

PROJECT PROFILE

Midland Cement Materials (MCM) Cement Batch Plant Extension

CDMS Consulting Engineers was contracted to design an extension to an existing cement batching plant located at the MCM facility in Midland. The design of the new 140T batch plant was started at concept phase and developed right through to detailed design for fabrication. CDMS supplied the client with an economical and reliable solution to suit the client's physical space limitations and their budget.

OUTCOME

- Design of silo support tower, 140T cement silo, 4T weigh hopper and air-slide
- Pipe design for both inlet and outlet lines, including structural supports
- Structural and mechanical detailed fabrication drawings

BACKGROUND

MCM is a local company that has been trading in Western Australia for over 40 years. CDMS had previously designed cement silos and steel structures for MCM so was selected to design an extension to the existing cement batching plant facility.

PROJECT OBJECTIVES

The new batch plant design was required to minimise cement handling time and provide a safe structural design for personnel protection. The turn-key cement batching system proposed by CDMS was to be fully automated, minimising operator input and increasing throughput.

CHALLENGES

The new batching facility was custom designed to fit around the existing plant, which produced various challenging design and space constraints. These included locating the new silo directly above an existing aggregate conveyor system, increasing storage weights and volumes and limiting outer diameters and dimensions.

MCM required the new 140T cement silo to be internally partitioned into two separate eccentric compartments, allowing for the storage of cement and fly ash separately. An internal partition caused additional load cases to be analysed as different parts of the silo would become critical under a different type of loading. MCM requested a 140T cement silo and a 4T hopper storage capacity which pushed the limit of the support structure as well as the available space for foundations. Managing the earthquake loads became critical for the support structure due to the large height/diameter ratio.

OUR APPROACH

After an internal meeting to discuss a range of different batch plant designs, senior CDMS engineering staff conducted a site visit to the MCM cement batching plant and recorded measurements of the existing steel work, foundations and locations of critical tie-in points. Once the client approved the proposed design, a 3D model was developed, relative to the existing MCM structures. The 3D model was used by the engineering team to troubleshoot any conflicts/interferences and was presented to the client for approval. With the conceptual design approved, CDMS commenced the detailed design.

The structural design of the support tower and the partitioned 140T cement silo comprised the major portion of the engineering and drafting work. After producing detailed fabrication drawings as well as structural FEA design reports, the complete design package was passed to the end user for final sign off.