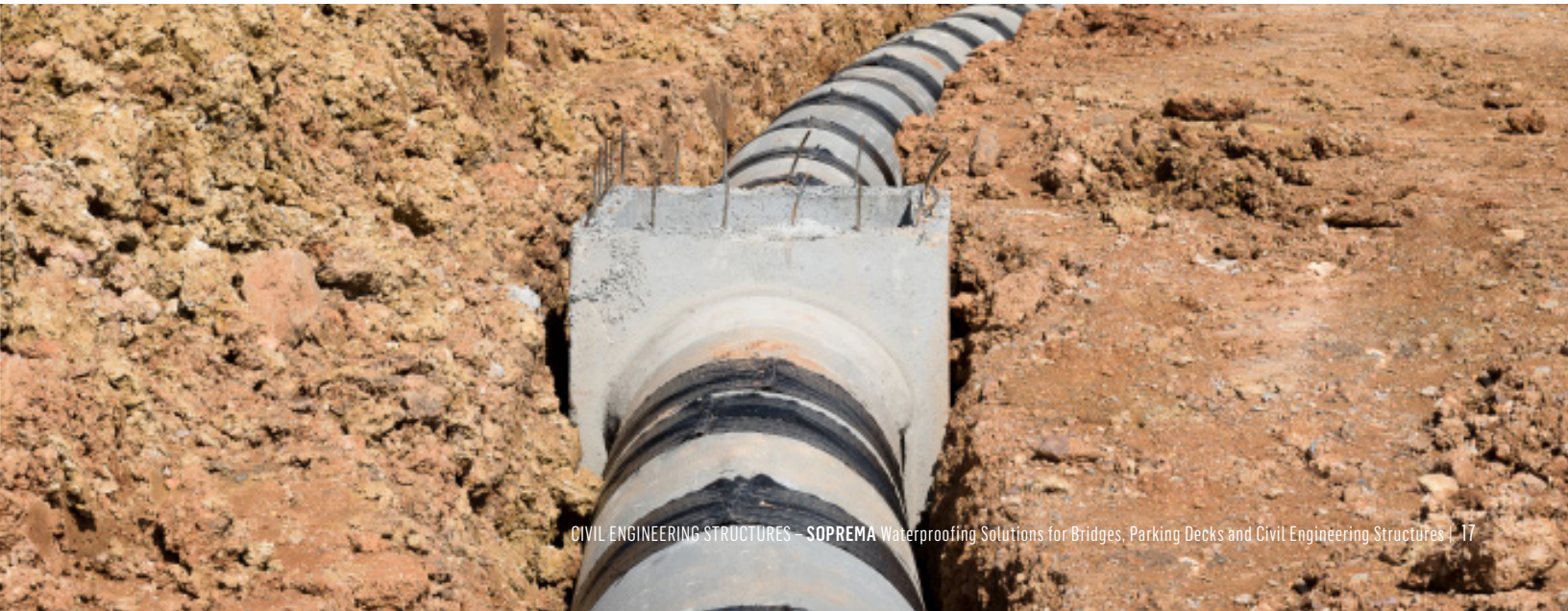
WATERPROOFING OF SMALL STRUCTURES

SOPRAPLY FLAM STICK and **SOPRALENE FLAM 180** self-adhesive or heat-welded membranes are used to waterproof small civil engineering structures such as culverts. These membranes are made of bitumen modified with SBS polymers.

