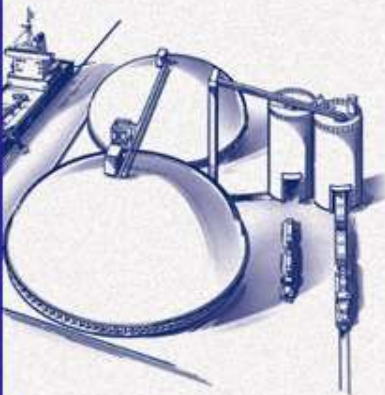


Cement trade, transportation and terminals



Looking back – Looking forward

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INTERCEM ASIA, BEIJING 2003



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Contents of presentation

Looking back

- ❖ Seaborne trade, transportation and terminals before INTERCEM
- ❖ Seaborne trade, transportation and terminals in the last 30 years (i.e. during INTERCEM)
- ❖ What can be learned from history?

Looking forward

- ❖ The need for flexibility

Seaborne trade, transportation and terminals BEFORE INTERCEM

1930's Start water transport of bulk cement on the Great Lakes



1950's First seagoing self discharging ships and distribution networks by cement producers US, Japan, Norway, Sweden, West Europe (inland)
Development of first pneumatic unloading systems (ENBO, Johannes Möllers)



Looking back

Trade, transportation and terminals BEFORE INTERCEM

- 1960's** Expansion of seaborne distribution networks (self discharging cement carriers (Nordströms, H.W. Carlsen, Claudius Peters, Fuller, Japanese systems)
- Blue Circle network in Indian Ocean (supplied out of Kenya)
 - Late 60's import terminal in New York City by Scancem



Looking back

Seaborne trade, transportation and terminals BEFORE INTERCEM

1970's

- First large cement shortage in the Middle East (supplied in bags).
- Scancem grinding plants in West Africa with clinker supply from Norway-Sweden.
- First Siwertell large unloader (1974) enabling large scale international bulk cement trade. Siwertell 800 tph unloader becomes the standard large unloader for more than 20 years.
- First Siwertell to US (Port Canaveral, 1975) and then Middle East 1977).
- First large flat storage terminal in US (San Diego) by independent importers.
- First road mobile KOVAKO unloader 1979 (for inland vessels).



Looking back

Seaborne trade, transportation and terminals BEFORE INTERCEM

1980 – 1985

- Boom in Middle East imports (floating terminals with Siwertell (1981 -1985)
- Rapid growth of international cement trade
- First small pneumatic KOVAKO unloaders for coastal vessels (Europe, Middle East)
- Globalisation of cement industry becomes stronger.
- Growth of multinationals

1985 First INTERCEM Conference!



Looking back

Seaborne trade, transportation and terminals BEFORE INTERCEM

(and, not unimportant, my own first contribution to the cement industry, 1982)



Looking back

Trade, transportation and terminals in the last 30 years

- ❖ Very strong growth in US imports with new terminals.
1985 – 1990
- ❖ First KOVAKO pneumatic bulk carrier unloaders built
with rapid growth in capacity (150-250-400-800 tph)
1985 – 1994
- ❖ Development of domes for cement terminals (late
1980's)
- ❖ Record sales of KOVAKO road mobile unloaders for
5,000 Dwt ships (over 70 units between 1985 and 1994.
Most of them to independent importers. Many of them
in combination with flat storage terminals.



Looking back

Trade, transportation and terminals in the last 30 years

- ❖ The strong growth of independent trade and terminals between 1980 and 1990 influences stability in many cement markets and the cement producers start pushing back
 - Antidumping suits
 - Focus on acquiring waterside cement plants
 - Retaliation against exporters
 - Strong consolidation in cement industry
- ❖ 1990 – 1993 slump in US imports. Many terminals close down. Asian markets start to grow rapidly



Looking back

Trade, transportation and terminals in the last 30 years

- 1991** First road mobile Siwertell 5.000S (1996) followed by 10.000S and in 2004 the 15.000S. Siwertell road mobiles become the standard for ship to truck unloading.
- 2000** The growth of the multinationals and their focus on controlling international cement and clinker trade reaches a peak. The top 10 cement multinationals control about 80% of global seaborne trade.



