SIZES AND CAPABILITIES OF GLOBAL EXPORT, IMPORT AND DISTRIBUTION TERMINALS FOR CEMENT AND CLINKER

Ad Ligthart
Cement Distribution Consultants

21-01-2015
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  ➢ Company overview
  ➢ Working method
• Global overview of cement and clinker shipping 2014
  ➢ Shipments by cargo type
  ➢ Clinker and cement trade by vessel type
• Facilities overview
  ➢ Cement plants
  ➢ Grinding plants
  ➢ Cement Terminals
• Coping with different dock situations
  ➢ Dedicated dock
  ➢ Public dock
  ➢ No dock
• New developments
## Cement Distribution Consultants

### an introduction

<table>
<thead>
<tr>
<th>Market knowledge</th>
<th>Consulting</th>
<th>Project / interim management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The global cement industry on Google Earth</td>
<td>Logistical, economical and technical services</td>
<td>Realising and managing projects</td>
</tr>
<tr>
<td>• Large database on waterside cement plants, waterside grinding plants and terminals</td>
<td>• Feasibility studies of complete logistical chains for trade and distribution</td>
<td>Examples</td>
</tr>
<tr>
<td>• 30 Years experience</td>
<td>• Shipping solutions</td>
<td>- Redevelopment of large “brown field” bulk terminal</td>
</tr>
<tr>
<td>• Authors of the “Handbook on Global Cement Trade and Distribution”</td>
<td>• Development of new facilities</td>
<td>- Temporary cement and fly ash import project for construction of large concrete dam</td>
</tr>
<tr>
<td></td>
<td>• Terminal and equipment design</td>
<td>- Logistics management for the supply of cementitious materials to the GCC countries</td>
</tr>
</tbody>
</table>
The Handbook on Global Cement Trade and Distribution

- Overview of Global cement and clinker trade
- Country and regional cement trade analysis and statistics
- Fully illustrated with 80 detailed colour maps indicating material flows and trading networks and facilities
- Cement shipping and distribution economics
- Review of cement terminal design and operation
- Facilities directory

Authors:
SHIPMENTS BY CARGO TYPE

<table>
<thead>
<tr>
<th>Clinker / cement type</th>
<th>Seaborne trade (Mt)</th>
<th>Inland water domestic trade (Mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>International</td>
<td>Domestic</td>
</tr>
<tr>
<td>Clinker</td>
<td>41,9</td>
<td>10,0</td>
</tr>
<tr>
<td>Cement – Bulk</td>
<td>44,1</td>
<td>70,5</td>
</tr>
<tr>
<td>Cement – Bagged</td>
<td>18,2</td>
<td>12,8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>104,2</strong></td>
<td><strong>93,3</strong></td>
</tr>
</tbody>
</table>

Total volume of cement and clinker transported by water 215,6 Mt
# Clinker and Cement Trade by Vessel Type

## Clinker and Cement Trade by Vessel Type 2014

<table>
<thead>
<tr>
<th>Clinker / cement type</th>
<th>Bulk Carriers (Mt)</th>
<th>Self-disch. cement carriers (Mt)</th>
<th>Inland ships &amp; water barges (Mt)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large</td>
<td>Coastal</td>
<td></td>
</tr>
<tr>
<td>Clinker</td>
<td>40,3</td>
<td>11,6</td>
<td>0</td>
</tr>
<tr>
<td>Cement – Bulk</td>
<td>7,2</td>
<td>10,4</td>
<td>97,0</td>
</tr>
<tr>
<td>Cement – Bagged</td>
<td>21,3</td>
<td>9,7</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>68,8</td>
<td>31,7</td>
<td>97,0</td>
</tr>
</tbody>
</table>

* excluding China

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**Global Overview Cement and Clinker Shipping**
<table>
<thead>
<tr>
<th>Facilities</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement plants</td>
<td>224</td>
</tr>
<tr>
<td>Cement terminals</td>
<td>871</td>
</tr>
<tr>
<td>Grinding plants</td>
<td>212</td>
</tr>
<tr>
<td><strong>Total Facilities</strong></td>
<td><strong>1307</strong></td>
</tr>
</tbody>
</table>
224 Cement plants involved in sea / waterborne trade and distribution of cement and clinker, of which...

- 92 Plants have their own port or dock
- 15 Plants rail cement to a loading facility in the plant
- 8 Plants connect to a loading facility in the port by a conveying belt
- 4 Cement plants rail cement to the port and load ships directly from rail cars

FACILITIES OVERVIEW - CEMENT PLANTS
224 Cement plants involved in sea / waterborne trade and distribution of cement and clinker of which...

