DOME TECHNOLOGY®

ANNUAL REPORT 2021

American Crystal Sugar
Montgomery, Illinois, USA

Highlights from our diverse scope of work
Published February 2022
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A PARTNER ABROAD

Kajima & Dome Technology collaborate to build domes in Japan

Dome Technology is collaborating with Japanese company Kajima to build industrial and commercial domes in Japan.

In March 2020 a prototype DomeSilo that will be used as an office building was built at Kajima's Seisho Experimental Field in Odawara City, Kanagawa Prefecture. Based on its success, the dome method was applied in June 2021 to a storage project in Shunan City, Yamaguchi Prefecture. The structure, with a diameter of 27.5 meters, a height of 28 meters, and a 10,000-ton storage capacity, will be completed in December 2022.

According to Kajima leadership, the company plans to expand its utilization of dome-construction methods to a variety of buildings including arenas.

Fabrication team completes record number of projects in 2021

- Dome Technology's innovation is possible, in part, thanks to the fabrication shop located on campus headquarters. Every year the shop takes on more projects with more sophistication. Here are a few stats:

- In 2021 the shop fabricated **855 tons of steel**, up from 600 tons in 2020.

- Stainless steel was a popular material last year; **410 stainless-steel hoppers** were produced, plus plenty of stainless-steel piping.

- The most noteworthy project was the **tube gallery for American Crystal Sugar**—see more details on page 3.

- The fabrication team installed a new plasma table with a 3D head that allows for precision plate cutting and can process **pipe up to 24 inches in diameter**.

Also, "we installed a new water filtration/osmosis system on our plasma table, which allows the plasma to utilize pure water as a shielding gas and enables us to process stainless steel with smooth, precise cuts and without discoloration," shop manager Kirby Sheldon said. "This process drastically reduces the amount of heat transfer to the stainless steel, greatly reducing the heat-affected zone."

Dome Technology is building a second dome, pictured on the left, for American Crystal Sugar in Montgomery, Illinois, USA. Above: The tube gallery connecting the domes was fabricated at the Dome Technology shop in Idaho Falls, Idaho, USA.

BACK FOR ROUND TWO

American Crystal Sugar works with Dome Technology on second sugar DomeSilo

Repeat customer American Crystal Sugar hired Dome Technology to build a second sugar DomeSilo in Montgomery, Illinois, USA. This dome, with a capacity of 60,000 metric tons, was being built adjacent to the distribution hub's existing dome from a 2017 collaboration between the companies. The new dome is 184 feet in diameter and 146 feet tall, similar in first DomeSilo.

Dome construction was just one part of the project puzzle for Dome Technology. The team also adapted existing infrastructure to provide rail loadout. Before this project, sugar was delivered to the site by rail, stored in the dome, then distributed by truck. To broaden its services, ACS asked Dome Technology to modify the rail system to not only accept rail cars but also load them. "Some of their clients didn't have truck receiving; they had rail receiving. So moving to rail distribution would diversify who they could sell to," Dome Technology sales manager Daren Wheeler said.

On the fabrication side, Dome Technology built and installed a large tube gallery that connects an existing bucket elevator to the new DomeSilo, allowing the company to optimize conveyance and protect product integrity. Built in the Dome Technology shop in Idaho Falls, the steel tubes are 13.5 feet in diameter for ease of maintenance and extend 160 feet to connect the bucket elevator to the new DomeSilo.

The tube gallery is essential to the project because it helps keep the temperature and moisture levels consistent during conveyance. "As it's being transported, it protects the sugar. That's the benefit—it's 100 percent protected from the elements," Wheeler said.

Fabrication of a round tube gallery requires precision, and bids from outside manufacturers were cost prohibitive. The project was moved to the Dome Technology shop as a cost-saving measure and allowed the team to oversee quality control. "It was pretty technical, and it speaks a lot for where we are going with fabrication as a company," he said.

The new dome is 184 feet in diameter and 146 feet tall, similar to the first DomeSilo.

The tubes' exteriors were finished with insulated paint. Loaded with tiny ceramic discs, this paint boosts insulation values and was a customer request. The gallery was installed in 18 hours.

Dome Technology is equipped to provide the full package for customers from concept to completion, which is demonstrated in the current ACS project, Dome Technology CEO Bradley Bateman said.

