AAPA Facilities Engineering Seminar & Expo

"Not just for containers anymore"

Bulk Handling – Ken Upchurch / BRUKS Rockwood

AAPA Facilities Engineering Seminar & Expo
"Bulk Handling"

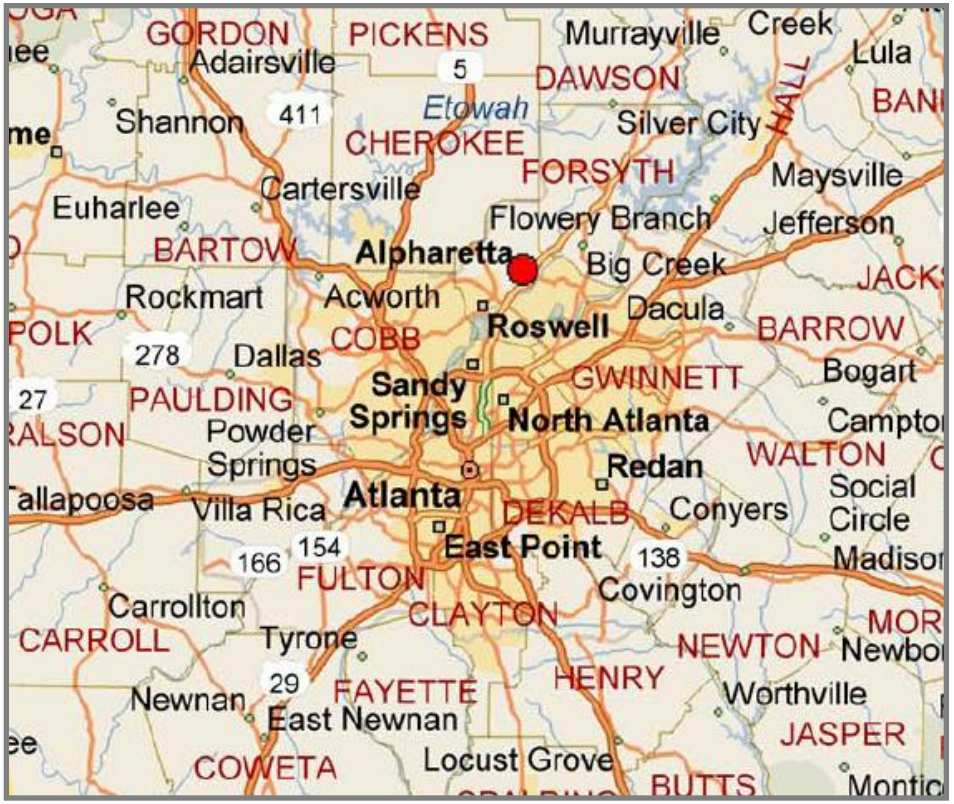
Presentation Agenda:

- **BRUKS Company Overview**
- **Examples of Bulk Handling at Export Terminals**
- **What is emerging in North America today**
- **Questions**

Company Overview:

“BRUKS Rockwood is a Provider of Bulk Materials Handling Solutions”

BRUKS Rockwood Office



BRUKS Rockwood, Inc.
5975 Shiloh Road
Alpharetta, Georgia
USA

BRUKS® Rockwood

History BRUKS Group

1897	**Klöckner GmbH**
1959	Bruks Mekaniska AB
1979	Rotom Verkstäder AB
1984	Celltec Engineering AB
1998	Rockwood Materials Handling

Klockner Office – Hirtscheid, Germany est. 1897

2000	BRUKS AB aquires Klöckner Gmbh
2004	Bruks Inc Atlanta is established
2006	New owner JCE Group
2006	Aquisition of Celltec Engineering AB
2007	Aquisition of Rotom
2008	**Aquisition of Rockwood**

