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smart project delivery

### Demonstrated Capabilities

- Research and Development
- Structural Engineering Innovation
- Analytical Capability
- Value Engineering

## Horizontal & Circular Storage Pre-Feasibility Study

**Client** CBH Group

**Project Location** Multiple sites in Western Australia.

### Scope

The project was for a Pre-Feasibility Study (PFS) to be actioned in two phases as follows:

1. Horizontal storage options investigation to identify all possible solutions for horizontal storage, develop the order of magnitude cost estimates and rank the options against each other for client consideration.
2. Developing horizontal storage preliminary designs with Class 2 estimates and value engineering opportunities. An optimisation study on their existing circular storage design.

### Business Objective

CBH wanted to investigate alternative options for horizontal grain storage buildings and understand the costs of implementation. Also, CBH was unsure that the existing circular storage design was the most cost-effective and wanted it assessed and optimised for both dimensions and construction materials and methods. For both types of storage options, the up to date budget pricing was required to facilitate accurate sustaining capital planning.

### Challenges to Overcome

Without any sites identified the designs would have to be generic, therefore the Basis of Design required careful development to ensure the resultant study work could be utilised for sites across CBH's Western Australia operations. Consideration also had to be given to constructability and materials available as many of its sites are somewhat remote. Materials selection also had to consider that some sites would be relatively close to the coast and subject to a corrosive environment.

### Smarts

The horizontal storage options investigation consisted of revisiting previous work utilising the Industrial Light Beam (ILB) system of portal frame construction. The Circular Storage design optimisation took the existing design, reworking the structural performance to take advantage of hoop stress load carrying, to get more performance out of the storage walls. The design was then evolved into two more designs of lesser diameter (more height) with all three designs enabling plotting of a polynomial curve to determine the most economic diameter (and height) for a 20,000t Circular Storage. The outcome of this work proved that a 40m diameter design was the most cost-effective design and 17% less in capital cost than the existing 58m diameter design. This exercise was also completed for a design with steel walls instead of concrete walls to prove that steel walls did not provide a cost-saving.

### Project Outcome

CBH was pleased to have found the most economical solution for both types of storage. The project was delivered 20% under budget.

# Delivering Value. Delivering Results.