Domestic seaborne distribution systems in Asia

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Cement Distribution Consultants

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Contents of presentation

- Introduction
- Overview of Asian cement and clinker trade and domestic distribution
- A brief overview of seaborne domestic distribution systems in Asia
- The economic factors behind seaborne distribution systems
- Logistical aspects of seaborne distribution systems

CEMENT DISTRIBUTION CONSULTANTS

Cement Distribution Consultants an introduction

Market knowledge	Consulting	Project / interim management
• The global cement industry on Google Earth • Large database on waterside cement plants, waterside grinding plants and terminals • 30 Years experience	Logistical, economical and technical services • Feasibility studies of complete logistical chains for trade and distribution • Shipping solutions • Development of new facilities • Terminal and equipment design	Realising and managing projects Examples - Redevelopment of large "brown field" bulk terminal - Temporary cement and fly ash import project for construction of large concrete dam

CEMENT DISTRIBUTION CONSULTANTS

Cement Distribution Consultants - an introduction

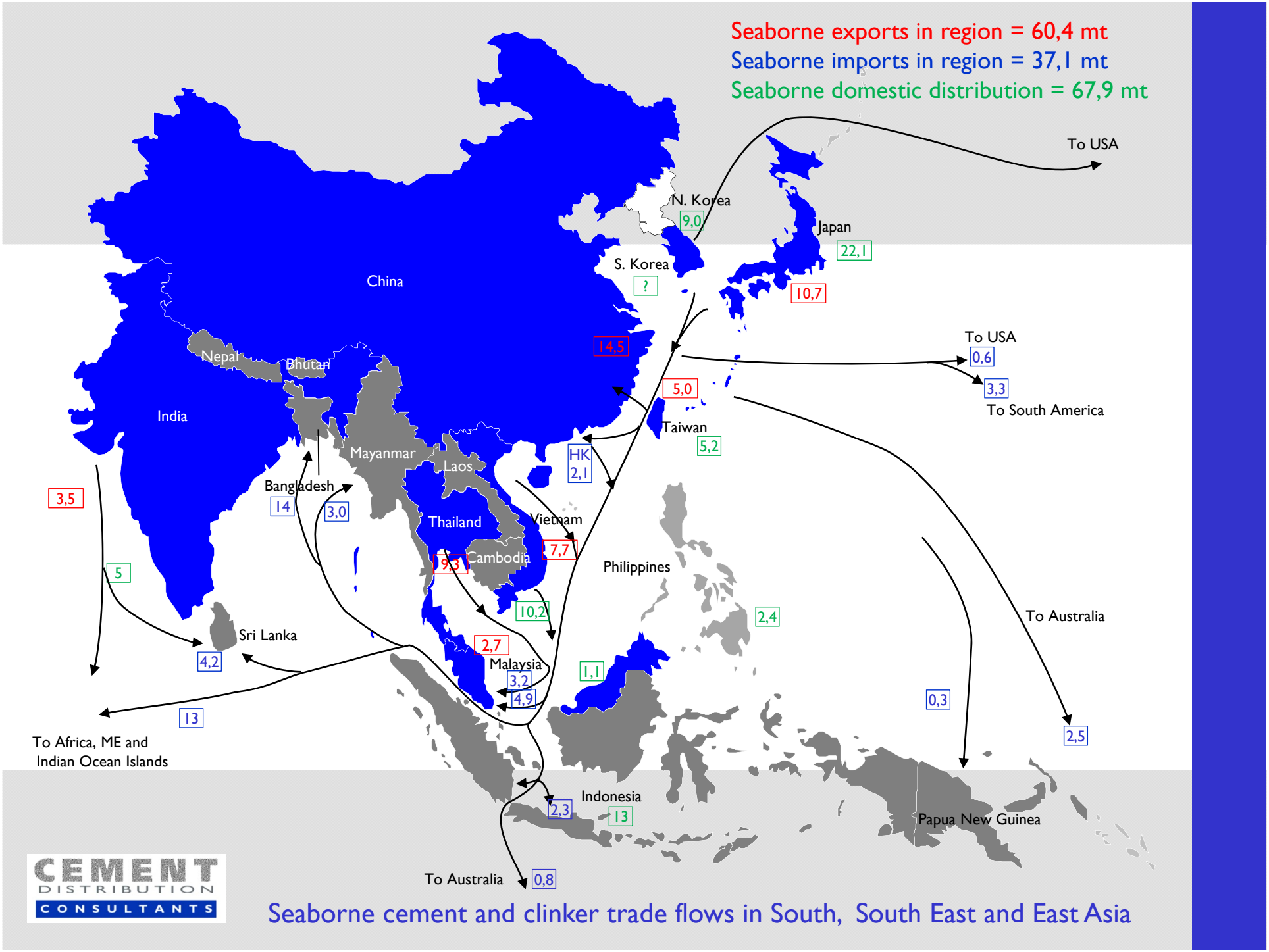
The cement industry on Google Earth

CEMENT DISTRIBUTION CONSULTANTS

Cement Distribution Consultants has a large database on waterside plants , grinding facilities, terminals and self discharging ships which is the basis for market studies, shipping studies, etc., etc.

Overview of seaborne Asian cement and clinker trade and distribution

CEMENT DISTRIBUTION CONSULTANTS


Seaborne exports in region = 60,4 mt
Seaborne imports in region = 37,1 mt
Seaborne domestic distribution = 67,9 mt
To USA
N. Korea
9,0
Japan
22,1
S. Korea
?
10,7
China
14,5
To USA
0,6
3,3
To South America
Nepal
Bhutan
India
5,0
Taiwan
5,2
HK
2,1
Mayanmar
Laos
Bangladesh
14
3,0
3,5
Thailand
Vietnam
7,7
9,3
Cambodia
Philippines
5
10,2
2,4
To Australia
Sri Lanka
4,2
2,7
Malaysia
3,2
4,9
1,1
0,3
13
2,5
To Africa, ME and
Indian Ocean Islands
Indonesia
2,3
13
Papua New Guinea
To Australia
0,8
CEMENT
DISTRIBUTION
CONSULTANTS
Seaborne cement and clinker trade flows in South, South East and East Asia