Looking back

Trade, transportation and terminals in the last 30 years

- 1997 – 2004** Several Spanish importers move from importing cement to importing clinker and build grinding plants. This becomes a trend.
- 1995 – ongoing** Cement traders evolve and become much more involved in the complete logistical chain from supplier to final customers including partnerships and investments.
- Mid 1990's – ongoing** More equipment manufacturers (IBAU, FL Smidth, Van Aalst Bulk Handling, Chinese manufacturers) involve themselves in ship unloaders and terminal equipment.
- 1998** Asian crisis. Very large amounts of cement and clinker available for export. The US becomes the main market.
- 2008 – 2014** Financial crisis. Imports in the US slump. Global cement and clinker trade contracts. Africa and Middle East become the growth markets.
- 2010 – ongoing** The trade of cementitious materials grows fast and becomes an important element in cement and clinker trade.

Looking back

Seaborne trade, transportation and terminals in the last 30 years

Changes in shipping

- ❖ Bulk carriers ⇒ Handysize (80's) ⇒ Handymax (90's-2005) ⇒ Supramax
- ❖ Self discharging ships become much more versatile and increase in size. Although still in majority used for distribution an important part of them is involved in regional and even global trade.

Looking back

What can be learned from history?

Cement and clinker trade keeps changing!!!!

(and that is why we keep coming to INTERCEM)

- ❖ Importing countries become exporters and v.v.
- ❖ Global and regional trade flows change
- ❖ Changes in shipping
- ❖ Changes in cement / clinker trade ratios
- ❖ Changes in ownership of coastal cement plants, grinding plants and terminals
- ❖ Changes in technology

Looking back

Lets look at the US

- 1975** First large import terminal for large bulk carriers
- 1984 – 1990** First “wave” of large terminal construction in US
- 1990 – 1994** Slump in US cement imports (12mt to 5 mt, i.e. almost all seaborne imports stopped)
- 1995 – 2007** Second “wave” of large terminal construction in US
- 2007 – 2014** Slump in US cement imports (2006 ⇨ 34 mt,
2010 ⇨ 6,2 mt)
again almost all seaborne imports stopped

Looking back

Lets look at the US

Almost all large seaborne import terminals completed after 2000 have been idle for a longer period than they have been operational!

Even terminals of 30 years old have seen 10 years of almost zero seaborne imports.

Question: What is the better terminal?

- A. A facility totally dedicated to cement (dock, unloader, storage facility) with low operating costs but at a high capital expenditure.
- B. A cement terminal using a general dock, a terminal type with a low capital expenditure but with a somewhat higher operating cost.

Looking back

Lets look at the US

The typical seaborne cement import terminal in the US was build for Handymax vessels (approx. 40.000 tons cargo size) with 60.000 tons of storage)

Shipping is changing

New Supramax vessels are more cost effective than Handymax vessels and have a cargo size of approx. 50.000 tons.

There are very few cement terminals in North America that can handle Supramaxes.



Handysize 10.000 – 40.000 Dwt

Looking back



Supramax 50.000 – 66.000



Handymax 40.000 – 50.000 Dwt

Lets look at the US

Are terminals going to expand?

Is clinker an alternative to cement shipping?

And what about cementitious materials? (multi product terminals)

Looking back

The need for flexibility

Adapting to larger ships and cement and cementitious materials

Looking forwards

The need for flexibility

Movable cement terminals



A new generation of floating terminals that do not need a dock

Looking forwards

The need for flexibility

Movable grinding plants



Containerised grinding plant – Plug & Grind from Cemengal

Grinding plant consists of 8 containers

Capacity up to 100.000 tons per year (for clinker)

Because of smaller scale, mobility and easy in installation it brings grinding capability to an entire new group of customers

Already 12 sold (of which 4 for GBFS)

The need for flexibility

Movable grinding plants



Grinding plant based on roller press technology by KHD

Compact

Modular

Low energy consumption

Does not need a fully horizontal base

A **GrindX**[®] plant can be put on a barge or in the hold of a floating terminal!

Looking forwards

The need for flexibility

Movable grinding plants - Floating **GrindX**®

Clinker versus cement

Floating grinding plant

Easier to find clinker suppliers than cement suppliers	Can be moved in and out of markets quickly and with relative ease
Clinker has a lower transport, handling and storage cost than cement	Can resolve congested port situations
Clinker does not require specialised handling and storage systems such as for cement and therefore general port facilities can be used	Suitable for temporary projects
By grinding close to the market, production can be optimised in respect to market demand and available local secondary raw materials and additives	Suitable for difficult or high risk markets
But clinker requires a grinding plant with substantial capital cost and land requirements. This is only feasible for long term projects with a stable and reasonably secure market	None or strongly reduced land lease cost