BRUKS® Rockwood

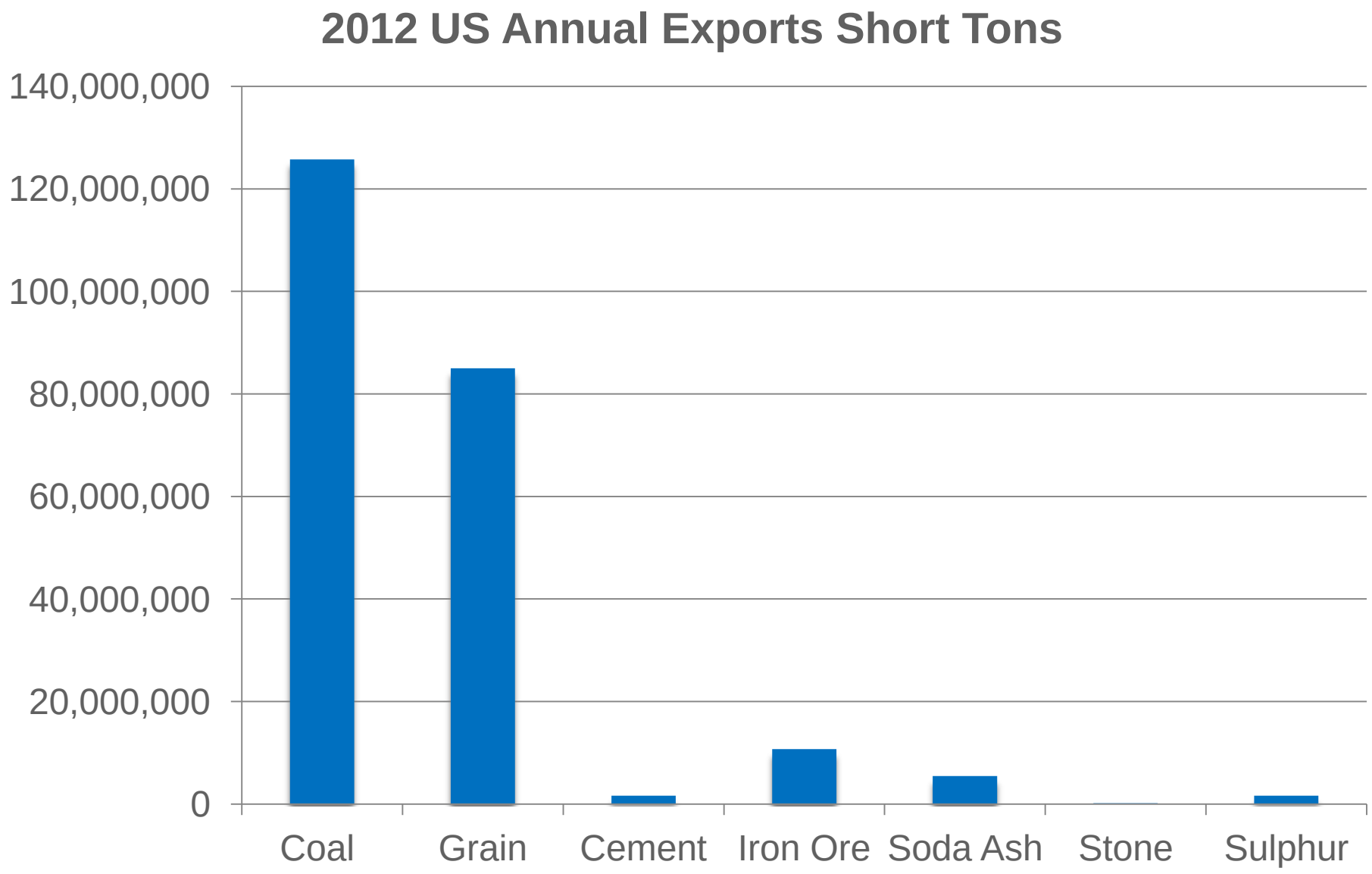
Equipment Portfolio


BRUKS


BRUKS
JLG ULTRA BOOM

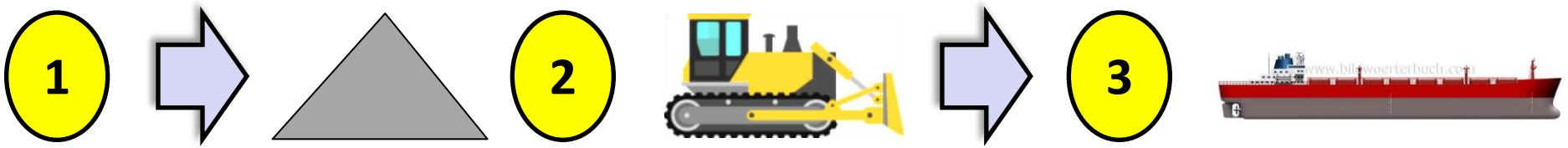
Bulk Handling at Export Terminals:

What products are shipping in ”bulk” form?



Source: US Energy Administration

The common elements in most ”bulk” terminals



1. **Receiving:**
   Materials are either produced locally and delivered to the terminal by conveyor or the materials are produced elsewhere and transported to the terminal by road, rail or water.

2. **Storage:**
   Once materials are received, they are stored or consolidated awaiting bulk transport.

3. **Loading:**
   The consolidated materials are then loaded onto bulk vessel for transport to the final destination of use.

What are the basic elements to a bulk terminal?

1. **Receiving:**
   The majority of bulk materials are being transported from the nation's interior to coastal port terminals. The most cost effective mode of transportation is typically by train. In some cases, product is received by barge or truck.

Truck

Barge

Train

What are the basic elements to a bulk terminal?

2. **Storage:**
   Material, capacity and environment all factor into the type of storage utilized for most bulk material terminals. Large capacity water resistant materials are usually stored outside. Lower volumes of absorbent materials are under roof.

Silo

Dome

Open Pile

What are the basic elements to a bulk terminal?

3. **Loading:**
   There are a wide range of equipment technologies available for efficient vessel load out. The loader design is highly dependent on dock configuration, vessel size, loading capacity and material characteristics.

Portable

Fixed

Traveling

Example Projects:

Sulphur Export Terminal

Basic Characteristics

Annual Throughput: 1M Tons

Storage Capacity: 100k Tons

Inbound Capacity: 500 TPH

Outbound Capacity: 1500 TPH


Receiving
Loading
Storage

Typical Equipment – Manual Storage

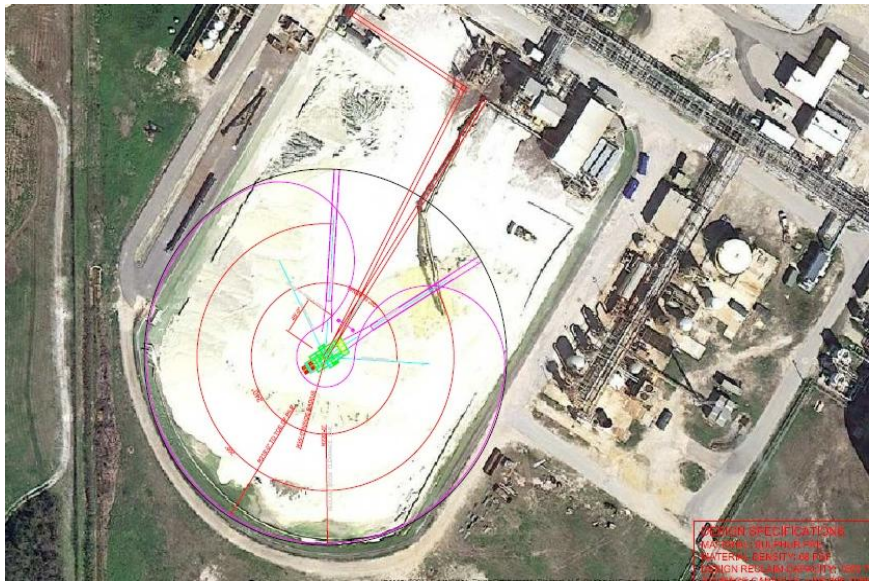
Fixed Stacker & Manual Reclaim

Manual Storage:

- Stacking or receiving is scheduled in conjunction with the prilling operation
- Material is stacked-out using a fixed conveyor
- The pile is managed by operators using a dozer or front-end loader
- Material is pushed to a reclaim hopper (average ~900 STPH)
- The reclaimer feeds directly to a take-away belt

Typical Equipment – Future Automation

As Business Grows….
Future Design Allows for Automated Stockpile



Automation Advantages:

- Improved inventory control
- Lower OPEX
- Improved loading capacities
- Reduced material degradation

Automation Disadvantages:

- Higher CAPEX costs

Typical Equipment – Traveling Ship Loaders

Traveling & Luffing

<u>Traveling & Luffing Loader:</u>

- Allows the vessel to be loaded without relocation
- Trimming is accomplished by traversing the loader along the dock line
- The machine is equipped with a telescopic spout & trimming spoon

Pet Coke Export Terminal

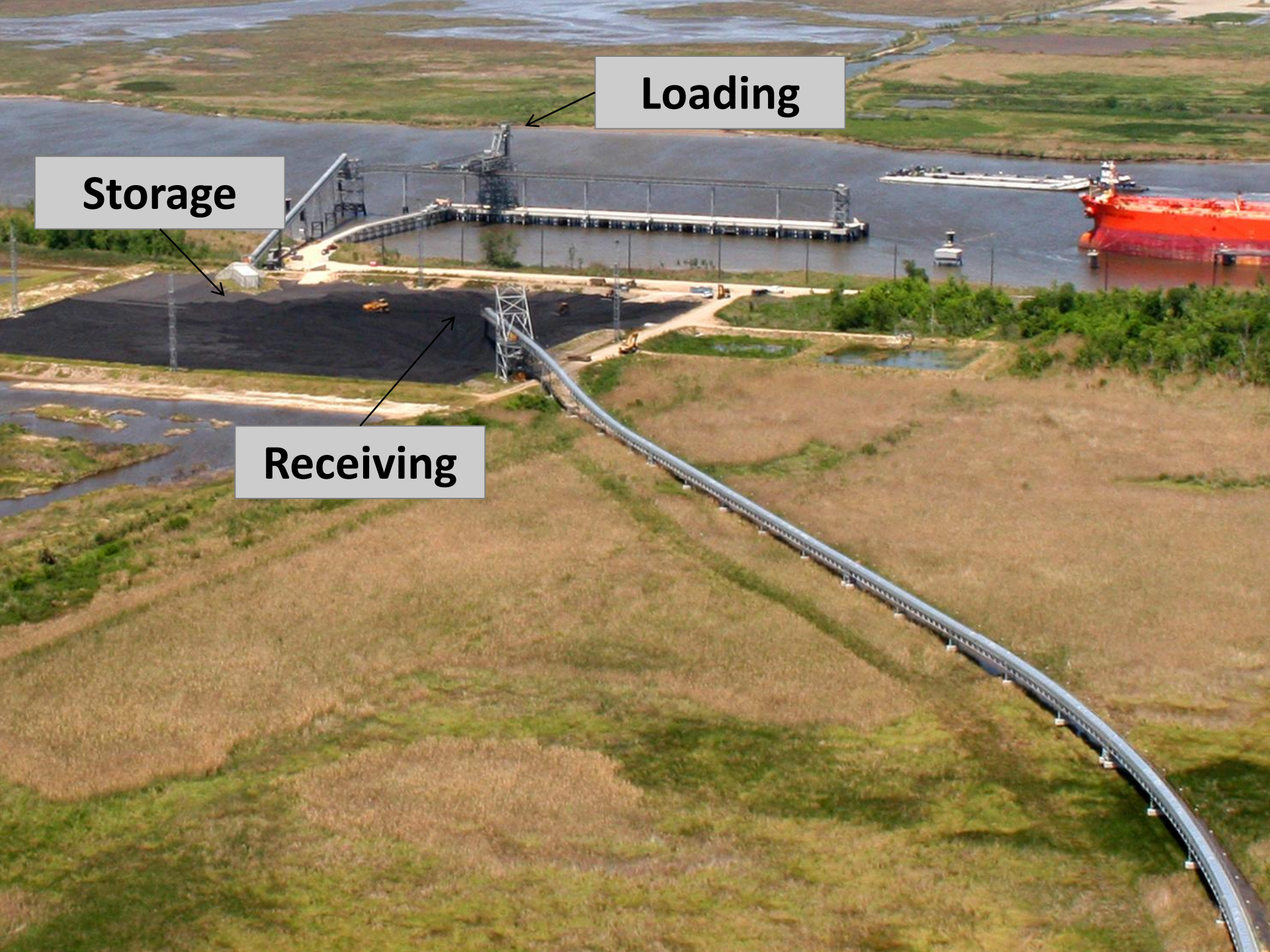
Basic Characteristics

Annual Throughput: 1M Tons

Storage Capacity: 75k Tons

Inbound Capacity: 500 TPH

Outbound Capacity: 2500 TPH


Loading
Storage
Receiving

Typical Equipment – Manual Storage

Fixed Stacker & Manual Reclaim

Manual Storage:

- Stacking or receiving is scheduled in conjunction with the coking operation
- Material is typically stacked-out using a fixed conveyor
- The pile is managed by operators using a dozer or front-end loader
- Material is pushed to a reclaim pit (average ~2000 STPH)
- The reclaimer feeds directly to a take-away belt

Typical Equipment – Traveling Ship Loaders

Traveling, Luffing & Shuttling

Traveling, Luffing & Shuttling Loader:

- Allows the vessel to be loaded without relocation
- Trimming is accomplished by traveling and shuttling (operating in x/y axis)
- The machine is equipped with a telescopic spout & trimming spoon
- The shuttle feature accommodates multiple beam widths

Coal Export Terminal

Basic Characteristics

Annual Throughput: 8M Tons

Storage Capacity: 1.3M Tons

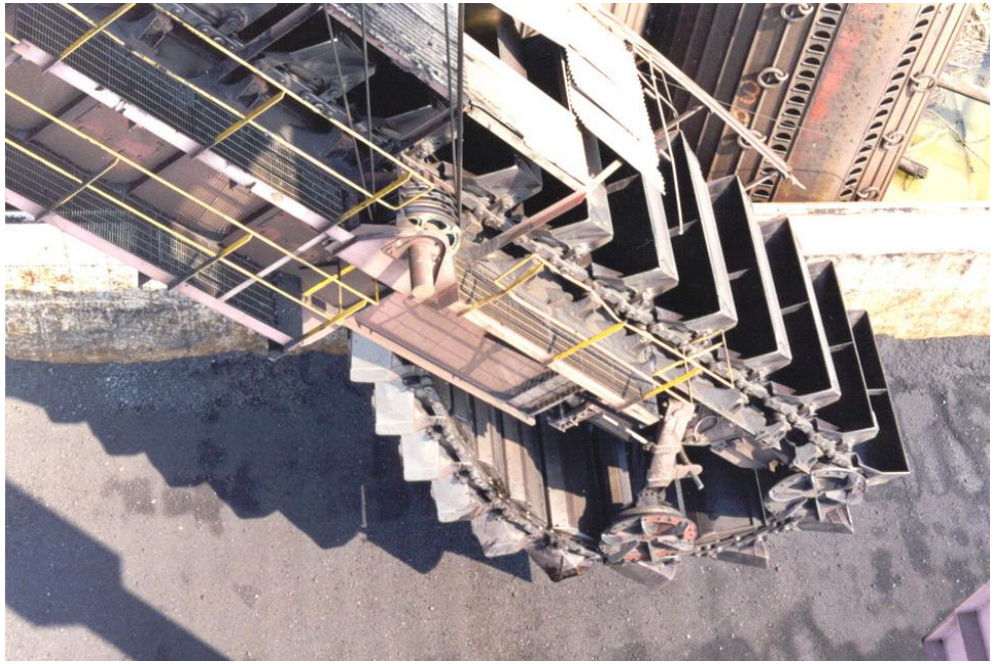
Inbound Capacity: 1500 TPH

Outbound Capacity: 5000 TPH


Receiving
Loading
Storage

Typical Equipment - Receiving

Barge Unloader



High Capacity Receiving:

- Material is produced elsewhere and delivered by river barge
- The continuous barge unloader (CBU) has a 1500 STPH capacity
- Unloaded material is conveyed directly to the storage pile

Typical Equipment – Automated Storage

Linear Stacker

Linear Reclaimer

Automated Stacking & Reclaim:

- Traveling stacker (2x) builds a linear pile at a rate of 1500 STPH
- The stacker is designed to control and segregate materials as needed
- The linear bucket wheel reclaimer (2x) has a capacity of 2500 STPH
- Reclaimed material is delivered to the ship loader

Typical Equipment – Traveling Ship Loaders

Traveling, Luffing & Slewing

Traveling, Luffing & Slewing Loader:

- Allows the vessel to be loaded at a 5000 STPH rate without relocation
- Trimming is accomplished by traveling and slewing (operating in x/y axis)
- The machine is equipped with a telescopic spout & trimming spoon
- The slew feature accommodates multiple beam widths
- Design works well with a dedicated fleet of non-geared vessels

What is being built in America today:


European renewable energy policies are driving the demand for wood pellets throughout the world
Some projections show North American exports growing by more than 10 million tons between 2013 and 2017
Typical ports are being designed to handle ~500,000 tons annually translating to 20 new export facilities in the next 4 to 5 years