An overview of Asian seaborne distribution systems

Indonesia

Japan

Korea

Taiwan

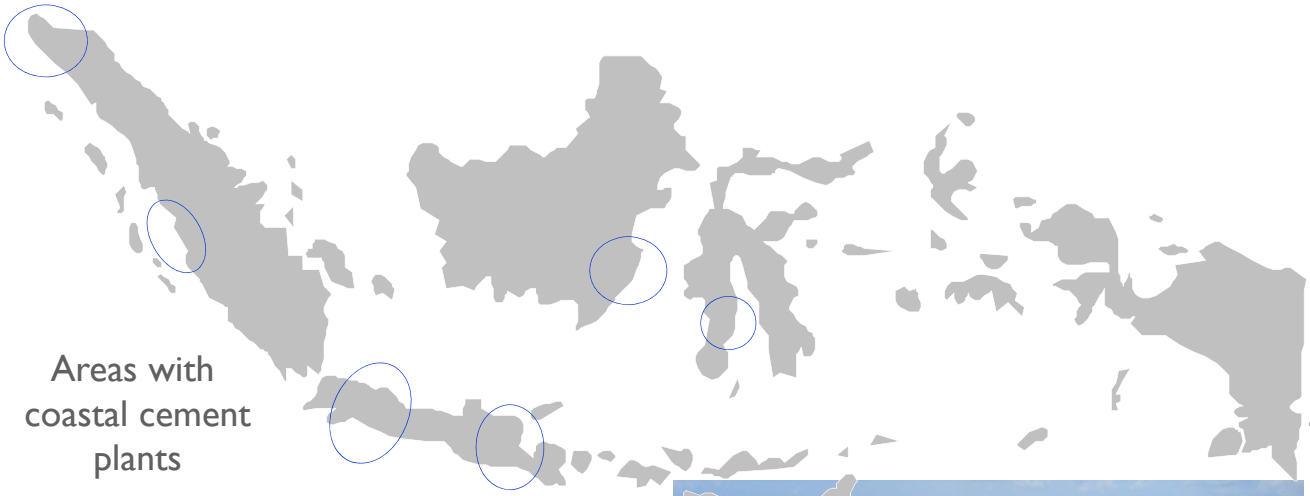
Vietnam

Philippines

India

CEMENT DISTRIBUTION CONSULTANTS

Country overview



Areas with coastal cement plants

Indonesia

Production	52,5	mt
Import by water	2,5	mt
Domestic distribution	13	mt

by water in bulk + 13 mt in bags!!!

Total waterborne (bulk) 15,5 mt

(30 % of production)

7 Coastal cement plants

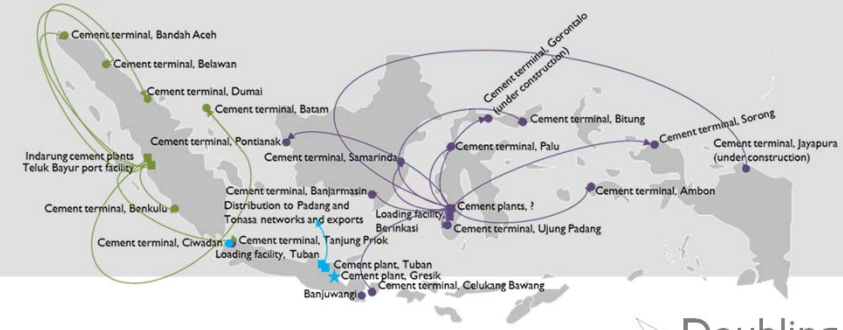
Approx. 34 coastal terminals

42 Self discharging vessels

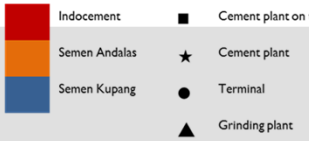
Cement and clinker trade flows in Asia

All figures 2012

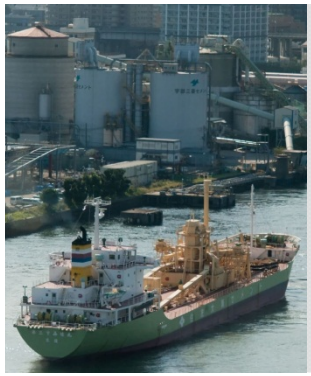
CEMENT DISTRIBUTION CONSULTANTS



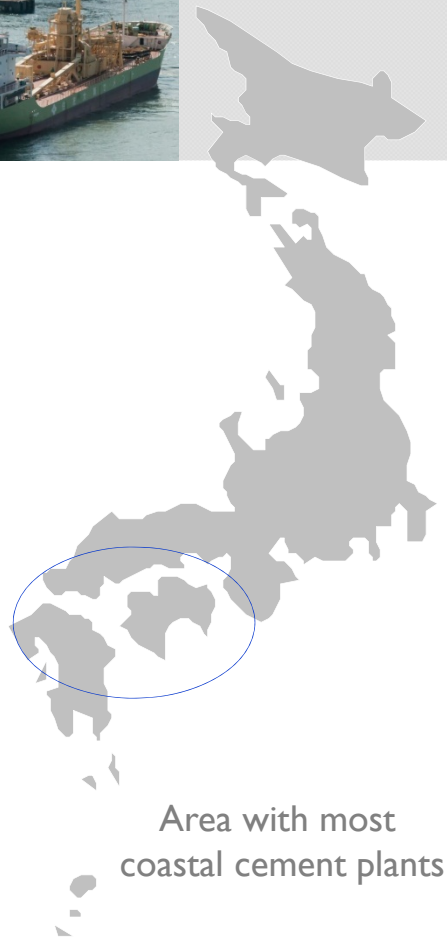
- Doubling of cement production in next decade
- Apart from current domestic sea distribution in bulk of 13 mt there is an equal quantity by sea in bags!
- Very large expansion of seaborne domestic distribution
- Large fleet of new self discharging ships required



CEMENT DISTRIBUTION CONSULTANTS



Country overview



Area with most coastal cement plants

Japan

Production	59 mt
Exports	10.7 mt
Domestic distribution by water	22 mt
Total	32,7 mt

(55% of production)

18 Coastal cement plants

Approx. 220 coastal terminals

76 Self discharging vessels

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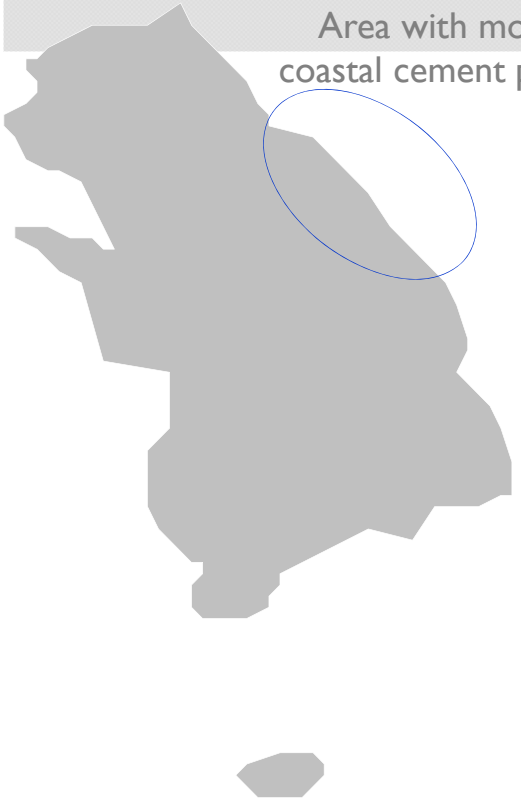
Cement and clinker trade flows in Asia

All figures 2012

Country overview



South Korea

Production	48,9 mt
Exports by water	10,0 mt
Domestic distribution by water	9,0 mt
Total waterborne (39% of production)	19,0 mt