Looking forwards

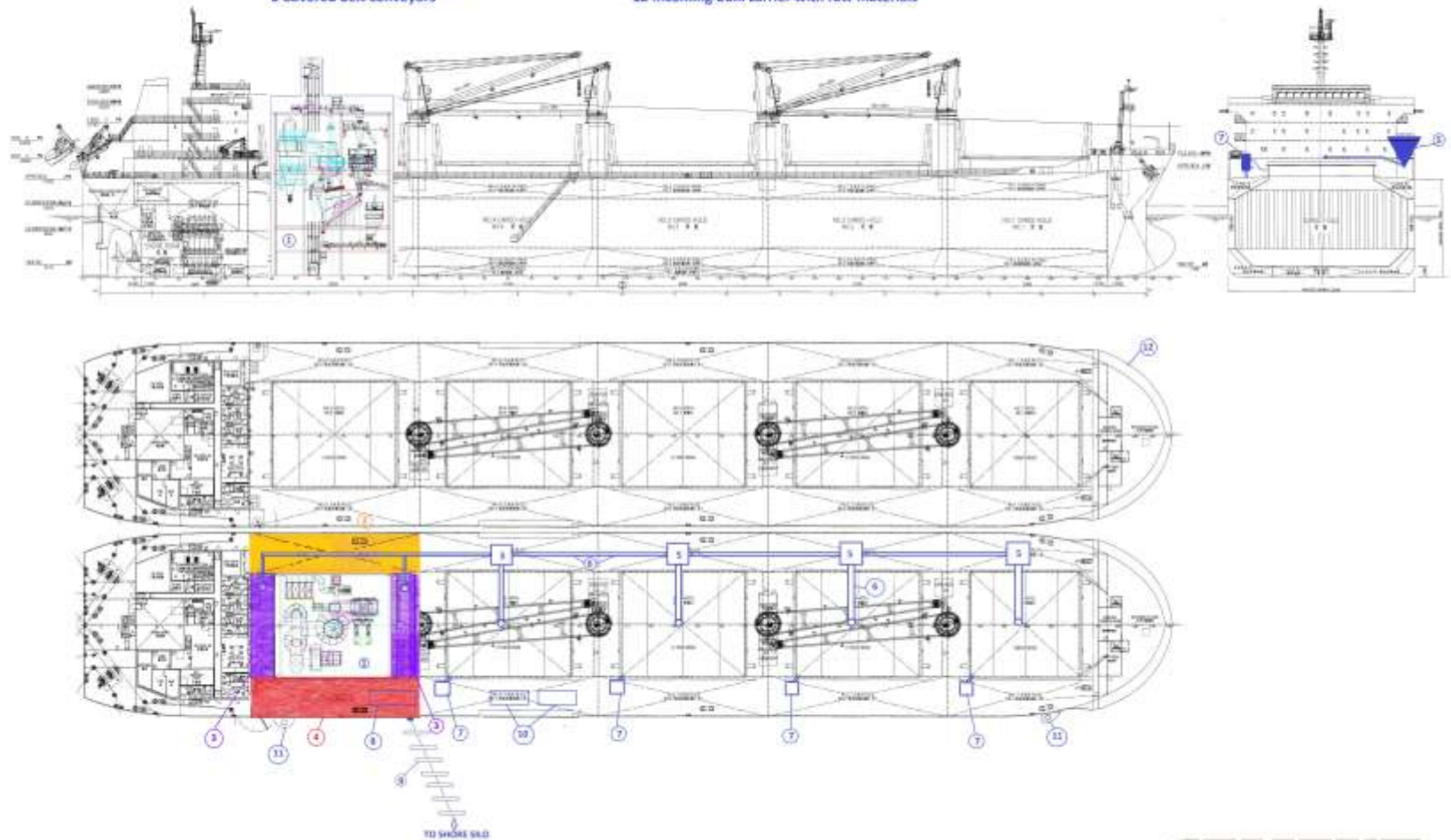
Example I Floating GrindX plant on barge with bagging and truck loading systems



Non-congested port – Temporary project

FLOATING GRINDMAX FACILITY BASED ON HANDYMAX BULK CARRIER (CLINKER VERSION)

- | | |
|-----------------------------------|---|
| 1 GrindMax plant | 7 Dust collectors |
| 2 Primary raw material storage | 8 Pneumatic conveying system finished product |
| 3 Secondary raw materials storage | 9 Floating pipeline |
| 4 Finished product storage | 10 Generator sets |
| 5 Hoppers with dust extraction | 11 Spud pole |
| 6 Covered belt conveyors | 12 Incoming bulk carrier with raw materials |



Example II Floating clinker terminal with GrindX plant



Congested port

Example III Midstream transfer of clinker from bulk carrier to barges and barge transport to floating GrindX plant on barge





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