



Pereira-Manizales Highway Tunnel



ABOUT THIS PROJECT:		
Market Segment: Tunnels	Owner: Autopistas del Café Group	Products Used: Xypex Patch'n Plug Xypex Concentrate Xypex Admix C-2000
Location: Pereira, Colombia	General Contractor: CIP SA - Ingeniería para el Concreto	

The Pereira-Manizales Highway Tunnel was constructed as part of a road complex near Pereira, Colombia, connecting the municipalities of Dosquebradas and Santa Rosa de Cabal. The project was owned by the Autopistas del Café Group, with the engineering team led by Carlos Zubieta Uribe, the project director, and Jorge Ardila, the project designer.

The tunnel was built through complex geological formations consisting of green and graphitic schists, including fractured rock zones and areas of intense weathering. These conditions created a high risk of severe water infiltration, requiring a reliable and permanent waterproofing solution. As the region does not experience extreme temperature variations, the selected waterproofing approach needed to perform effectively under consistently humid conditions.

CIP SA - Ingeniería para el Concreto was engaged to address these challenges. After evaluating the project's strict performance requirements, local climate conditions, and challenging geology, Xypex Crystalline Technology was selected for its proven performance in tunnel applications.



Xypex Admix 2000 was incorporated into the fresh concrete as the primary integral waterproofing solution, as it was the most suitable admixture for the project's environmental conditions. Additional protection was provided using Xypex Concentrate and Xypex Patch'n Plug at joints, penetrations, and localized repair areas.

These products, when applied to concrete, activate a chemical reaction between the proprietary Xypex active components, moisture, and unhydrated cement particles. This reaction forms insoluble crystals that fill pores, capillaries, and micro-cracks, effectively blocking water and harmful agents, such as chlorides and sulfates.



Additionally, the proprietary Xypex Crystalline Technology provides the concrete with self-healing properties. When new micro-cracks form, moisture triggers additional crystal growth, healing them. This ongoing self-healing, waterproofing and improving chemical resistance mechanism reduces maintenance costs and extends the structure's lifespan.

Xypex Admix C-2000 was incorporated into the cast-in-place concrete. Since this waterproofing admixture is added to the concrete during batching, it eliminates the need for post-curing applications, such as membranes, saving both time and costs. Xypex Patch'n Plug, a fast-setting hydraulic cement compound designed to stop active water leaks instantly, was used to repair leaking joints.

On the precast sections of the tunnel, Xypex Concentrate, a surface-applied cementitious waterproofing material, was sprayed as a slurry coat. Known for its versatility in both positive and negative side applications, even under extreme hydrostatic pressure, Xypex Concentrate is designed to deeply penetrate the existing concrete, becoming an integral part of the concrete structure, rather than merely serving as a surface barrier, which ensures long-lasting protection.

Thanks to CIP SA - Ingeniería para el Concreto's meticulous work and the efficacy and effectivity of the Xypex Crystalline Technology, the Pereira-Manizales Highway Tunnel not only met its strict waterproofing requirements but reduced the need for maintenance and enhanced its lifespan.