6 Coastal cement plants

Approx. 18 coastal terminals

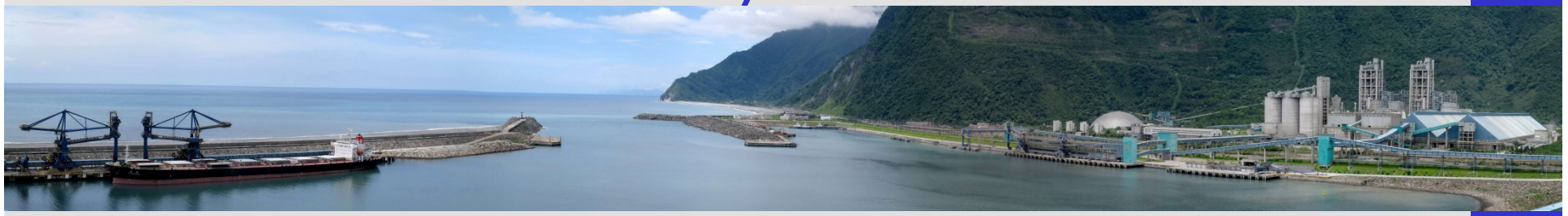
34 Self discharging vessels of which about 17 involved in exports

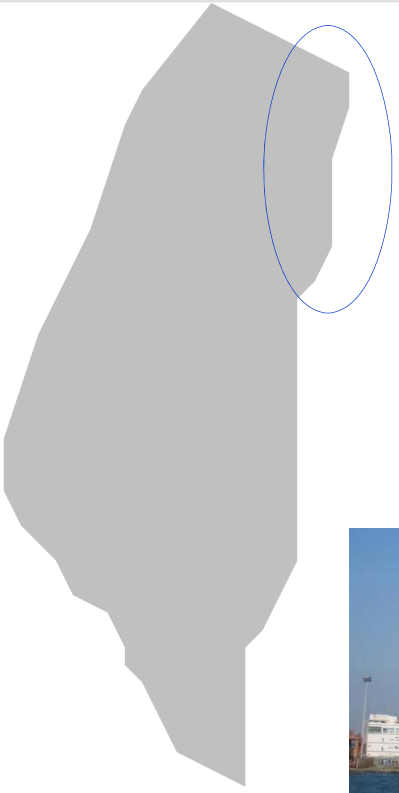
Cement and clinker trade flows in Asia

All figures 2012

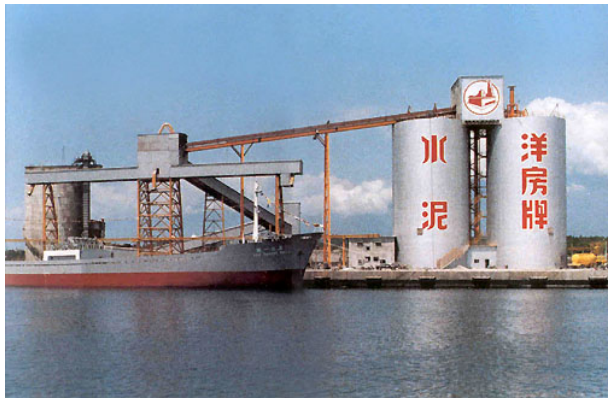
CEMENT DISTRIBUTION CONSULTANTS

Country overview





Area with most coastal cement plants



Taiwan

Production	15,8 mt
Exports by water	5,0 mt
Domestic distribution by water	5,2 mt
Total waterborne (65% of production)	10,2 mt

5 Coastal cement plants

Approx. 16 coastal terminals

15 Self discharging vessels

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Cement and clinker trade flows in Asia

All figures 2012

Country overview

Area with most coastal cement plants

Clinker grinding plants and terminals

Vietnam

Production	47 mt
Exports by water	7,7 mt
Domestic distribution by water	10,2 mt
Total waterborne (38% of production)	17,9 mt

12 Coastal cement plants

Approx. 5 coastal terminals (plus 15 grinding plants)

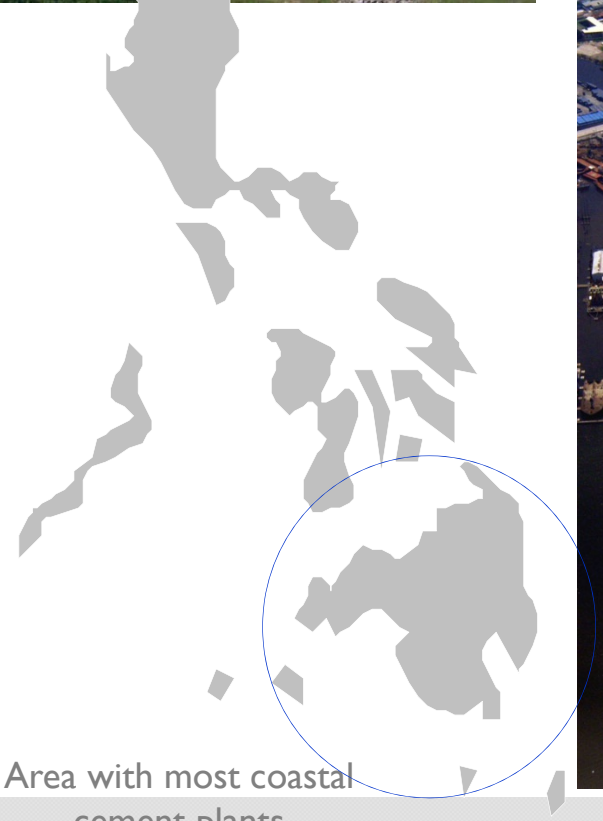
7 Self discharging vessels

CEMENT DISTRIBUTION CONSULTANTS

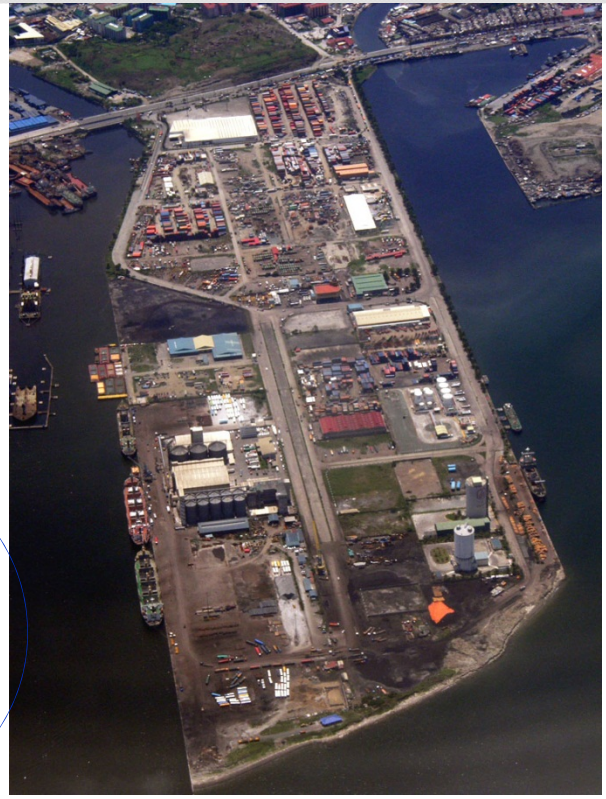
Cement and clinker trade flows in Asia

All figures 2012

Country overview



Area with most coastal cement plants



Philippines

Production	17,7 mt
Exports by sea	0,3 mt
Domestic distribution by sea	2,4 mt
Total waterborne (15% of production)	2,7 mt

7 Coastal cement plants

Approx. 7 coastal terminals

4 Self discharging vessels

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Cement and clinker trade flows in Asia

All figures 2012

Country overview

Area with most coastal cement plants

Area with most coastal grinding plants

Malaysia

Production	20,5 mt
Exports by water	2,7 mt
Domestic distribution by water	1,1 mt
Total waterborne (18,5% of production)	3,8 mt

1 Coastal cement plant

4 Coastal terminals

2 Self discharging vessels

Substantial clinker imports

The only cement plant on the water is Lafarge Langkawi which is an important export base to the Indian Ocean.