BENEFITS

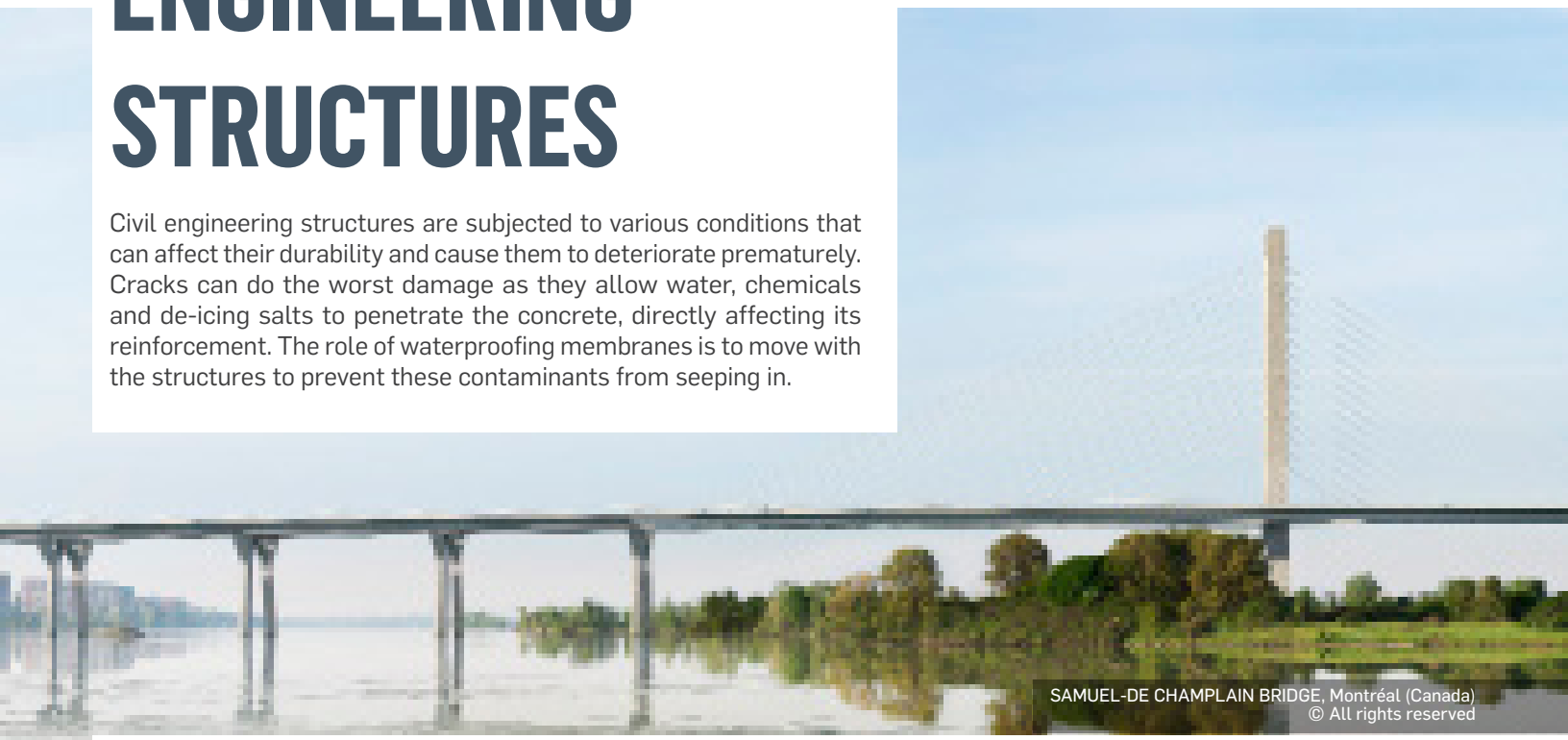
- Quick installation
- Excellent puncture and tear resistance
- For vertical and horizontal applications
- Approved by the QMT (Québec Ministry of Transportation)

SYSTEMS	PRIMERS	WATERPROOFING MEMBRANES	APPLICATION	BENEFITS
 Self-adhesive system	ELASTOCOL STICK	SOPRAPLY FLAM STICK	Self-adhesive membrane	• Simpler installation • Versions available with or without granules • Excellent static puncture and tear resistance • Application possible as low as -10 °C (14 °F)
 Heat-welded system	ANTIROCK PRIMER or ANTIROCK PRIMER EMULSION	SOPRALENE FLAM 180	Manual welding using a propane torch	• Increased resistance • Installation possible throughout the year, even in cold weather • Excellent puncture and tear resistance



FIVE DEGRADATION FACTORS OF CIVIL ENGINEERING STRUCTURES

Civil engineering structures are subjected to various conditions that can affect their durability and cause them to deteriorate prematurely. Cracks can do the worst damage as they allow water, chemicals and de-icing salts to penetrate the concrete, directly affecting its reinforcement. The role of waterproofing membranes is to move with the structures to prevent these contaminants from seeping in.



SAMUEL-DE CHAMPLAIN BRIDGE, Montréal (Canada)

Water infiltration

Water from rain showers or melting snow will penetrate the concrete structure through the cracks, causing corrosion on the steel reinforcement.

De-icing salts

Salts used to de-ice roads are very damaging to bridge decks. They penetrate the concrete surface and weaken its reinforcement.

