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### Chryso Products Facilitate Silo Slide In Northern Cape

An innovation solution, applied by Chryso Southern Africa, contributed to the successful completion by Renniks Construction of six grain and wheat silos in Kimberley in the Northern Cape using slip forming construction methodology.

These large silos, 33 metres in height with a 200 mm wall thickness, used a total of 6 300 m<sup>3</sup> of concrete and were commissioned by GWK, a leader in the agribusiness.

Renniks Construction has a long spanning relationship with Chryso Southern Africa and is one of the few South African companies that has specialist slip forming capabilities. The two companies have worked together on many projects; most notably, the Fulton Award winning Impala Shaft #16 project.

“Slip forming is a sliding construction methodology that requires the assembly of a sliding system at ground level. This system is lifted incrementally as concrete is poured; creating a structure with no joints. Reinforcing is fixed into position as the slide progresses so as not to slow down the placement of concrete. Once the required height of the concrete structure is reached the sliding system is dismantled,” explains Wayne Kamoo, site manager at Renniks Construction.

Brenton Brouard, Chryso Southern Africa’s technical manager: concrete, says that Chryso Southern Africa played a key role in the concrete mix design for the project.

“The particles of the river sand in the area are not as rounded as that of conventional river sand. We therefore decided to use a greater amount of crusher sand than usual. However, this could have caused a potential problem as there were fewer fines in the overall grading of the blend,” Brouard says. “Typically, concrete used in a slide should be cohesive with sufficient fines. The concrete has to have good finishability properties in order to create the ‘slip effect’. If there is material segregation with aggregates protruding, then the slide will not be smooth and there will be difficulty in incrementally lifting the sliding system.”

As a solution, Brouard elected to use an admixture called CHRYSO® Quad 20. “This admixture was an ideal choice for the Kimberley project because we were working with a concrete which, comparatively speaking, lacked fines. CHRYSO® Quad 20 increases the cohesiveness of the concrete and prevents bleeding and segregation, improves the finishability of the concrete and assists construction by giving the concrete its sliding effect.

“We also used another admixture - CHRYSO® Omega 101. This product also facilitated the finishability of the concrete. Its air entraining properties assisted by replacing the lack of fines in the mix and helped with greater workability,” Brouard says. “By facilitating greater workability of the concrete, there was sufficient time created to allow concrete to be placed into the form around the entire circumference of the silo and vibrated and for the sliding process to proceed without interruptions.

It was important to achieve the correct slump as should the slump have been too high, the sliding process may have been delayed. In addition, it would have been very difficult to slide if the slump was too low. Since CHRYSO® Omega 101 is a multi-dose admixture it allowed the contractor to create concrete with the slump best suited for the project.

The sliding system had shutters 1.2 metres in height and tapered at both sides which meant that the silo narrowed with every lift. There were 24 jacks set 2.3 metres apart. Kamoo explains that the design of the structure determined the number of jacks. “The wall thickness, the amount of steel used and the number of cast items also determines how far apart the jacks should be placed. If the jacks are too far apart there would have been a lot of friction between the concrete and the shutters causing damage to the concrete,” he says.

Planning is of the utmost importance with concrete slides. Since slip forming is a continuous process teams have to work 12 hour shifts. “One has to have a reliable and consistent supply of cement, admixtures, sand and stone to site to facilitate this continuous operation. With Chryso we received good service and the mix design is always done professionally,” Kamoo concludes.

CHRYSO FACILITATES SLIDE PIC 01 : An innovation solution, applied by Chryso Southern Africa, contributed to the successful completion by Renniks Construction of six grain and wheat silos in Kimberley in the Northern Cape using slip forming construction methodology.

CHRYSO FACILITATES SLIDE PIC 02 : CHRYSO®Quad 20 increases the cohesiveness of the concrete and prevents bleeding and segregation, improves the finishability of the concrete and assists construction by giving the concrete its sliding effect.

CHRYSO FACILITATES SLIDE PIC 03 : CHRYSO®Omega 101 also facilitated the finishability of the concrete.

CHRYSO FACILITATES SLIDE PIC 04 : An innovation solution, applied by Chryso Southern Africa, contributed to the successful completion by Renniks Construction of six grain and wheat silos in Kimberley in the Northern Cape using slip forming construction methodology.

CHRYSO FACILITATES SLIDE PIC 05 : From left, Brenton Brouard, Chryso Southern Africa's technical manager: concrete; Greyling Jansen, Chryso Southern Africa technical sales representative and Wayne Kamoo, site manager at Renniks Construction.

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