

Saskatchewan grain terminal – North Vancouver, BC, Canada

Project overview

MAPEI's *Planitop® XS* was used to coat the interior of grain silos at a North Vancouver terminal so that the grain can slip easily down the vertical surface when stored.



Project information

Project category:	Industrial – Grain silos
Period of construction:	2014 (new silos)
Period of renovation:	2014
Year of MAPEI involvement:	2014
MAPEI coordinator:	Dave Randall
Project owner:	Glencore International
MAPEI distributor:	National Concrete Accessories
General contractor:	FWS Group – Winnipeg, MB, Canada
Concrete contractor:	Western Construction Services
Project manager:	Clare Post
Photographer:	Dave Randall
Project size:	20,000 sq. ft. (1 858 m ²)



MAPEI products used

- *Planitop XS*



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Planitop XS smooths inner surface of grain silos

Planitop XS repair mortar was used in a unique and interesting way on a grain-terminal facility owned by Glencore International. The terminal, located on the North Shore of Vancouver directly across from Stanley Park, was becoming too small and more grain silos were required. The owners decided to hire FWS Group out of Winnipeg, MB, to build the required new silos and renovate the existing one.

Project background and details

FWS Group has experience building grain silos using a "slip-form" system. Starting from the beginning of the 20th century, slip forming has been widely used in formwork due to its efficiency. Slip forming is a concrete-formwork method that improves speed and productivity of repetitive vertical concrete work. Typical projects that employ this technique include silos, the core of high-rise buildings, telecommunication towers, cooling towers, heavy concrete offshore platforms, etc.

Slip forming is one of the most commonly used methods of construction in concrete silos, such as the ones used on a grain-terminal facility. The silos used for grain are interconnected as multiple cells. The speed of slip form is a function of concrete properties, number of stoppages, weather conditions and management capabilities. The slipping rate depends on how fast horizontal reinforcements and anchor plates can be placed. In addition, concrete setting time greatly influences the slipping rate.

The slip form can move whenever concrete can carry the load of its weight in the lowest parts of form sheet; therefore, slipping rate is directly related to the concrete setting time. Setting time is influenced by weather conditions (temperature, humidity, etc.), cement ratio, type of cement, slump and admixtures; so, the best slipping rate will be chosen based upon job conditions.

Slip-form speed should not be so fast that it will cause "collapses" (where soft concrete falls out from under the form), nor so slow that it will cause "stick" (where concrete sticks to the slip form and parts rip away from the wall). The average rate of pour on this project was approximately 11" (27,9 cm) per hour.

There were some challenges on the project regarding weather conditions and the type of cement used. The goal with grain silos is to have a smooth surface on the interior face so that the grain slides down off the wall as the silo is being emptied.

Because of the challenges faced on site, the interior surfaces required some attention to smooth them out. Several products were tested out on site; *Planitop XS* was preferred and chosen by the concrete finishers, Western Construction Services.

MAPEI products on the jobsite

A platform was suspended by a crane on the interior of the silo. Workers were able to stock their tools and supplies on the platform while working from it.

Once mixed, *Planitop XS* was skimmed onto the surface of the concrete silos and then smoothed out. On the second pass with the material, a steel finishing trowel was used to burnish the surface smooth (much like a burnished concrete slab).

When the project was completed, the concrete finishers and the general contractor were very pleased with the performance of *Planitop XS* and the overall appearance of the grain silos' inner surfaces.

