



Case Study:

LARGE SCALE FLOCCULANT MIXING AND DOSING PLANT FOR HEAVY MINERAL SANDS TAILINGS TREATMENT



Location:

Cataby, approximately 150km north of Perth, Western Australia

Operation Type:

Heavy Mineral Sands Tailings

Equipment Solution:

**Flocculant Plant
(472kg/h dry feed rate)**

Year:

2019

Scope of Project:

Due to Transmin's knowledge of large scale flocculant preparation plants, we were approached to design, engineer and fabricate a flocculant storage, mixing and dosing plant for one of the newest Heavy Minerals Sands mining and processing plants in Western Australia.

The client requested that Transmin would supply the whole flocculant plant.

The Solution:

Fabricated at Transmin's workshop in Malaga, it took 20 weeks for the Transmin team to build and factory test the equipment before it was shipped to the mine site north of Perth, Western Australia

The dry flocculant polymer is delivered via bulk tank trucks, where it is pneumatically blown into the 170m³ geometric capacity storage silo via the off-loading compressor on-board the delivery truck.

Due to the large required throughput of the system (472kg/h dry feed), Transmin designed the system with dual dry feed systems, dual wetting heads and dual mix tanks.

The dry feed systems take discharge directly from the silo via screw feeders into heated cones (to remove moisture) prior to being pneumatically conveyed to the wetting heads via the blower and eductor/venturi assembly.

The wetting head assembly is designed with a centrally-located dry feed discharge encircled by the wetting nozzles to ensure the best possible dissolution of the polymer can occur in the mix tanks. Due to the volume of water required the wetting head assembly includes a rapid fill nozzle as well as a water inlet manifold, complete with instrumentation and valving to ensure flow and pressure are maintained.

The dual mix tanks are 150m³ capacity each. The solution is continuously and gently agitated for a minimum of 30 minutes to suitably age the flocculant solution and allow the polymer chains to “uncoil”.

After each batch of mixed flocculant solution is completed, it is transferred via low-shear, progressive-cavity pumps to the storage tank. The capacity of the the storage tank is 660m³, which equates to approximately 7 hours of flocculant solution storage. Due to the size of the storage tank it was fabricated in strakes to facilitate ease of transport site. The tank was then assembled on-site by welding the strakes together and painted in-situ.

The flocculant is then dosed into two separate downstream unit processes via progressive-cavity pumps and static mixers. The static mixers are designed to further dilute the mixed flocculant solution to ensure the correct flocculation of the solids within the processes.

A control system that interfaced with in-field instrumentation was supplied to ensure that the batching process could be completely automated.

LPF™ Specifications:

Based on their requirements, the client EPC chose the following specifications:

- ▶ **Heavy-duty D4 chain**
- ▶ **1.8m wide belt**
Reinforced with steel slats
- ▶ **1500 tonnes / hour**
- ▶ **Belt speed 0.25m/second**
- ▶ **35m³ hopper**
For front-end-loader
- ▶ **75kw electric motor**
- ▶ **Total weight approx. 40 tonnes**



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