All figures 2012

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Cement and clinker trade flows in Asia

Country overview

India

Production	246,7 mt
Exports by water	3,5 mt
Domestic distribution by water	5 mt
Total waterborne (3,5% of production)	8,5 mt

4 Coastal cement plants

Approx. 7 coastal terminals

14 Self discharging vessels

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Cement and clinker trade flows in Asia

All figures 2012

Economical mechanisms behind seaborne trade and distribution

- Maximizing plant utilisation
- Cost of transportation effects
- Effects of vertical integration
- GDP/Cement consumption curve
- Acceleration factor of cement consumption
- Trade fluctuation mechanism
- Price maker or price follower

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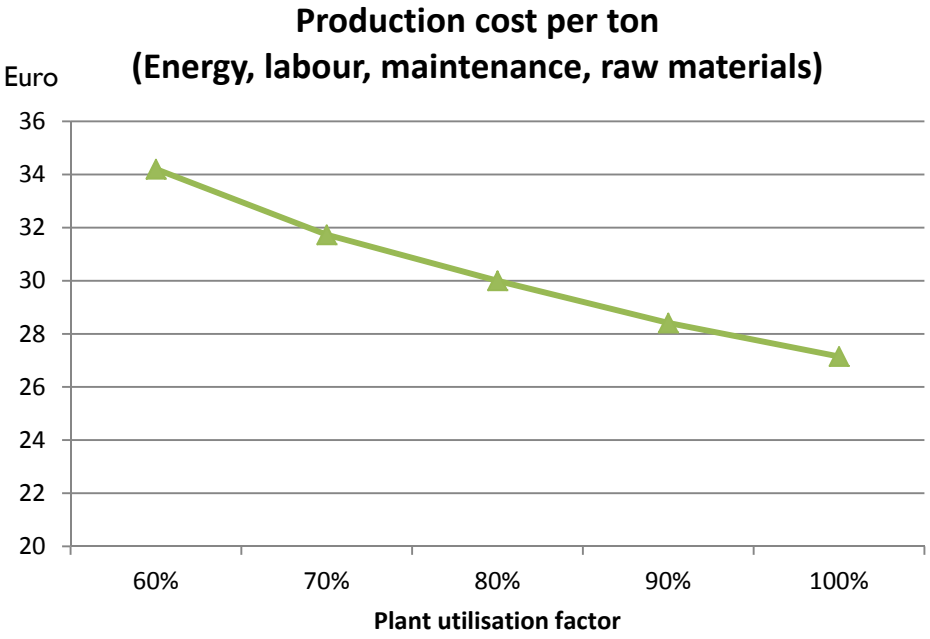
Economical Mechanisms



Example only!

Assumptions:
- Plant capacity 1,5 mtpa
- Ex works price domestic € 85
- Ex works price exports € 40

Example 1

Domestic sales	1.050.000 tons (70%)
Export sales	0

Income domestic sales	89.250.000
Income export sales	0
Total income	89.250.000
Production costs (@70%)	33.316.500
Contribution to financial costs and profit	55.933.500

Example 2

Domestic sales	1.050.000 tons (70%)
Export sales	300.000 tons (20%)
Total sales	1.350.000 tons (90%)

Income domestic sales	89.250.000
Income export sales	12.000.000
Total income	101.250.000
Production costs (@90%)	38.353.500
Contribution to financial costs and profit	62.896.500

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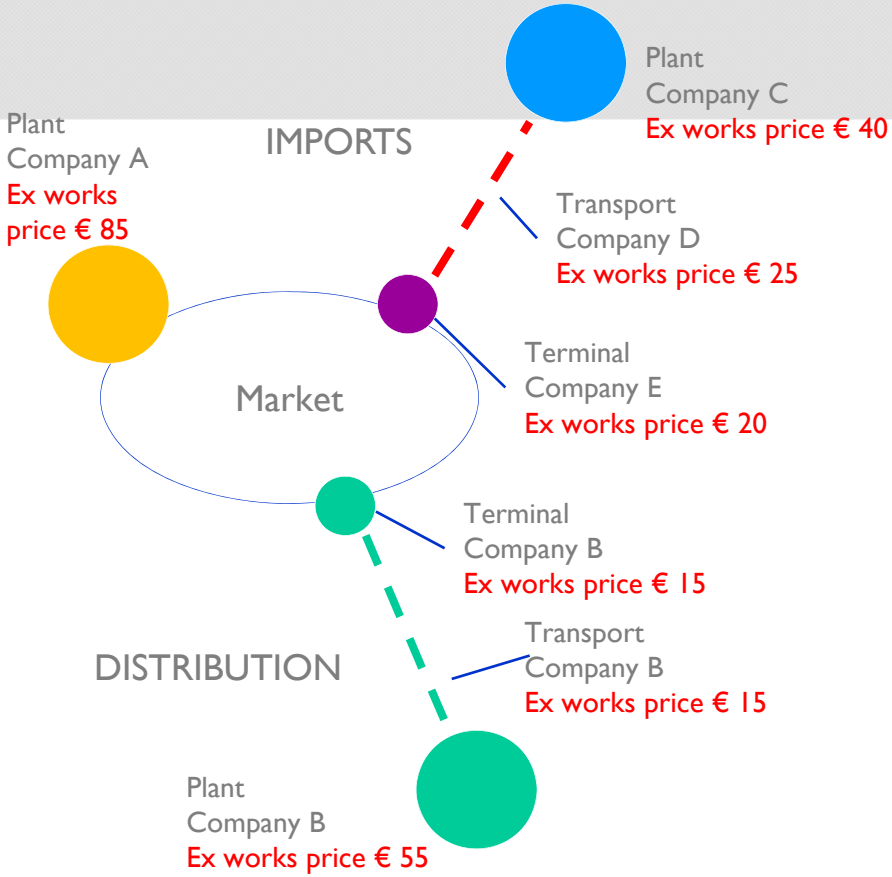
Maximizing plant utilisation

Economical Mechanisms

- Cement sold in other markets than the local one has to have a lower Ex Works price to allow for the higher cost of transportation.
- The margin on the additional cement sold into other markets provides and additional contribution which largely goes directly to the bottom line.
- The key benefit of the additional cement sold into other markets is the higher utilisation of the plant resulting in a substantial lower production cost per ton over the entire production of the plant!

Economical Mechanisms



A single plant supplying a single local market at first glance seems to be in the most profitable situation.

However, this is only the case when this plant can reach (near) full utilisation rates. When company A can only sell 70% of its capacity in its home market and has no means to reach other markets it is far worse off than company B or C that might be able to sell 70% in their home markets plus 20% to other markets, even at a reduced ex works price.

