

CLEAN BULK PORTS



DUST FREE BULK HANDLING

The next generation in clean bulk ports

Case Studies of bulk handling systems to stop dust pollution



Frank van Laarhoven



LOCATION

**Sea Ports &
developed
railroad
infrastructure**



**Fast growing
bulk export
industry**



**Millions of tons
of bulk cargo!**



**All create a
number of
environmental
challenges**

CURRENT BULK HANDLING METHODS

Many companies are now looking at systems **to reduce** levels of contamination, but also cost effective systems to meet current environmental guidelines

? £ € \$



SOURCES OF DUST

Dust is generated
at any point in the logistic cycle
when energy is added to materials



SOURCES OF DUST

During these processes the commodity is handled **multiple times** resulting in **losses and dust!**



Transfer Points



Open Wagons



Stockpiling Commodities



Ship Loading



A new method
to handle bulk
is available

Containerised BULK HANDLING

| FILL | TRANSPORT | STORE | LOAD |

CONTAINERISED BULK HANDLING

The CBH system uses:

Sealed containers
for **storage** and **transport**...

...by rail



CONTAINERISED BULK HANDLING

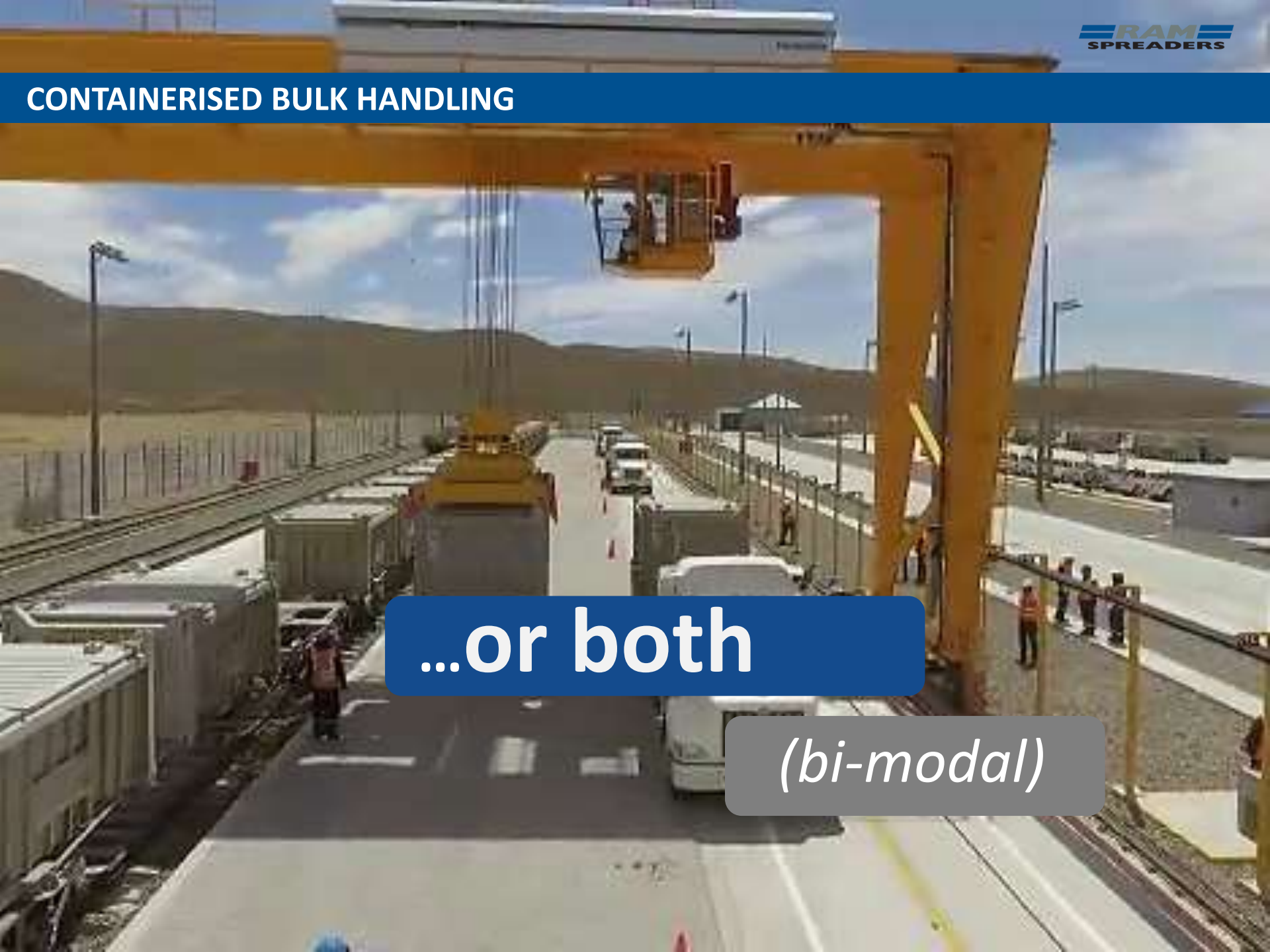


...by road

CONTAINERISED BULK HANDLING

...or both

(bi-modal)



CONTAINERISED BULK HANDLING

The CBH system also uses:

RAM Revolver®
Rotating Spreader



CONTAINERISED BULK HANDLING

That...