Temperature variations

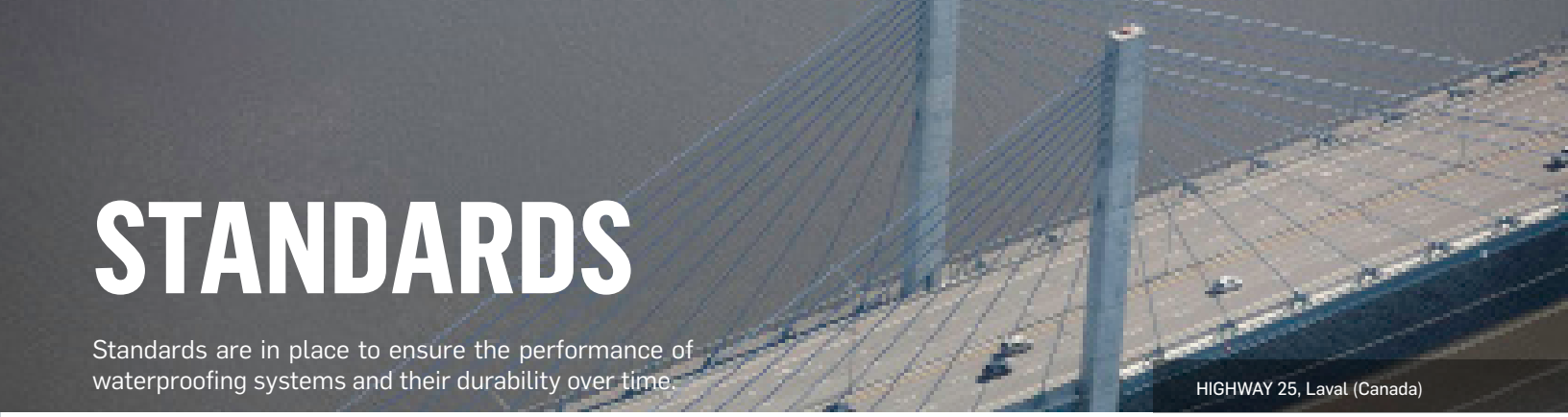
Canadian winters are particularly damaging to structures. Freeze and thaw cycles have a major impact on their early deterioration. Extreme temperature variations can cause stress and movement in the structure, which can lead to cracks.

Dynamic and static loads

Static loads combined with dynamic loads, such as heavy vehicle traffic, can cause structural damage. Although structures are designed to withstand these loads, the resulting movements can damage the concrete structure and make cracks appear.

Chemicals from vehicles

Gasoline, coolants, and other chemicals leaking from vehicles can affect the durability of concrete in the long term by seeping into the substrate and then attacking its porosity and its steel reinforcement.



STANDARDS

Standards are in place to ensure the performance of waterproofing systems and their durability over time.

HIGHWAY 25, Laval (Canada)

STANDARDS FOR BITUMINOUS WATERPROOFING

ANTIROCK systems meet the following standards:

CAN/CGSB-37.56-M

Resistance to Deformation, Tensile Strength, Elongation at Breaks, Cold Flexibility, and Static Puncture Resistance

ASTM D5147

Tensile Strength, Elongation at Maximum Force, and Low Temperature Flexibility

ASTM D5602

Static Puncture Resistance

STANDARDS FOR RAILWAY WORKS

PMMA-based **ALSAN CIVIL** systems meet the following standards:

AREMA North American Ballast

Durability Test (compressive strength with ballast)

ASTM C518

Thermal Transmission

ASTM D257-14

Electrical Resistivity

STANDARDS FOR LIQUID WATERPROOFING

PMMA-based **ALSAN CIVIL** systems meet the following standards:

ASTM C957

Standard Specification for High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Integral Wearing Surface

ASTM C1305

Dynamic Crack Bridging

ASTM C836

Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

ASTM E96

Water Vapour Transmission

ASTM D7234

Adhesion of the Waterproofing System to Concrete Surfaces

ASTM D4541

Tear Resistance on Concrete and Steel Surfaces

ASTM D638

Tensile Strength

ASTM C1202

Resistance to Chloride Ions

CAN/CGSB-37.50-M89

Flexibility at Low Temperature

INNOVATION SINCE 1908

SOPREMA's success has developed around the idea that material quality, durability and reliability must be up to the builder's expectations and ambitions. For more than 100 years, SOPREMA has been using its expertise to develop a variety of high-end products that meet or exceed all the requirements of the construction field.

BR470_230117