

Vancouver International Airport Pier D Expansion

Vancouver, BC, Canada (2021)

PRODUCTS USED:

Krytol Internal Membrane™ (KIM®) Krytol T1®
Krytol® Waterstop System

OWNER:

Vancouver Airport Authority

ARCHITECT:

Kasian Architecture

CONTRACTOR:

PCL Construction

STRUCTURAL ENGINEER:

Bush, Bohlman & Partners L.L.P.

READY-MIX SUPPLIER:

Ocean Concrete

BACKGROUND

In 2018, the Vancouver International Airport (YVR) celebrated a record-breaking level of growth. Reaching their 25-million-passenger milestone two years ahead of forecast, YVR saw an increase in passengers. That increase was over 7%, and such a big leap was mainly thanks to expanding services from YVR's airline partners. That included the growth of Air Canada who had made YVR their premier transpacific hub. This level of growth has only been expected to get bigger as forecasts for YVR indicate that the airport will reach 31 million passengers annually by 2022.

To ensure that YVR could continue supporting this ever-increasing number of passengers, the Vancouver Airport Authority chose to expand the airport. This expansion (known as the Pier D expansion) gave YVR another eight wide body gates. Four of those gates were bridged gates, allowing YVR to make room for more planes, including large aircraft, such as the A380, which come with a 79-meter (260-foot) wingspan. The other four gates were remote stand operation gates. These added space for more buses, increasing how many passengers YVR could transport across the airport.

At the same time, the Vancouver Airport Authority also added a wide variety of other new features, including a private nursing room, a pet relief area, vision strips designed by a Musqueam artist, refill stations for hot and cold water bottles, a pond water feature, and an abundance of outlets and charging stations.

It was the largest terminal expansion YVR had seen since 1996, and it wouldn't have been possible without thorough, permanent concrete waterproofing. Such waterproofing was critical as YVR is an airport located in Richmond, British Columbia, a region that is very close to sea level, making the area more prone to water ingress. It was a significant concern to the engineers of the expansion, so they all decided to agree upon one waterproofing design that they would use to ensure the project received optimal protection.



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SOLUTION

During this decision-making, they recalled how Kryton's waterproofing system and Krytol Assurance Program™ (KAP) had successfully supported the construction of the airport's baggage tunnel. It was such a success that the engineers chose to employ the same system and program for all high-risk areas of the Pier D expansion.

With that in mind, the construction team added around 300 m³ (392.34 y³) of Kryton's waterproofing admixture, KIM, directly into the concrete for the expansion project's pond water feature, elevator and escalator pits, utility chambers, sumps, and planter pit. They also lined the elevator and escalator pits with Krytol T1.

The Krytol® technology from both transformed the concrete from a stationary material to one that could protect itself from water and waterborne contaminants. At the slightest sign of moisture, the concrete would have the ability to use the Krytol technology to chemically react to water and nearby unhydrated cement particles to form interlocking crystals. These crystals would then fill up any capillary pores and micro-cracks, effectively blocking any spaces that water and any contaminants within it could go through. This protection will work for the lifetime of the treated structure as the Krytol technology within the concrete will remain dormant until activated by the presence of moisture.

It significantly reduces the risk of water passing through the concrete. But the concrete's joints could still act as an entryway for moisture. So to mitigate that possible risk as well, the construction team treated the joints with Kryton's Krytol Waterstop System. Using the system's triple protection, the team applied Krytol Waterstop Treatment™ to the concrete around the joints, installed the Krytonite™ Swelling Waterstop, and then applied the Krytol Waterstop Grout™. The treatment would provide additional waterproofing protection while also protecting the rebar inside the concrete from corrosion. At the same time, the waterstop would act as an additional barrier that could swell in the presence of water to seal construction joints away from the moisture. And finally, the grout would add fiber reinforcements to reduce the possibility of the concrete structure shrinking or cracking.

All throughout this work, the construction team were backed by KAP. That gave the team access to an in-depth design review, site training and inspections, and a 10-year labor and material warranty for leaks from Kryton. All of which led to the team confidently completing the Pier D expansion in a way that left no sign of leaks or other moisture concerns.