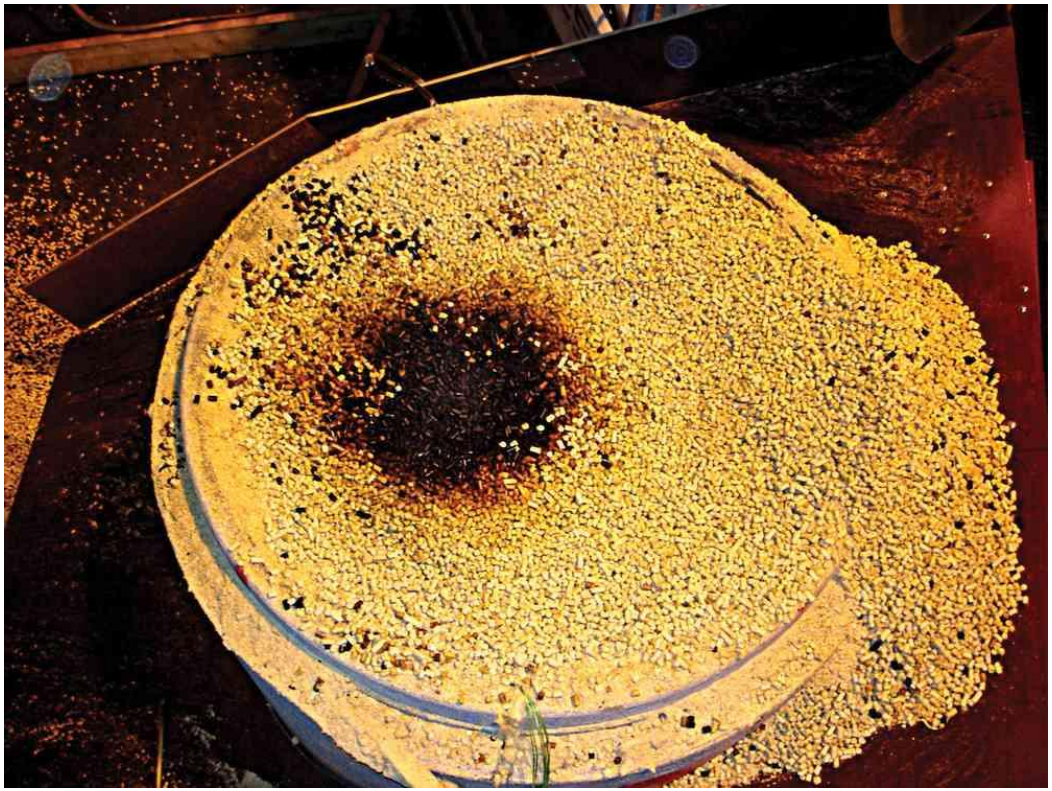
What is a wood pellet?

Wood Pellet Characteristics:

- Produced from whole tree chips (typically green)
- The green chips are dried to a moisture level of 5 – 10%
- The chips are then milled to produce a finer particle < 4 mm
- These particles are then processed into a pellet using a press
- This process generates excessive heat that requires the pellets to be “cooled”
- Once cooled the pellets are typically loaded for transport to the export terminal
- The pellets continue to generate heat for the next several days
- Eventually the pellet heat stabilizes and can be loaded onto ocean going vessels

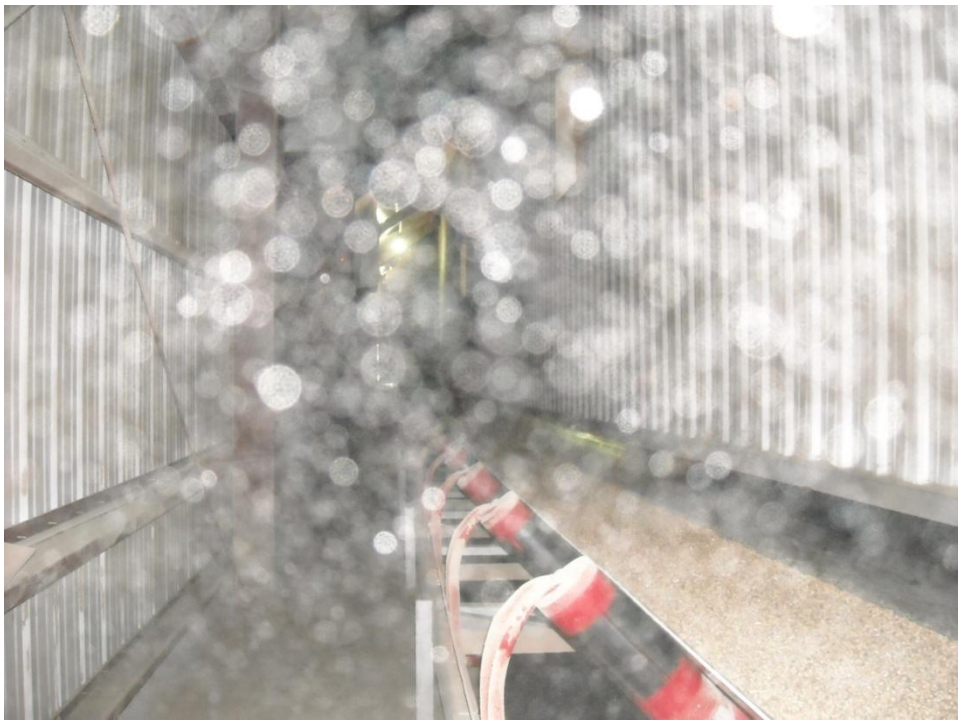
Pellet Terminal Challenges

Heat Control – the internal heat generated by the wood pellet can reach a combustion point. The result can be fire or explosion. Aeration and heat monitoring are a MUST.