23 Truck cement to a loading facility in the port

9 Cement plants barge cement and clinker to ports for direct transfer of barges to ships

55 Plants truck cement or clinker to the port for direct ship loading

18 Cement plants distribute domestically by barges

FACILITIES OVERVIEW CEMENT PLANTS
224 Cement plants involved in sea / waterborne trade and distribution of cement and clinker of which…

138 Load up to Handysize and Handy max bulkers

64 Load up to coastal (<10,000 Dwt vessels)

5 Load Great Lakes vessels

17 Load inland barges solely for domestic distribution
212 Grinding plants
of which:

177 Can receive Handysize / Handymax bulkers

21 Can receive coastal (<10,000 Dwt) vessels

8 Receive Great Lakes carriers

6 Receive inland barges
871 Cement terminals
of which…

176 With ship unloader

Norcem, Oslo

Houston Cement

695 Served by self discharging vessel
871 Cement terminals

140 Suitable for handysize / handymax vessels

of which….

61 Served by self discharging ships

50 Have a mechanical unloader

24 Have a pneumatic unloader

5 Have grab and hopper system

FACILITIES OVERVIEW

CEMENT TERMINALS
871 Cement terminals
731 suitable for coastal (< 10,000 dwt) and inland vessels of which....

621 Served by self discharging vessels
81 Have a pneumatic unloader
28 Have a mechanical unloader
1 Has a grab & hopper system

Holcim, Plymouth
Southern Cement, Ipswich
Cemwest, Lorient

FACILITIES OVERVIEW
871 Cement terminals of which:

- 730 Silo terminals
- 74 Flat storage terminals
- 24 Dome terminals
- 17 Floating terminals
- 14 Direct to end user (no storage)
- 12 Unknown

FACILITIES OVERVIEW
CEMENT TERMINALS
Facilities that have a dedicated dock

116 Cement plants

55 Grinding plants

243 Terminals
Grinding plants with their own dock

Cemento Panama (Argos), Colon

Ciment de Mauretania

Dock Situations
Cement terminals with their own dock

Cemex, Houston

Semen Tonasa, Celukan Bawang

Lafarge, Sete

DOCK SITUATIONS
Facilities that use a public dock

- 81 Cement plants
- 106 Grinding plants
- 547 Terminals
Grinding plants that use a public dock

*SCA and SOCIMAT (Holcim), Abidjan*

*Sierra Leone (Heidelberg), Freetown*

*Cementos Colon (Argos), Dominican Republic*
Cement terminals that use a public dock

Southern Cement, Ipswich
Dangote, Tema

Dock Situations
Facilities that do not use a dock at all

27 Cement plants
51 Grinding plants
82 Cement terminals
Cement plants that do not use a dock

Cement loading in the Netherlands

Clinker loading in Vietnam

Cement loading in the Netherlands
Grinding plants that do not use a dock

Ghacem (Heidelberg), Takodari

Tokuyama, Noumea

Ghacem (Heidelberg), Takodari
Cement terminals that do not use a dock

Floating terminal Lavioletta, Almirante

Indocement, Lombok

Riverside Construction Materials (Silvi), Bristol, PA

Semen Tonasa, Sorong
New developments in cement and clinker trade

- Larger cement terminals
- New applications of grinding plants
  - Plug & Grind
  - Floating grind plant
Larger cement terminals

• Normal size of cement terminals is 1,2 - 1,5 * ship size

• New development → terminal size is 2 - 2,5 * ship size
  • Lower shipping cost (larger shipping window)
  • Possibility to accept “opportunity” ship loads
  • Flexibility to move to multiple materials
  • Use of domes or flat storage

NEW DEVELOPMENTS

Riverside Construction Materials, 130,000 tons

Beton Provincial, 100,000 tons
New applications of grinding plants
Plug & grind from Cemengal

**Containerised grinding plant**
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)
New applications of grinding plants
Floating GrindX® from KHD

Grinding plant based on roller press technology
- Compact
- Modular
- Low energy consumption
- Does not need a fully horizontal base

Standard Production Output Range 40 tph – 60 tph*

A GrindX® plant can be put on a barge or in the hold of a floating terminal!
# Floating GrindX®

## Clinker versus cement

<table>
<thead>
<tr>
<th>Clinker versus cement</th>
<th>Floating grinding plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easier to find clinker suppliers than cement suppliers</td>
<td>Can be moved in and out of markets quickly and with relative ease</td>
</tr>
<tr>
<td>Clinker has a lower transport, handling and storage cost than cement</td>
<td>Can resolve congested port situations</td>
</tr>
<tr>
<td>Clinker does not require specialised handling and storage systems such as for cement and therefore general port facilities can be used</td>
<td>Suitable for temporary projects</td>
</tr>
<tr>
<td>By grinding close to the market, production can be optimised in respect to market demand and available local secondary raw materials and additives</td>
<td>Suitable for difficult or high risk markets</td>
</tr>
</tbody>
</table>

**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
Example 1  Floating GrindX plant on barge with bagging and truck loading systems

Non-congested port – Temporary project
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

By-passing a congested port
THANK YOU

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