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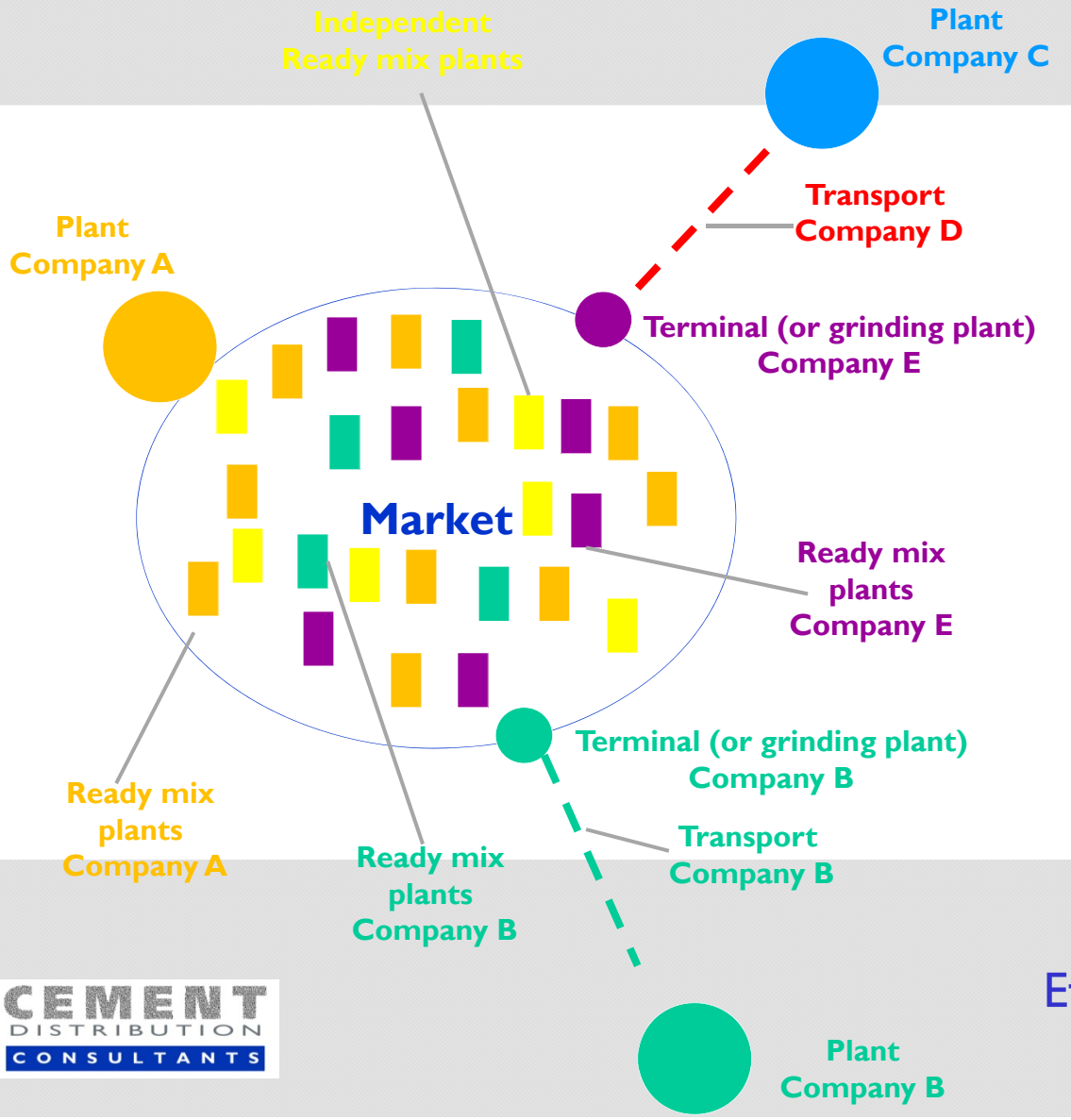
Cost of transportation aspects

Economical Mechanisms



Vertical integration of the cement industry into the ready mix concrete products, sand and aggregate industries has the effect that for cement supply the market share and pricing become more stable.

This allows for long-term investments in distribution facilities and transport methods and with that a lower distribution cost per ton.

However, vertical integration means that independent ready mix and concrete products companies have to buy their cement from their competitors and gives a strong incentive for them to realize their own cement supply by imports

Effects of vertical integration

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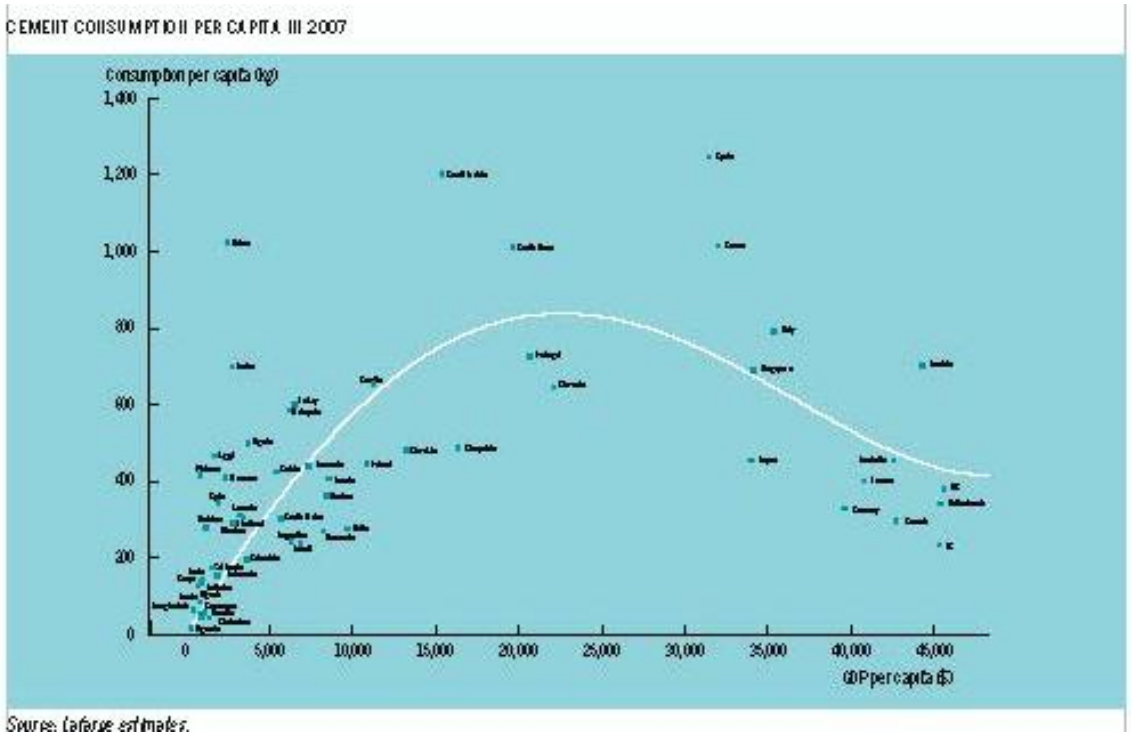
Economical Mechanisms