Pellet Terminal Challenges

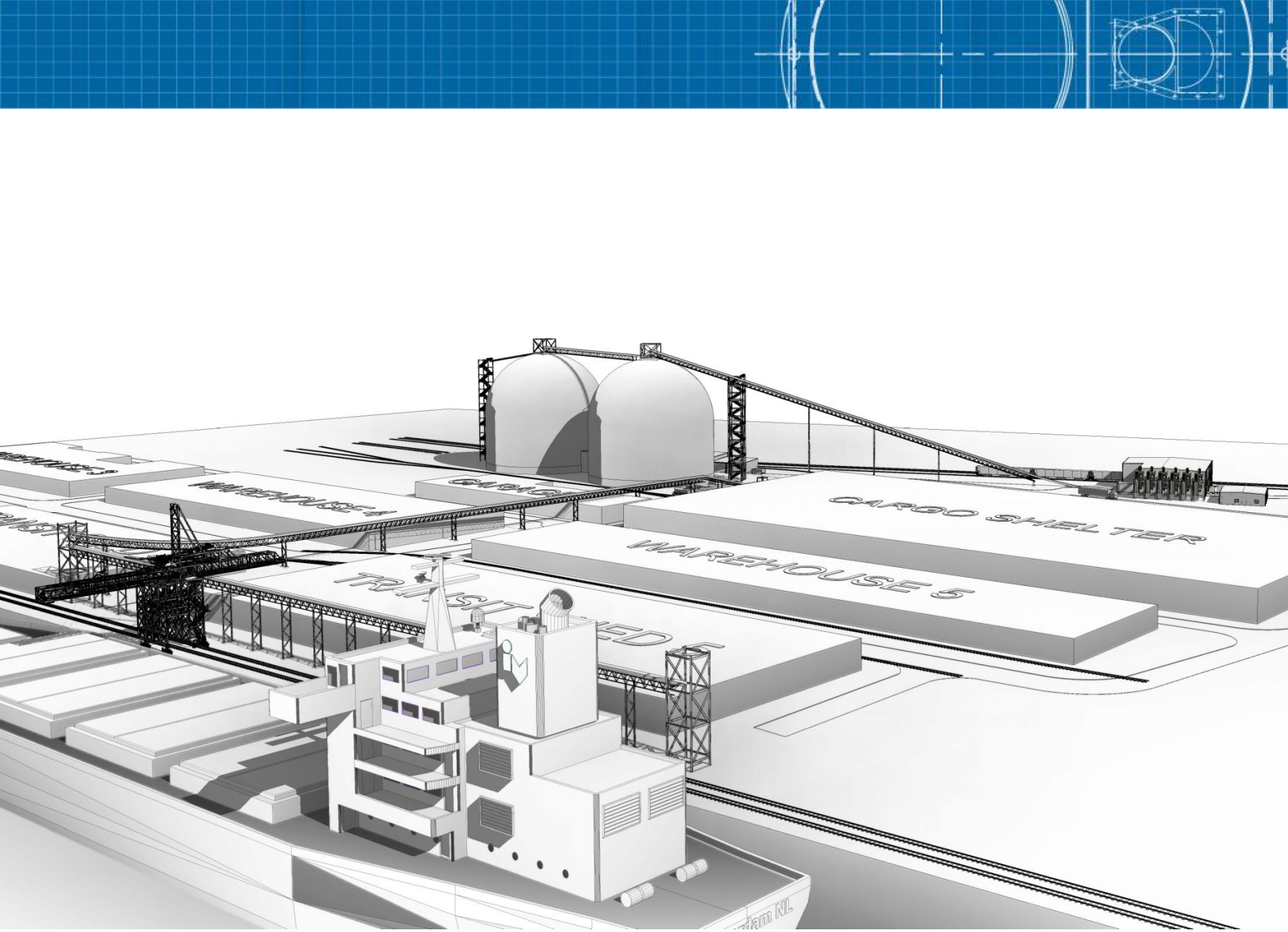
Degradation & Dust – pellets are constructed by forming small particulates through a die. If not handled properly, the pellet can be broken down into its original form creating large quantities of airborne particulates

