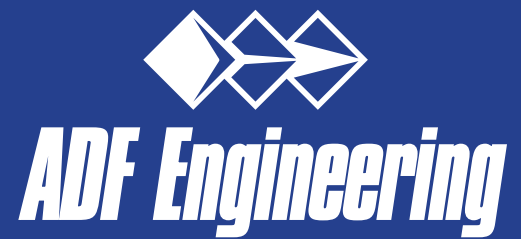


Sugar Handling

Solutions and Services



PROBLEM SOLVED

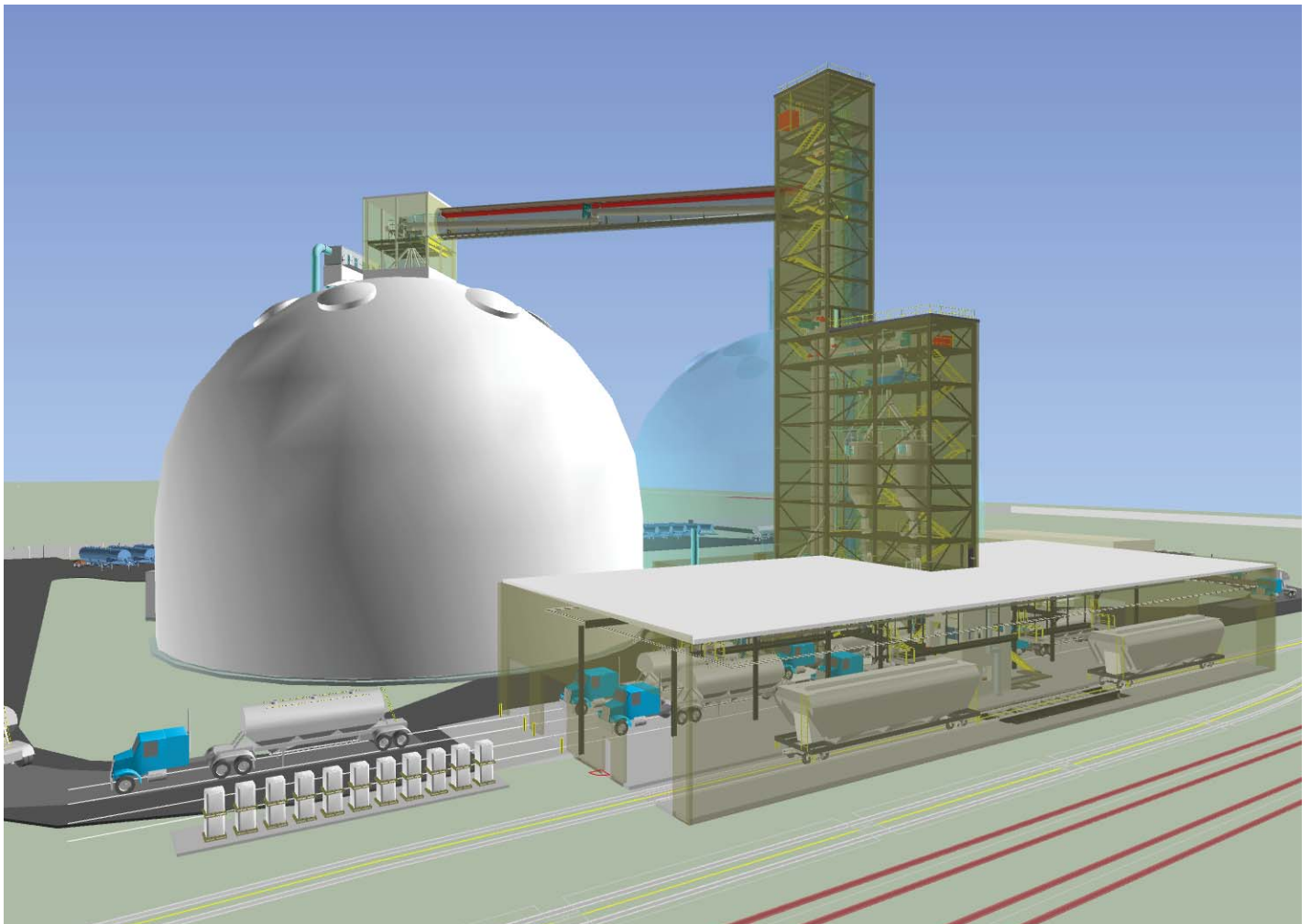
Sugar Handling Expertise

ADF Engineering offers a complete range of analysis and solutions for handling bulk granulated sugar and producing and handling liquid sucrose. Solutions for improving sugar unloading, transfer and storage, and handling of granulated sugar can be achieved to optimize efficiencies and lower costs associated sugar handling opportunities.

Pictured below: A sugar storage dome, bridge, and transloading facility that was designed by ADF recently. The total project cost was nearly \$44 million, and the facility's loadout can fill four trucks per hour from two different loadout areas, totaling 200,000 pounds of sugar moved every hour.

Areas of Opportunity

- Granulation degradation
- Excess fines
- Caking in storage silos
- Plugging in sugar transfer lines
- Combustible dust management
- Dust Hazard Analyses
- Receiving and unloading
- Analysis upon receipt
- Regulatory compliance
- Points of use
- Transfer processes
- Gentle handling
- Mixing and batching



Receiving/Unloading

- By railcar
- By bulk truck
- Methodology
 - Pneumatic
 - Gravity
 - In-Line Food Safety Devices
 - Metal Detection
 - Screening
 - Rare Earth Magnets
- Unloading Key Parameters
 - Pressure
 - Relative Humidity
 - Temperature
 - Make-Up Air

Storage to Point of Use

- Dust Collection
- Transfer Process
 - Mechanical – Screw Conveyor
 - Pneumatic – Dense Phase, Fluid Phase

Analysis of Sugar

- Upon Receipt and throughout the sugar transfer & handling process
- Expectations of sugar functionality in producing finished product (baking, sweetener, structural, liquid)
- Key Analytic Attributes
 - Moisture
 - Granulation Degradation (Sieve Analysis, CV, Mean Aperture)

Analysis of Sugar System for Combustible Dust Management

- Performance of Dust Hazard Analysis (DHA)
- Identify potential opportunities
- Propose management/mitigation solutions
- Provide resources to implement solutions

Sugar Handling to Storage

- Transfer Systems
 - Pneumatic
 - Dense Phase
 - Fluid Phase
 - Belt Driven
 - Mechanical Screw Conveyance
 - Bucket Elevators
- Distance Parameters
 - Lbs. Per Hour Expectation
 - Pipe Sizing
 - Vertical & Horizontal
- Transfer Constraints
 - Horizontal Distance
 - Valves, Turns & Sweeps
- Storage Conditions
 - Size/Amount of Storage
 - Storage Temperature & Humidity
 - Dust Collection Systems