FLEXIBLE STORAGE

Two-dome project keeps all the options open for cement company Bridgesource

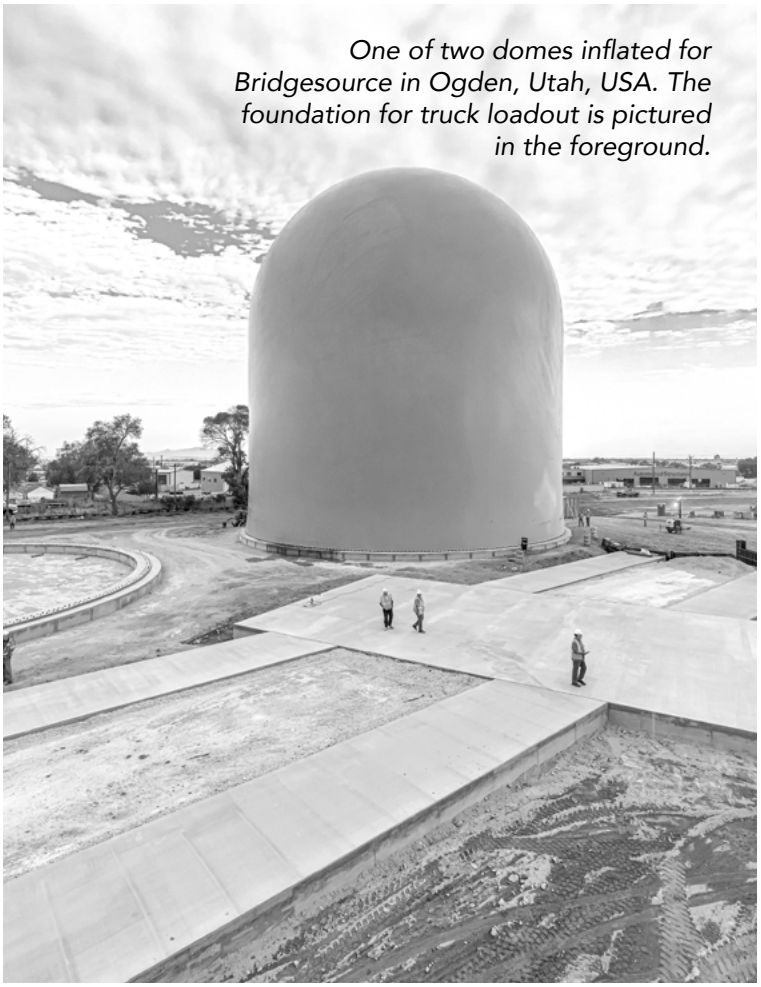
Two DomeSilos for Bridgesource, a division of Clyde Companies, have been built in Ogden, Utah, USA, and work is continuing inside on specialized systems.

Fly ash or cement will be pneumatically conveyed to one of two domes, the centerpiece of the storage facility. Each dome is 108 feet in diameter and 120 feet tall with a capacity of 25,000 short tons each. Reclaim will be 99 percent live with a DCL aerated floor system and side discharge.

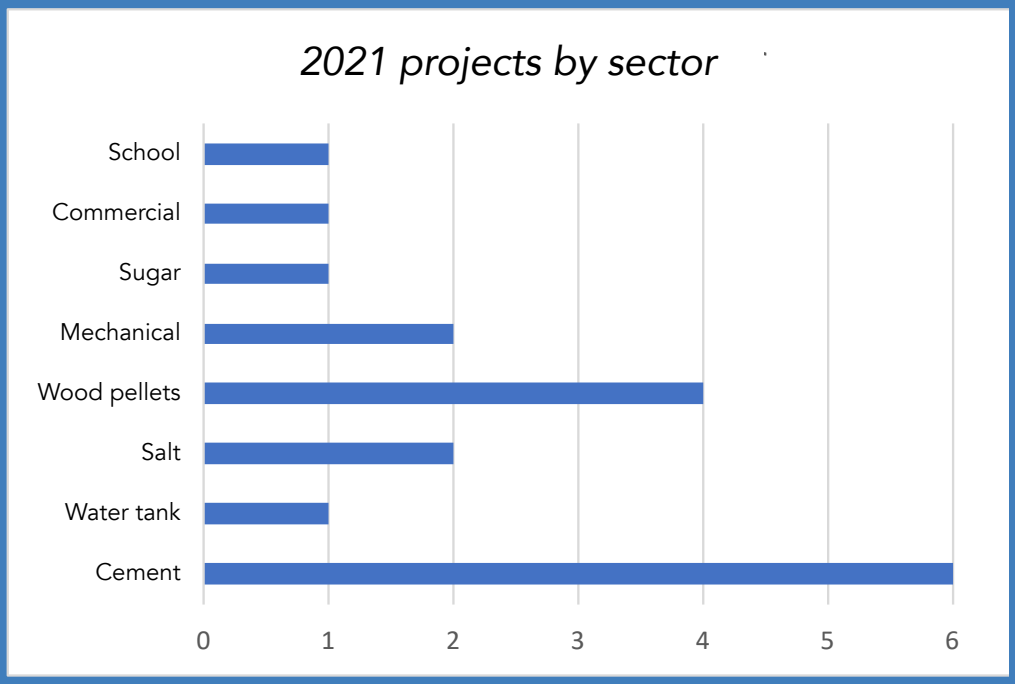
An innovative sloped-floor design allows for building a vault to house mechanical equipment like blowers underneath the high end of the floor.

Trains will deliver and discharge product into a large T-shaped pit with pneumatic-transport equipment inside; Dome Technology is also constructing a steel building over the pit. From the domes, fly ash will return to the pit, from which product will be conveyed to one of two 300 short-ton day bins for truck loading or a batch plant. A 700-foot pipe will transport fly ash from the pit to the batch plant. When complete, Bridgesource will be set to store and distribute fly ash on the Ogden rail line.

The DomeSilos will also be capable of transitioning to cement storage if necessary. Dome Technology began deep-foundation systems in Spring 2021. Project completion is scheduled for Summer 2022.



One of two domes inflated for Bridgesource in Ogden, Utah, USA. The foundation for truck loadout is pictured in the foreground.



2021 PROJECTS AT A GLANCE

Last year Dome Technology worked on 18 construction project, eight of which included structural steel and related mechanical and electrical systems—see the breakdown in the graph at left. The team also tackled 20 engineering projects.

Details about completed work are published on our website. Look for new posts every Monday at dome technology.com/company/articles.