DUST FREE

Containerised Bulk Handling
Case Studies of Ports adopting innovative systems to stop dust pollution
AIR POLLUTION:

Workers who are involved in the daily handling of certain bulk cargo are exposing themselves to harmful airborne pollutants which cause respiratory problems.

This exposure can lead to lung diseases such as:

- Silo-Filler’s disease
- Black Lung disease
- Farmer’s Lung disease
**Silo-Filler’s disease**

Caused by exposure to nitrogen oxide gas which is given off during grain fermentation in the silo. As nitrogen oxide is heavier than air it can escape through the silo chute into barn areas.
Black Lung disease
Caused by exposure to coal dust with similar symptoms to inhaling silica dust and tobacco smoke.
Farmers Lung disease
Caused by exposure to tiny microorganisms which inhabit moldy hay. Inhaled it provokes the creation of antibodies that circulate the bloodstream.
In order to reduce airborne pollution and meet global environmental guidelines,

bulk ports, terminals and bulk commodity handling facilities are having to find ways to reduce the levels of dust generated during the handling and unloading of bulk commodities.
SOURCES OF DUST
SOURCES OF DUST

TRANSFER POINTS
OPEN WAGONS
OPEN STOCKPILES
SHIP LOADING
SOURCES OF DUST

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SOURCES OF DUST

TRANSFER POINTS
OPEN WAGONS
OPEN STOCKPILES
SHIP LOADING
During these processes the commodity is handled **multiple times** resulting in **losses and dust!**
Dust is generated at any point in the logistic cycle when energy is added to materials.
Many companies are now looking at systems to reduce levels of contamination, but also cost effective systems to meet current environmental guidelines.
Containerised BULK HANDLING
A new method to export bulk is available.

*Containerised Bulk Handling* is in operation at various bulk *and* standard container terminals and has already won 2 awards for its environmental benefits and innovative technology.
The CBH system uses: Sealed containers as a method of storage and transport... ...either by rail
...or both

(bi-modal)
The CBH system also uses: RAM Revolver®, a rotating spreader which handles the container, lifts the lid and rotates the container, gently tipping the commodity out.
CONTAINERISED BULK HANDLING

THE PROCESS

FILL the CONTAINER at the MINE

- EXISTING SITE EQUIPMENT USED
- NO LOSS OF COMMODITY
- NO CLEAN UP REQUIRED
THE PROCESS

SEAL the CONTAINER

- EXISTING SITE EQUIPMENT USED
- SELF LOCKING LID SYSTEM
- SEALS COMMODITY UNTIL LOADING
- NO CONTAMINATION
CONTAINERISED BULK HANDLING

THE PROCESS

SEND CONTAINER by RAIL
- SEALED CONTAINERS – NO DUST
- NO CONTAMINATION
- NO LOSS OF COMMODITY
CONTAINERISED BULK HANDLING

THE PROCESS

Or SEND CONTAINER by ROAD

- USING EXISTING ROAD NETWORK
THE PROCESS

STORE CONTAINERS AT PORT

- NO STOCK PILE – NO DUST
- NO CONTAMINATION
- FAST & EFFICIENT LOADING
- STORE MULTIPLE TYPES OF COMMODITIES AT SAME AREA WITH NO CROSS CONTAMINATION
THE PROCESS

LOAD using RAM Revolver

- FOR ALL TYPES OF CRANE
- LOADS OF UP TO 1,000 TPH*
  *subject to commodity & loading conditions
- SWL – UP TO 45T
- LID LIFTER TECHNOLOGY – NO CONTAMINATION – NO DUST
- TWISTLOCK & GRIPPERS SECURE CONTAINER DURING ROTATION
CONTAINERISED BULK HANDLING

MISTING SYSTEM

MISTING SYSTEM OFF

MISTING SYSTEM ON contamination material loss
LOADING PROCESS

ROTARY LOADING WITH VIRTUALLY NO DUST GENERATED
CLEANEST ORE LOADING SYSTEM AVAILABLE

- Ships hold loaded to a 3rd full due to density of ore
- Peak of 5m cargo depth provides 12m air height in hold
- Leaves plenty of room IN HOLD to unload ore
- Unloading normally to within 1m of top of cargo – greatly reduces dust generation

Water sprays at top of hold

17m Total area depth
12m Air height in hold
5m Cargo depth
CONTAINERISED BULK HANDLING

CBH BENEFITS

SAFE & FAST
Virtually unmanned operation
With loading rates of 1000 tonnes per crane per hour

ENVIRONMENTAL
Zero Dust - No clean up
Best practice by EPA with fast approval

COST
Lower set up costs
No conveyor, ship loaders or storage sheds

PROVEN & REPRODUCIBLE
Providing a simple proven turnkey solution to importers
CASE STUDY 1

COMPANY: Transnet Port Elizabeth

COMMODITY: Manganese

EQUIPMENT: Ship to Shore Crane

CLICK HERE FOR VIDEO
CASE STUDY 1

PORT ELIZABETH

South Africa
CASE STUDY 1

PORT ELIZABETH  South Africa
CASE STUDY 1

PORT ELIZABETH  South Africa
Transnet’s introduction of Containerised Bulk Handling delights customers and is breaking bulk handling records in South Africa.

12 = A record breaking 14,230 tonnes of manganese was loaded in just 12 hours.
CASE STUDY 2

COMPANY: TPR Rosario
COMMODITY: Grain
EQUIPMENT: Ship Crane
TPR Rosario - Argentina

Overview

**TPR Rosario is the first terminal in the world to utilize Containerised Bulk Handling.**

The terminal is a key gateway hub for Argentina, handling all types of import and export cargo.
Case Study 2

TPR Rosario - Argentina

Challenges

Growing business of exporting grain required TPR to find a method to improve productivity whilst also simplifying the operation.

