Bulk Materials Handling

Center of Excellence

Optimising the way bulk materials are managed can have an enormous impact on overall project cost and plant availability. Incorporating innovation and improvement initiatives are critical to meet customers' focus on productivity and energy efficiency needs.

Our Bulk Materials Handling team assists with the technical leadership required to ensure the latest technologies are incorporated into capital projects. Our first-principles design approach provides the flexibility to design systems from base componentry up, minimising capital intensity and maximising construction efficiency and operability.

By aligning our capabilities with each customer's goals, we help them to achieve operational and performance excellence driving innovations across the entire project lifecycle, from concept design, through procurement, construction and commissioning. Our Bulk Materials Handling team tailors their services to each customer's unique requirements.

The Bechtel Difference

Our customers' projects are an investment in the future. They create jobs and economies; improve the resiliency of the world's infrastructure; increase access to energy, resources and vital services; and make the world a safer and cleaner place. While our expertise enables delivery, ongoing collaboration is critical to long-term success.

We help our customers achieve operational and performance excellence with the highest capital efficiency – driving innovations across the project lifecycle, mitigating risk, and contributing to a lasting positive legacy.

Expertise and Experience

During the past three decades, Bechtel has designed minerals processing plants that include materials handling systems for conveying ores of iron, copper, nickel, bauxite, coal, oil sands as well as other minerals and concentrates, with a wide range of properties ranging from abrasive to sticky. We have helped our customers with everything from economic evaluations, preparation of specifications, design, construction, and project management.

Our teams provide specialist engineers who have attained world-class stature in their field. Each of our materials handling technical specialists have been chosen for their substantial study and execution experience for our major mining customers. These experts undertake special assignments and mentoring roles in the company with the goal of providing design services including:

- Championing technical and engineering excellence
- Advising management on strategic technical trends that will impact the industry
- Serving as technical ambassadors in the industry
- Applying state-of-the-art processes and technology to all projects
- Publishing and presenting their thought leadership at conferences, and providing leadership in relevant professional society committees
- Serving on expert panels and advisory boards.

Engineering

This team includes principal engineers with considerable experience leading teams in the design of materials handling systems as well as others who have similar experience in the specification, design analysis and construction supervision of stackers, reclaimers and shiploaders. These leading professionals are backed-up by a multidiscipline team of engineers and designers in all disciplines with skills in structural analytics, FEA, simulations, design automation, electrical and process control.

Value for our Customers

Aligning with our customers	World-class expertise	First-principles design approach	Design certainty	Operational and performance excellence
Tailored services to each customer's unique requirements	Expert knowledge of refining and processing facilities	Minimise capital intensity and maximise construction efficiency and operability	High levels of design certainty during project bid phase to reduce project risks and improve TIC	Cost effective solutions with short ramp-up times

Capabilities

Bulk Materials Handling Center of Excellence

Our Center of Excellence for Bulk Materials Handling in Brisbane services both Australian and international customers. In 2018, Bechtel also established an engineering center in Perth to focus primarily in the iron ore market. These two centers of engineering work together across Australia using our standard high-technology approach with an emphasis on adding value to our clients in studies and execution projects.

Conveyor-in-a-Day™

Material handling forms an important part of our customers' projects and one in which we can significantly improve project schedule, design certainty and engineering efforts. A core component of our engineering approach is to use our unique Conveyor-in-a-Day™ (CiaD™) tool.

This system allows unrivalled speed of option analysis – it is a proven system which is currently in use between our Perth and Brisbane centers and has recently been used on large scale copper projects in Chile and Peru.

Our conveyor design automation tool utilises a database of flexible parametrised modules to deliver a conveyor design that has been optimised for specific project requirements and simultaneously produces all the engineering design details as well as fabrication details for production. It can be executed across all geographies and commodities without the requirement to re-engineer for project specific demands by implementing a rules-based engineering approach.

Chute design

Along with the CiaD™ initiative at Bechtel we have developed a standardised and mechanised approach to the design of chute work for large materials handling facilities, in which the various analytical and geometric software packages have been integrated by the development of in-house software suites.

The initial chute configurations and models have the benefit of being fully parametric. This allows quick adjustment of the design until an efficient chute flow has been achieved. This ability has been available for some time, but the steps that follow are new and unique to Bechtel.

Once the flow regime through the chute is operating satisfactorily, we can directly load the chute geometry and loading data, into STRAND7 for analysis. This software connects the 3D platework together to form a surface model for the FEA analysis.

This enables the stress analysis to be conducted immediately, and again the feedback loop to the parametric 3D modelling software enables plate thickness to be adjusted by the update of simple parameters in the INVENTOR. This loop is important.

The last step is the translation of the final chute geometry into the fabrication software. At Bechtel we use Tekla for fabrication modelling and the last task the software must perform is the translation of the INVENTOR file into Tekla format. The new program changes all of the INVENTOR 3D shapes into Tekla shapes, recognises the interfaces between adjoining plates and builds the weld detail for each plate-to-plate interface and includes the edge preparation into the models. These models are then ready to ship directly to the fabricator's facilities for cutting and welding.

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