GDP related to cement consumption

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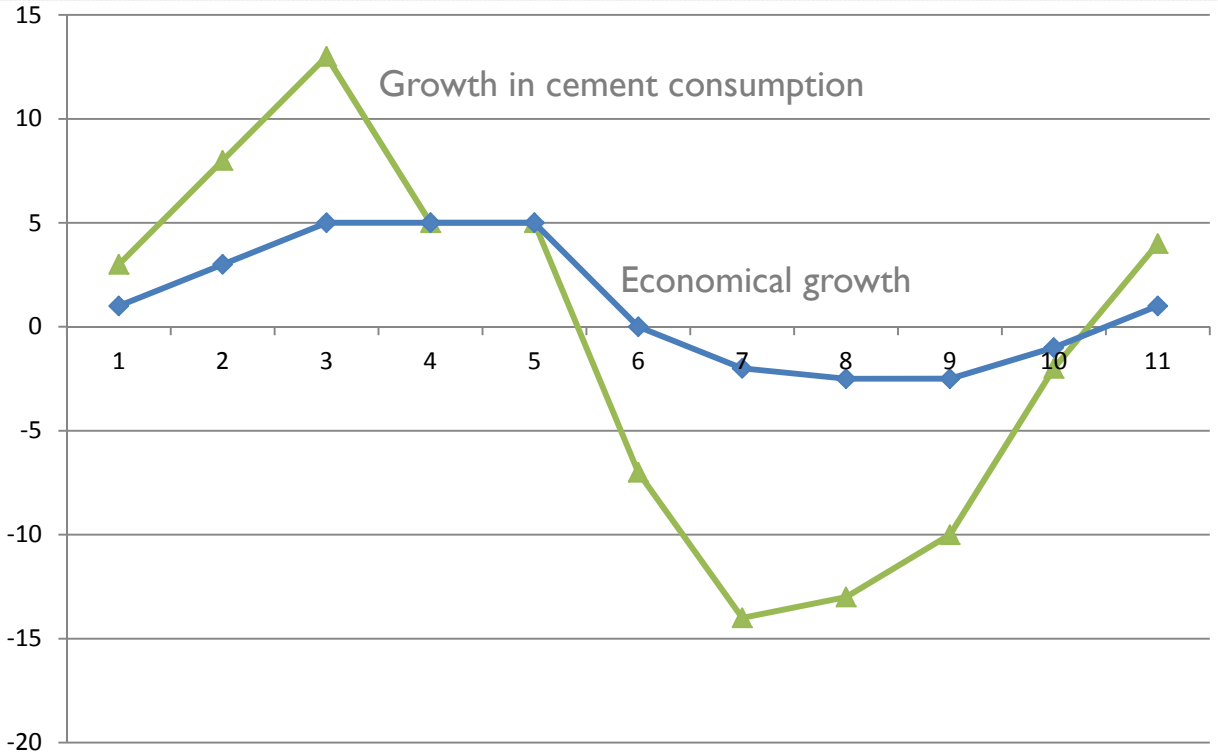
Economical Mechanisms



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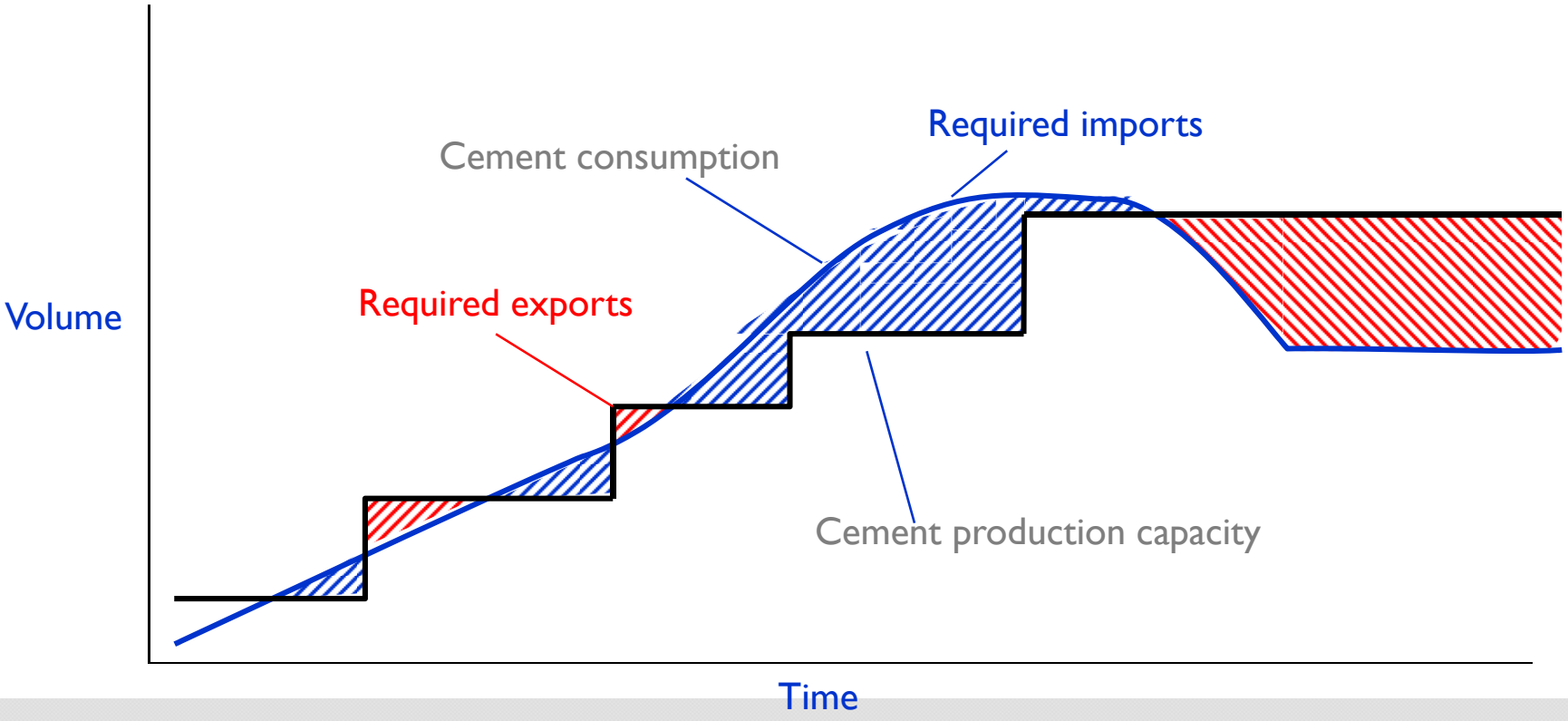
Acceleration factor of cement consumption

Economical Mechanisms



Trade fluctuation mechanism

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Economical Mechanisms

A price maker is the company that has the lowest combination of production, transport and financial costs in its key markets and as such can determine the price in these markets.