Limited investment capacity – existing equipment has to be used or modified.

Traditional contamination of commodity from open stockpiles.
CASE STUDY 2

TPR Rosario - Argentina

**Fill**
at the Farm

Agri-bulk loaded into specially designed high cube 20ft containers

**Containers**
as Transport and Silo

**Multipurpose use:**
Fill | Transport | Store | Empty | Re-use
TPR Rosario - Argentina

The Problem
Contamination of Commodity

Open stockpiles at risk of “spoil” due to:

- Contamination from vermin & birds
- Moisture
- Airborne contaminants
- Open top transport from farm to port
- Other physical external contaminants

The Solution
Contamination free

CBH contamination free process down to:

- Commodity
  - Being stored in sealed containers
  - Kept secure and dry throughout the process

- Lid on Container
  - Lifted only during rotation of commodity into the ships hold

No stockpiles = No contamination
Benefits

- Fast loading rates with CBH
- Handling process can be as high as 25 cycles per hour
- Up to 1,000 tons per hour can be achieved
- Minimal material loss
- Innovative lid system means no material loss during CBH process
CASE STUDY 2

TPR Rosario - Argentina

Solution

Any container terminal

- CBH allows exporters to take the grain to any container terminal

Storage – Sealed Container

- Grain stored in high cube 20ft or 40ft containers with lids
- No material loss

Portable

- Containers can be re-located to other operation port with the rotating spreader
CASE STUDY 3

COMPANY: Patrick Ports & Stevedoring

COMMODITY: Copper Concentrate

EQUIPMENT: Ship Crane
Environmental Benefits

“Turning DP World Adelaide from a standard container terminal into a bulk handling terminal raised an interesting reaction”.

“The sailing squadron next to the terminal came to me one day to protest about the new system of bulk export being introduced at the terminal, and they wouldn’t allow us to operate the system as it would create red dust on their sailing boats”.

“They had slack jaws when I told them the system had already been running for six months with zero emissions”.

DPW Adelaide
CASE STUDY - TESTIMONIAL

...and terminal growth

“DPW Adelaide was an under utilized terminal with low berth occupancy and little growth prospects”

“...to grow the terminal we needed to think outside traditional income sources”

Ray Lee
Regional Director
DPW Australia | 2009-2011

DPW Adelaide
Low capital expenditure

“Patrick was able to utilize this new revolving spreader technology to export copper concentrate for our client with very little capital”

“Our Client was extremely pleased with the dust free solution”

Patrick | Asciano

Adrian Howard
Commercial Director
Patrick Ports & Stevedoring
High loading rates minimize shipping costs

Miners Perspective

“Environmentally it is a very clean system due to containers being emptied directly into the ship’s hold thereby minimizing a number of dust generating points.”

“Loading rates of 15,000 wmt/day being achieved are such that it helps to minimize shipping costs.”

North Park Mines

Jack Cole
North Park Mines
CASE STUDY – FURTHER EXAMPLES

LATVIA

COAL
IRON ORE
MANGANESE
COPPER
GRAIN

MHC CRANE
SHIPS CRANE
STS CRANE
BRIDGE CRANE
REACH STACKER
CASE STUDY – FURTHER EXAMPLES

CHILE

COAL
IRON ORE
MANGANESE
COPPER
GRAIN

MHC CRANE
SHIPS CRANE
STS CRANE
BRIDGE CRANE
REACH STACKER
CASE STUDY

ARIZONA / MEXICO

CAPSTONE MINING CORP

COAL
IRON ORE
MANGANESE
COPPER
GRAIN
OTHER

MHC CRANE
SHIPS CRANE
STS CRANE
BRIDGE CRANE
REACH STACKER
### CBH - COMPARISONS

#### MHC model
- Cranes x 2 = USD$ 8,000,000.00
- Containers x 30 = USD$ 300,000.00
- CHE = USD$ 500,000.00
- Revolver’s = USD$ 1,500,000.00

= 10 MILLION

#### Ships Crane model
- Revolver’s x 2 = USD$ 800,000.00
- Misting System = USD$ 200,000.00
- Container = Leased
- Fork Truck = Leased

= 1 MILLION
CONTAINERISED BULK HANDLING - BENEFITS

- Flexible Berths – No fixed bulk berths
- Fast to start
- No dust
- Low cost
CONTAINERISED BULK HANDLING - BENEFITS

Cost
- Lower set up costs (No conveyor, ship loaders, storage sheds)

Environmental
- Zero dust, no clean up
- Best practice by EPA with fast approval

Safe & Fast
- Virtually man less operation with loading rates of 1700 TPH per crane

Proven & Reproducible
- Providing a simple proven turnkey solution to exporters
INTEGRATED APPROACH

Revolver®

Cranes

Dust Suppression

Container Handlers

Containers

REVOLVER trailer system
CBH COMPANIES

Exxaro
Grinrod
DP World
Eletheni/ SNR
BHP B
Oz Minerals
Hillgrove Copper
Transnet
FQML
TPR Argentina
Ironclad
Patrick
MMG Las Bambas
Riga Universal Terminals

ETI Bakir
Port of Quijarro
HPH Timsa
“Not often do you get a solution that is the lowest cost but also best practice environmentally”
Containerised Bulk Handling with RAM Revolver® is recognized by the bulk handling industry as an innovative and environmentally friendly solution.

IBJ - 2014
Environmental Protection Award
For contamination & dust free Containerised Bulk Handling

IBJ - 2016
Innovative Technology Award
For Bi-Modal Containerised Bulk Handling from Las Bambas Mine to Matarani Port