Handles the container

Lifts the lid

Rotates the container



Low Environmental Impact

Containerised Bulk Handling:

Reduces pressure from Authorities for compliance with environmental guidelines

Reduces material loss by up to 3% with sealed container technology

BULK EXPORT

CONTAINERISED BULK HANDLING - EXPORT

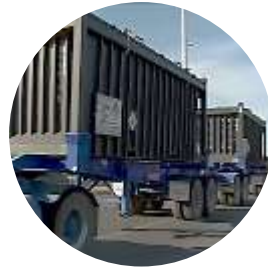


CONTAINERISED BULK HANDLING - EXPORT

1

Fill & Seal Container

- Existing equipment used
- Self locking lid system
- No loss of commodity
- No clean up
- No contamination

2

Send Container By Rail or Road

- Sealed containers – No dust!
- No contamination
- No loss of commodity
- Existing infrastructure used

3

Store at Port

- Fast & effective loading
- No stockpile – No dust
- No contamination of commodity
- Store multiple types of commodity in same area with no cross contamination

4

Unload using RAM Revolver

- For all types of crane
- Loads of up to 1,000TPH
- SWL up to 45T
- Twistlock & grippers secure container during rotation

MISTING SYSTEM

CONTAINERISED BULK HANDLING

MISTING SYSTEM



MISTING SYTEM

OFF



MISTING SYSTEM

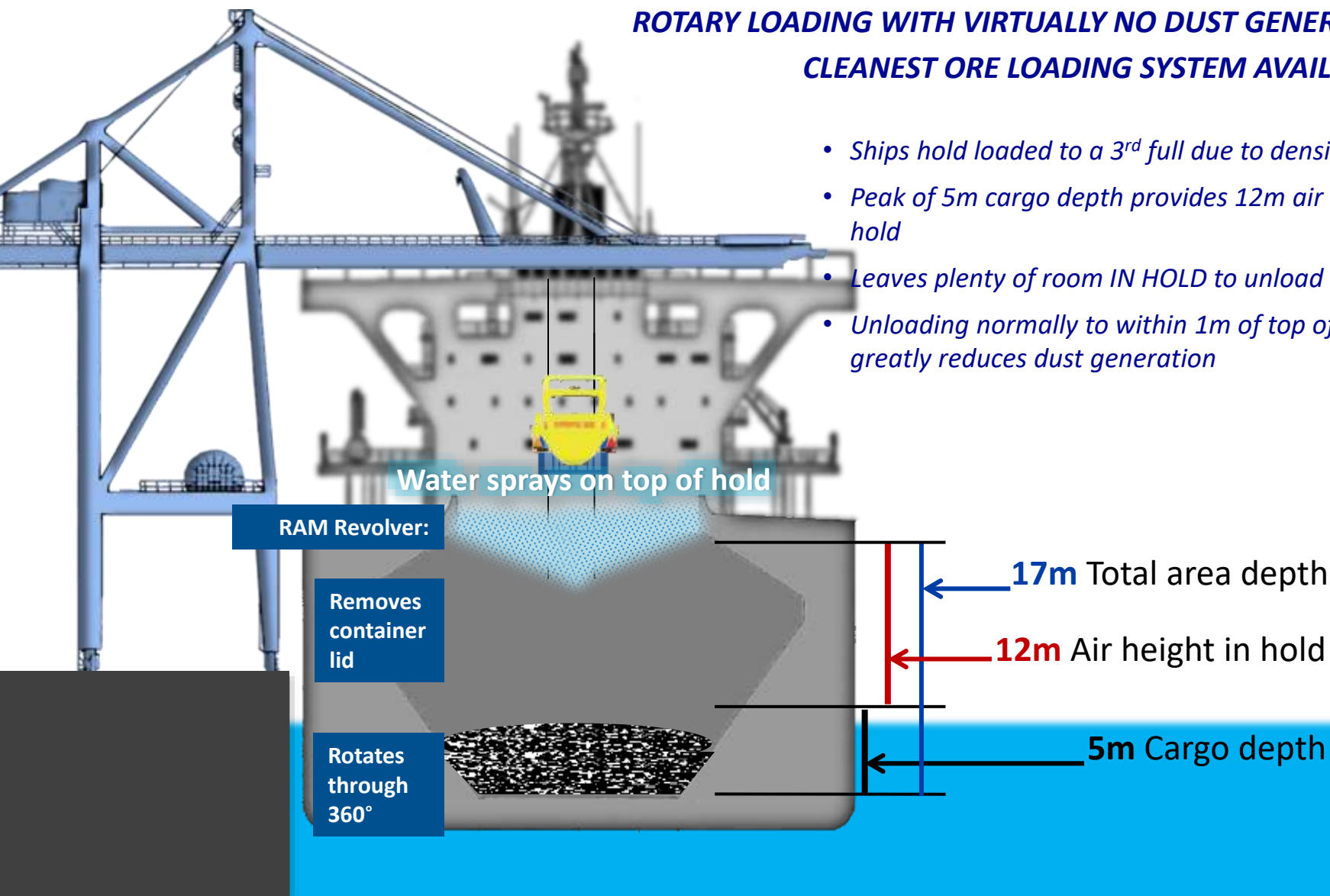
ON

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





CASE STUDY 1

LOCATION: Riga

COMMODITY: Biomass

EQUIPMENT: MHC Crane



CASE STUDY 1

Riga Universal Terminal (RUT) became **the first** terminal in Europe to introduce the **Containerised Bulk Handling** system.

Since its introduction RUT have **doubled** their biomass export to cope with the increased demand and bring in new levels of revenue.

CASE STUDY 1

With the system capable of lifting 35m³ per cycle, RUT utilized their existing MHC

...and projected a **30 lifts per hour** capacity

allowing them to handle large volumes of biomass per hour

CUBIC METERS PER CYCLE 35.00
 MOVES PER HOUR 30.00

M³ PER HOUR 1,050

CASE STUDY 1



The main benefit from introducing the new technology is a significant optimization of terminal expenses and an increase in performance.

Now we can perform dry bulk handling operations involving a significantly smaller number of machines and human resources.



Atis Šulte
Sales & Business
Development Director

Saving on resources amount to almost 50%, he added.



CASE STUDY 2

LOCATION: Poti - Georgia

COMMODITY: Copper Concentrate

EQUIPMENT: MHC



CASE STUDY 2

CBH introduced to support local dry bulk clients...

...with local companies importing, blending and exporting locally mined copper concentrate gives the port flexibility to handle all commodities with existing equipment using CBH.