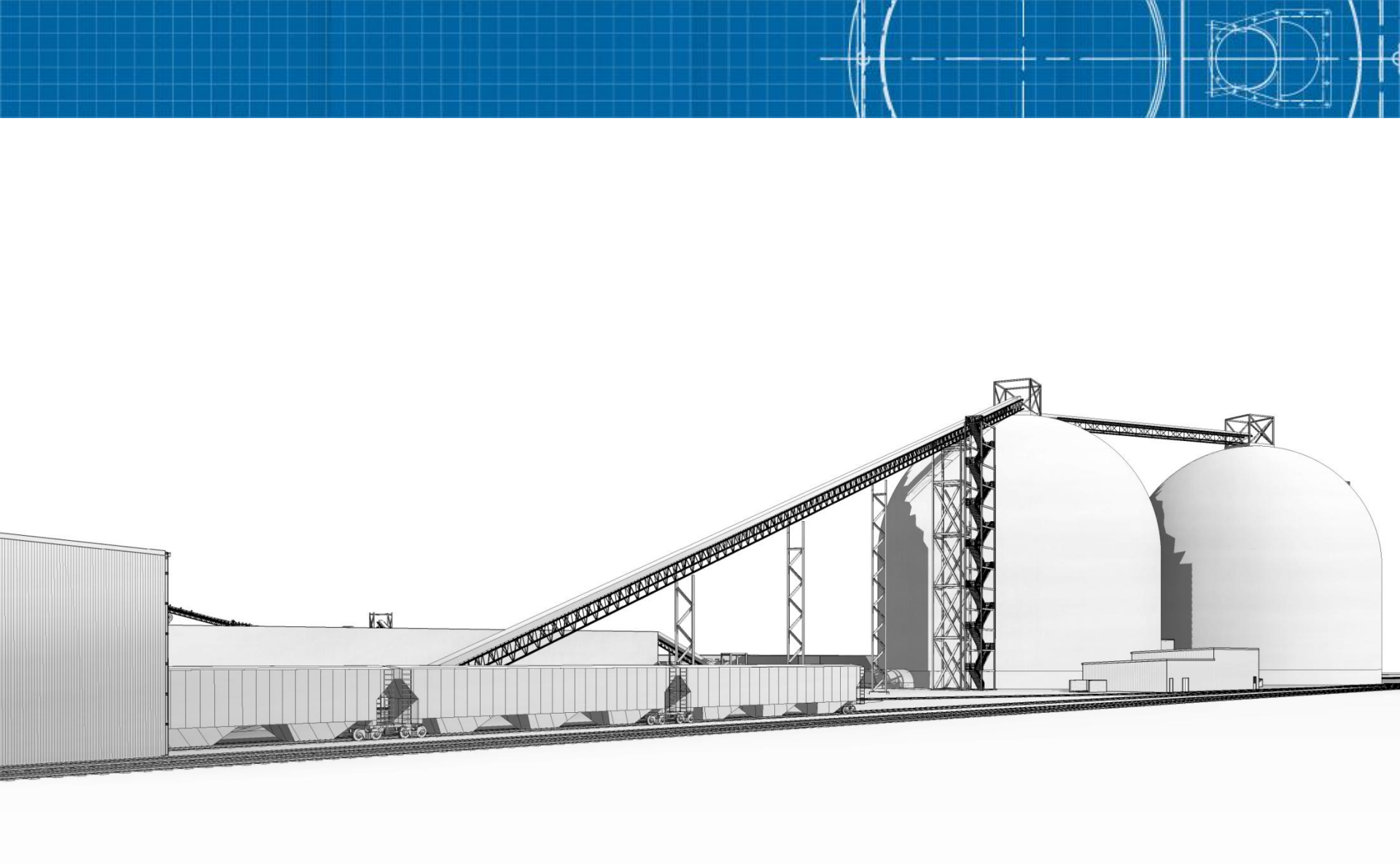


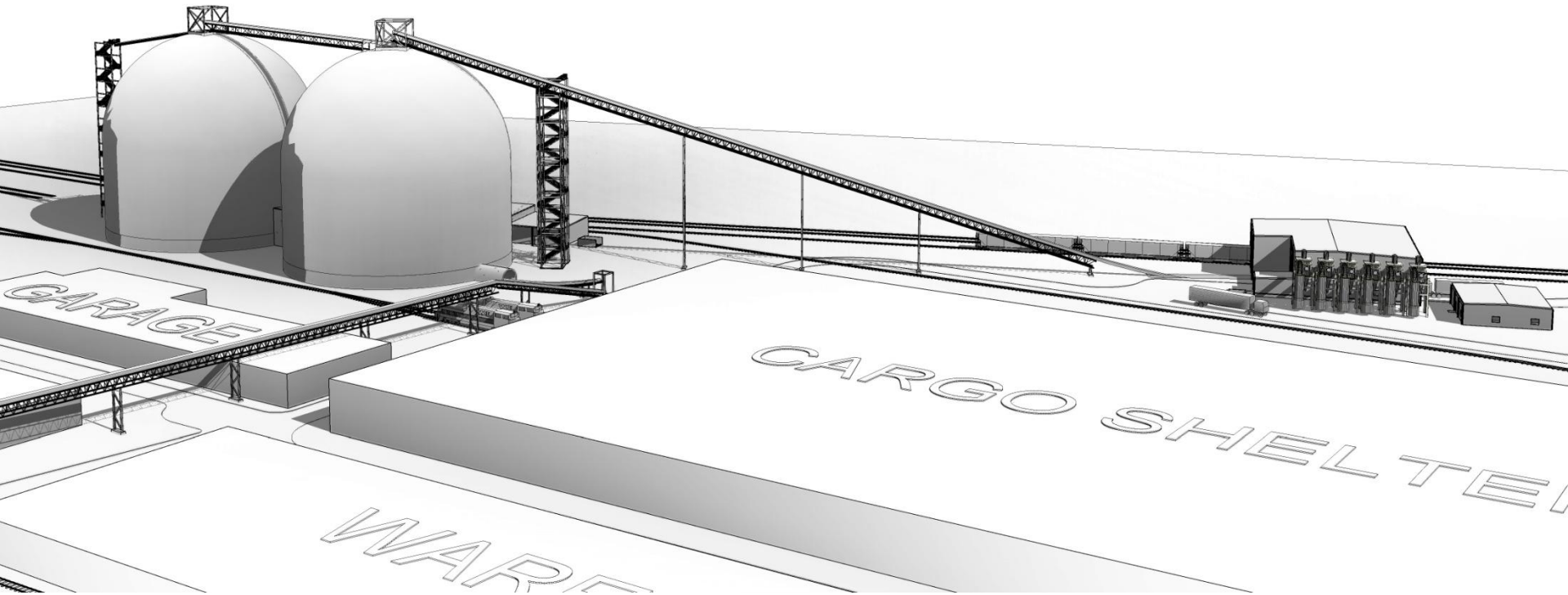
Pellet Terminal Challenges

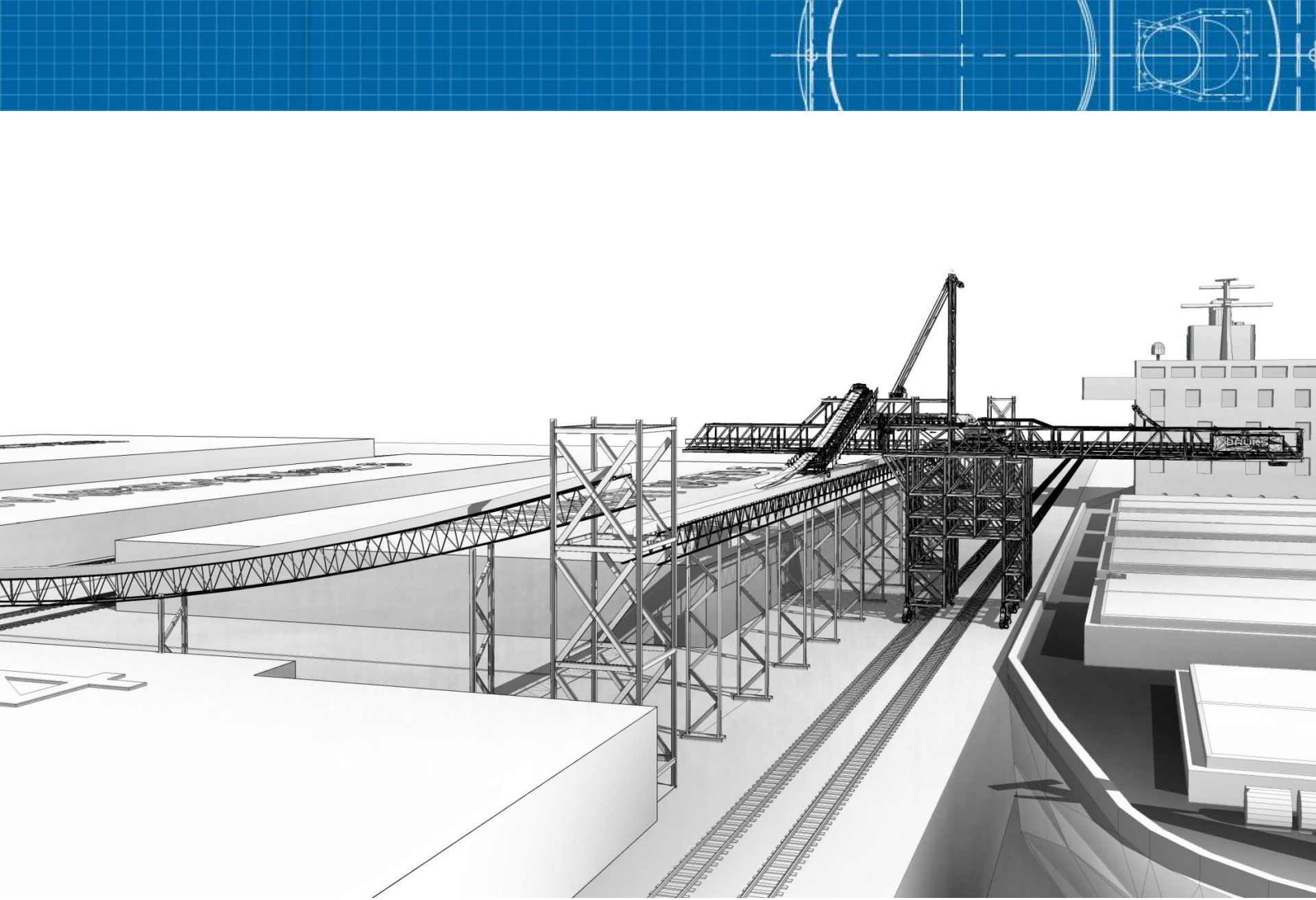
Water – pellets are NOT water resistant. When introduced to water, the smaller particles act as absorbent and the pellets turn to “mush”

Basic Elements – Pellet Export Terminal


CARGO SHELTER
WAREHOUSE 5




GARAGE
CARGO SHELTE



Typical Equipment - Receiving

The majority of the plants being built are looking for ports with rail access

Typical Equipment - Conveying

Conveyors are protected to allow for unloading in all weather conditions as well as to reduce dust emissions

Typical Equipment - Storage

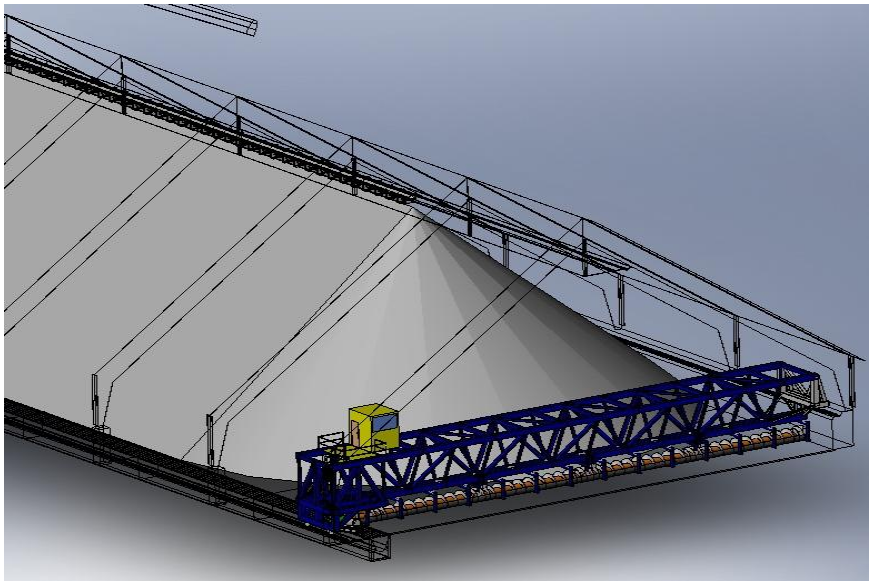
Most terminals are being designed to store at minimum of 50,000 tons under roof in either a linear or circular storage facility

Typical Equipment - Reclaim

Manually operated equipment is commonly used for reclaim operations

Typical Equipment - Reclaim

Excessive degradation, operating costs and loading efficiencies are spurring development of new reclaimer technology



Typical Equipment - Loading

A variety of loading equipment has been tried including portable, fixed and traveling machines

Portable

Fixed

Traveling

In Closing:

Bulk Handling will be a constant for future terminal operations in North America

Economic and political forces will continue to influence the material types and volumes that are handled

There is not a “one size fits all” design that suits all operations and materials. Flexibility in design is critical

Questions?

Please feel free to contact:
Ken Upchurch
Vice President Sales & Marketing
BRUKS Rockwood
770-849-0100 x109
kuh@bruks.com