A price follower does not have this advantage and therefore will not start a price war and will follow the pricing of its competitor

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Price maker or Price follower

Logistics of seaborne distribution systems

- Basics
- Closed versus open systems
- Growing distribution systems
- Possibilities and limitations of self discharging cement carriers
- New self discharging cement carriers

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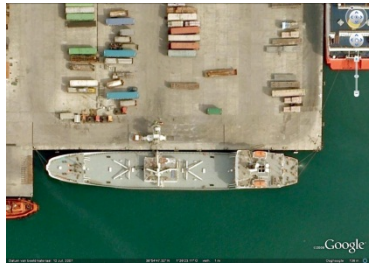
Logistical issues



- Shipping is the determining cost factor in seaborne trade and distribution
- Ship size is determined by transportation distance (but can be influenced by the shipping market situation and available port facilities)
- The ship size and shipping irregularity determine the required buffer storage in loading port facilities and discharge terminals
- The ship size and type determined the required size and type of the loading and discharge systems

Logistical issues

Self discharging cement carrier with on-board loading and discharge systems

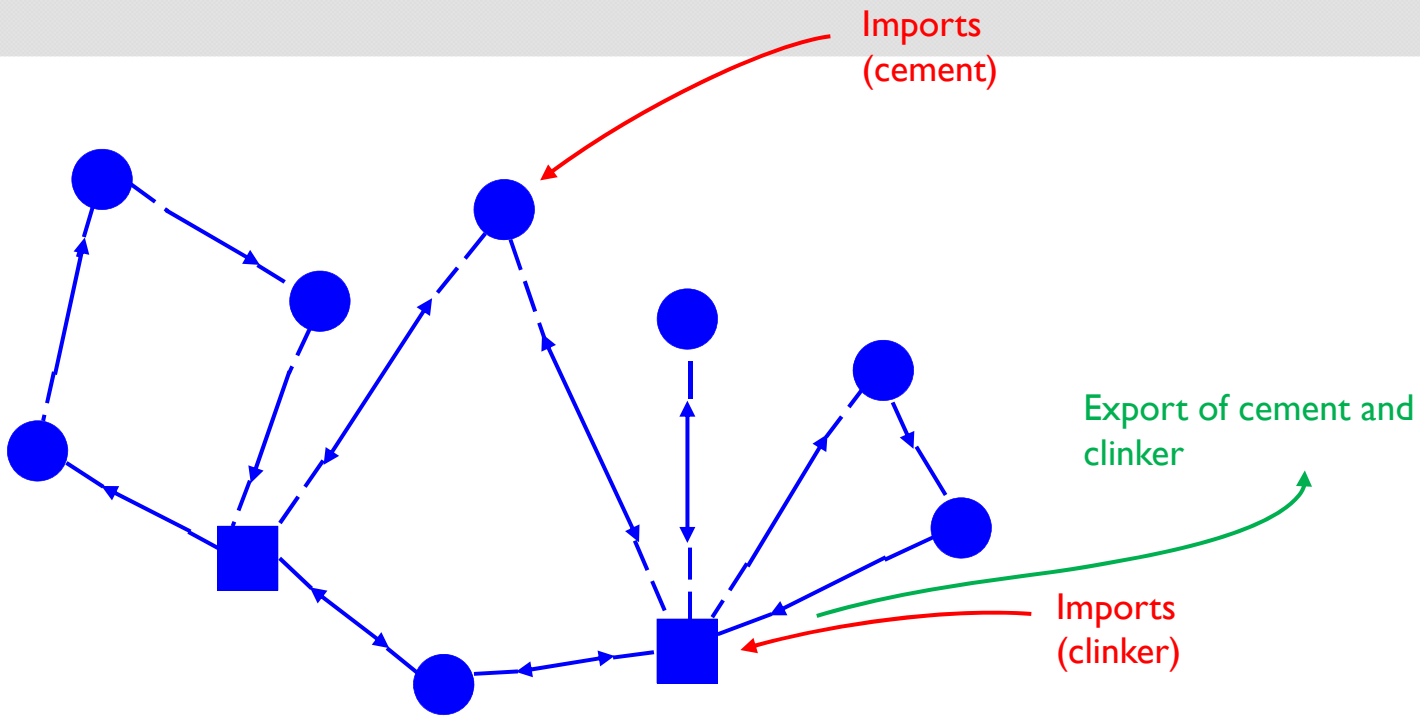
- All weather, highly efficient loading and discharge
- Does not necessarily need a dock, just dolphins and a pipeline to shore
- Cannot take return cargo. Therefore best on short term medium distance routes
- On a specific route it has a fixed annual tonnage capacity. If this tonnage is lower then the vessel is idle part of the time. If the tonnage is higher a different solution has to be found.
- Very regular scheduling possible.
- Can deliver cargo at multiple terminals in one voyage

General bulk carrier requiring specialist on shore loading and discharge systems

- Loading and discharge will have inefficiencies and will take more time. Rain delays can occur
- Needs a dock. Docks are usually shared and so delays can occur because of other operations
- Can take return cargo or go to different trade routes. Therefore best for long and medium distance routes.
- Shipping by general bulk carriers can be adapted much more easily to changing market conditions.
- More irregular scheduling. Requires larger buffer storages.

Closed system: No import or export capability

Logistical issues



Open system: With possibilities to import and export cement and clinker

Imports and exports require larger ships than distribution systems and creating and open system means creating the loading and discharge facilities for these larger ships

Closed versus open system

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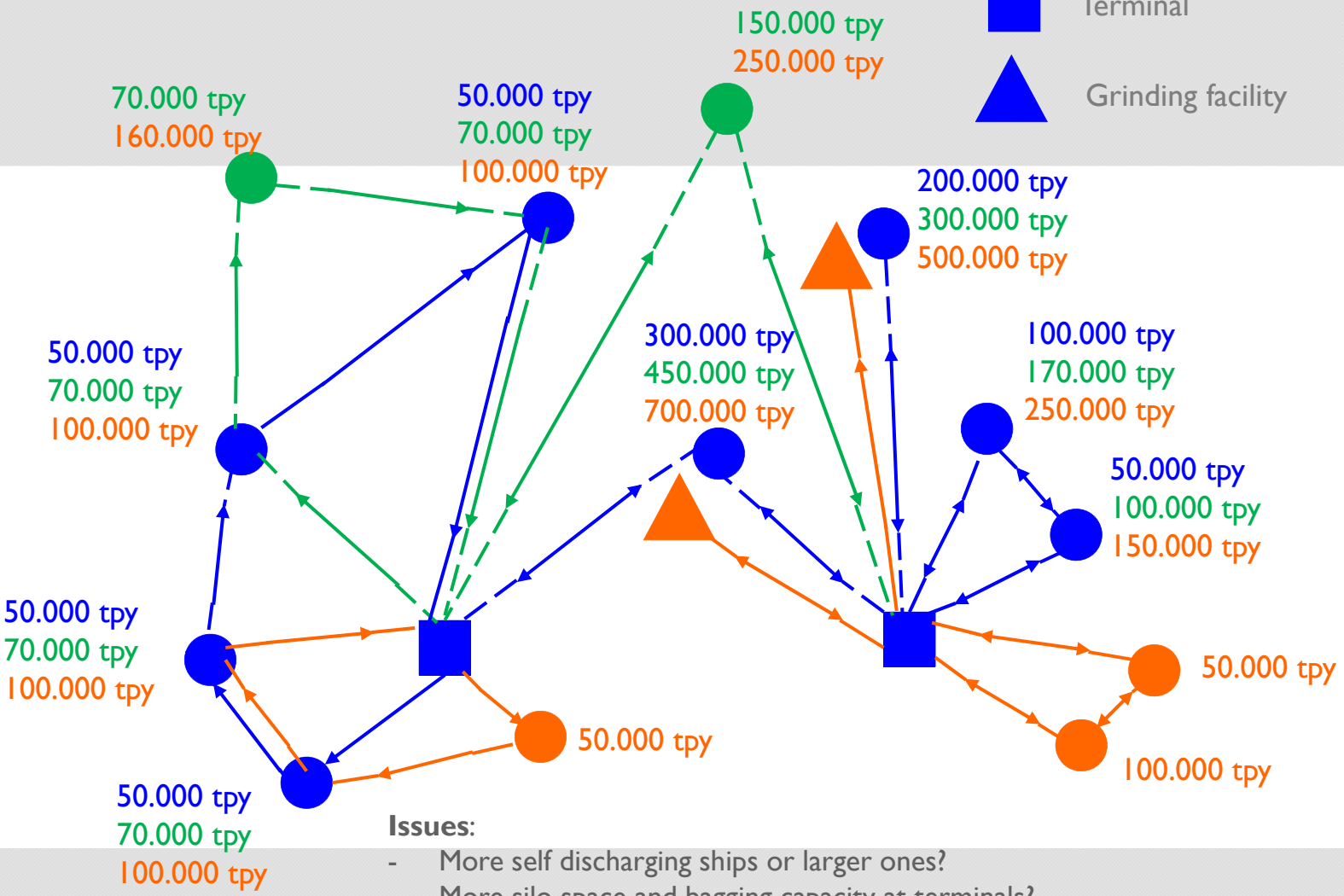
- Now
- 5 Years later
- 10 years later