CASE STUDY 2

With the port located close to a residential area, school and recreational park...

...CBH adds very little energy to the bulk material when unloded, and a dust suppression misting system contains the dust plume within the ships hatch.



CASE STUDY - TESTIMONIAL

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



Ray Lee

Regional Director
DPW Australia | 2009-2011

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

CASE STUDY - TESTIMONIAL

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”*



Adrian Howard
Commercial Director
Patrick Ports & Stevedoring

Patrick | Asciano

CASE STUDY - TESTIMONIAL

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**”*



Jack Cole
North Park Mines

North Park Mines

CASE STUDY – FURTHER EXAMPLES

MHC Crane Application



RUT Latvia - Grain



South Africa- Coal



Chile – Copper/ Potassium Salt



Maputo - Coal



Congo – Iron Ore



Chile – Copper/Zinc



Cuba - Zinc



USA – Wood Chip/Pellet



Mexico – Lead/Copper/Zinc

CASE STUDY – FURTHER EXAMPLES

Bridge & Reach Stacker Application



Peru - Copper



Mauritania - Magnetite



Bolivia - Urea



Turkey - Copper



Chile - Copper



Arizona/Mexico - Copper

CASE STUDY – FURTHER EXAMPLES

Ship Crane and STS Crane Applications



Argentina – Soya/Rice



South Africa- Manganese



Australia - Copper



Chile - Zinc



Argentina - Grain



Australia – Iron Ore



USA – Wood Chip/Pellet

CONTAINERISED BULK HANDLING - BENEFITS

Containerizes the bulk
Low set up cost
Environmentally friendly
Award winning solution
No contamination







COST



CONTAMINATION

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

EQUIPMENT

INTEGRATED APPROACH

Revolver®



Cranes



Dust Suppression



Container Handlers



Containers



REVOLVER trailer system



EQUIPMENT APPLICATION

Ship to Shore
Crane



Mobile Harbour
Crane



Ship
Crane



Reach
Stacker



Bridge
Crane

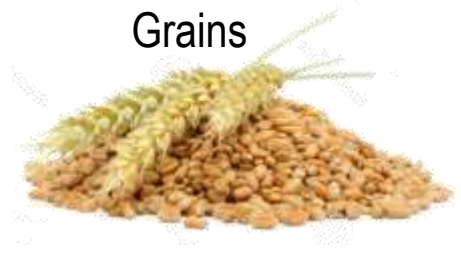


COMMODITIES HANDLED

LOAD & DISCHARGE



Grains



Mineral Sands



Soya



Wood Chip



Copper Concentrate



Scrap Metal



Coal



Iron Ore



Bagged Materials



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



AWARD WINNING



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



RAM Spreaders &
Patrick Ports and
Stevedoring
Australia



*For contamination & dust free
Containerised Bulk Handling*

IBJ - 2016

Innovative Technology Award

RAM Spreaders &
MMG Las Bambas
Peru



*For Bi-Modal Containerised Bulk Handling
from Las Bambas Mine to Matarani Port*