Logistical issues

Plant

Terminal

Grinding facility



Issues:

- More self discharging ships or larger ones?
- More silo space and bagging capacity at terminals?
- Access for larger ships at terminal?
- Change to clinker distribution instead of cement?
- Expanded capability to imports and export?
- Multiple cement types?

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Growth of seaborne distribution systems

The self discharging cement carrier is the key to successful and economic seaborne domestic distribution systems

Small ships versus larger ships

Second hand vessel

- "Immediate availability"
- Lower capital cost
- Availability can be limited
  - Right size not available
  - Right type not available
- High operating cost

New fuel efficient ships versus second hand older vessels

New building

- Long delivery time
- Higher capital cost
- Optimal size
- Optimal configuration
- High fuel efficiency
- Lower maintenance

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General developments in Shipping

- IFO (intermediate Fuel Oil) is becoming less available and increased faster in price than other fuels.
- Stricter environmental regulations (Limiting high sulphur fuels)
- Stricter safety regulations (movement to double hull bulk carriers)

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New self discharging cement carriers

Ship design

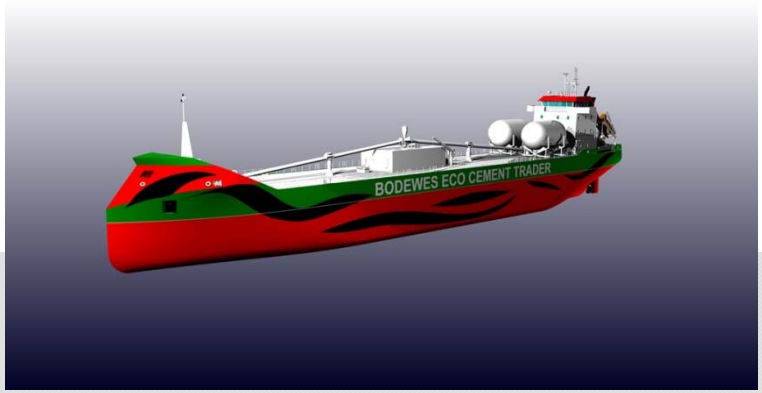
Fuel efficient
- longer ships with less width
- 15-20% lower fuel cost

Safety
- Double hull
- Long Narrow holds!
- Stability is a much bigger issue

Environmental
- Possibility to switch to LNG

Cement handling system

- Integrated tank top of double bottom / fluidising floor
- Fluidising floor as low as possible to increase hold volume and stability
- Changes required to layout and system design of cement handling systems



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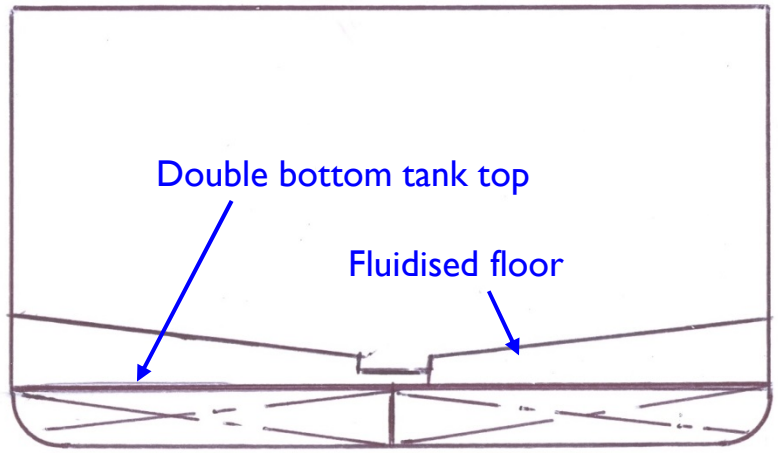
ROYAL BODEWES

Self discharging ships

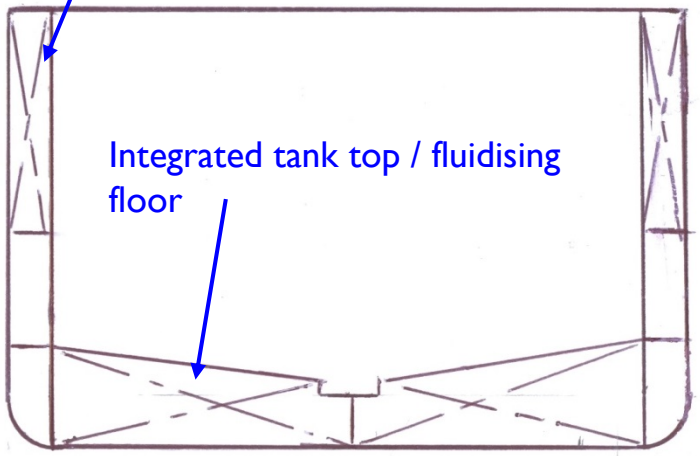
Old type

Wide body with single hull



New type

Narrow body with double hull



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Optimizing seaborne domestic distribution systems

- Long term approach required
- Move to larger self discharging cement carriers
  - Visit multiple terminals in one voyage
  - Offshore discharge possibility to allow for larger vessels (floating pipeline)
- Move to new building cement carriers with low operating costs and optimally sized and fitted
- Consider clinker distribution and grinding plant for high volume routes
- Build flexibility in the system to cope with change market conditions, multiple products.

To optimize seaborne domestic distribution system it is required that all possibilities can be compare and evaluated.

This is only possible by building a business model of the complete network combining logistics and economics

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THANK YOU

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