European cement trade and distribution
Logistics and Technology

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Cement Distribution Consultants

CEMENT DISTRIBUTION CONSULTANTS

25 September 2012

INTERNATIONAL CEMENT CONFERENCE Cemtech PRODUCTION EXPERTISE - MANAGEMENT SKILLS

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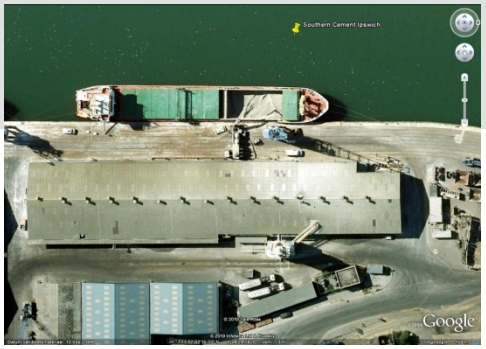

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  - Import and Distribution terminals
- How to improve logistical costs?

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Overview Europe cement trade and distribution

- Europe has not been very exiting in recent years in respect to cement and clinker trade and distribution
- Since the start of the crisis there is a strong reduction in seaborne imports, exports and waterborne domestic distribution
- Continuous consolidation of independents terminals and grinding plants into networks.
- Few new developments (except perhaps for Black Sea area and France)
- Further pruning of networks to be expected (closing or mothballing of facilities)

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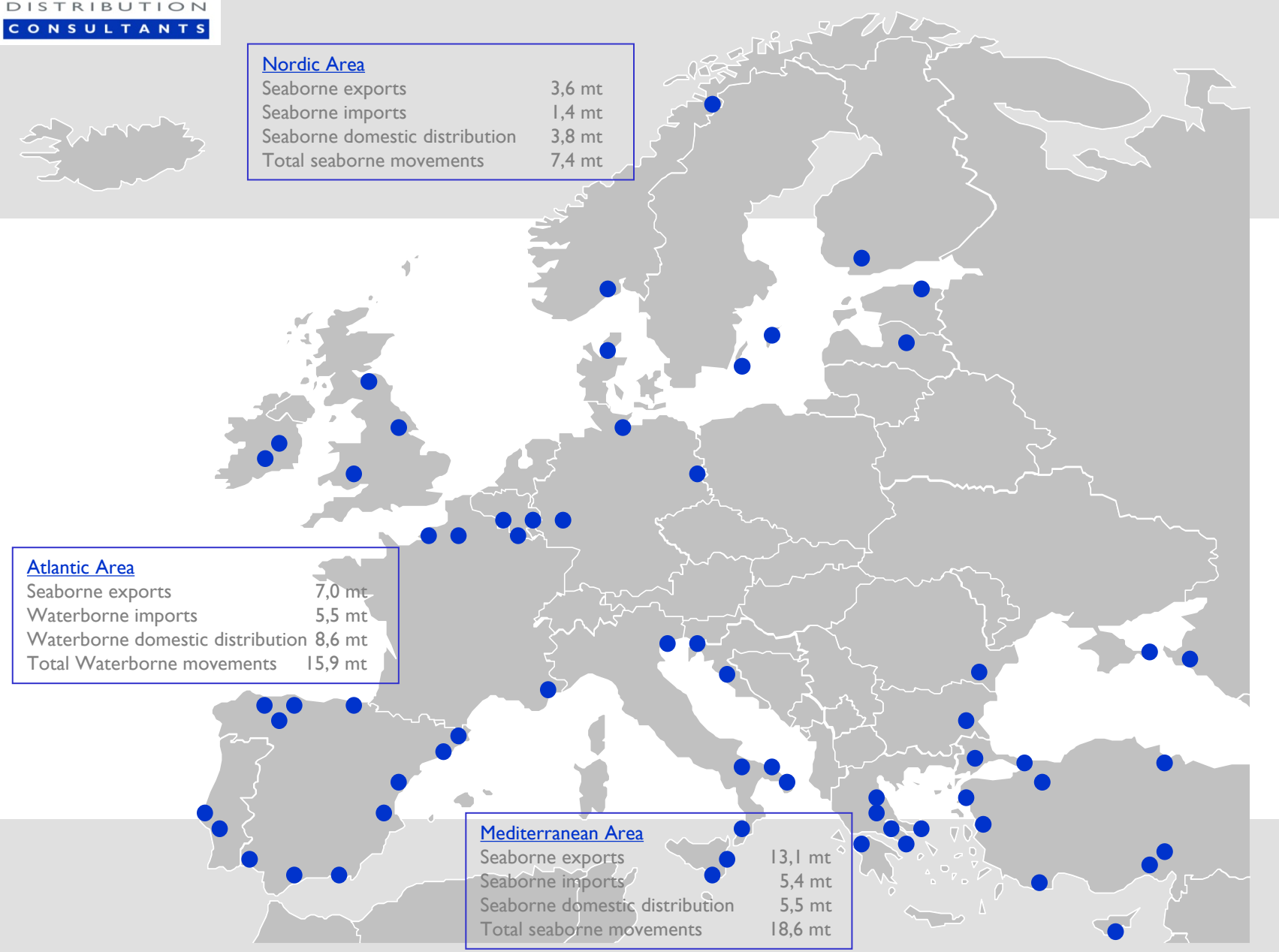
Main cement and clinker flows



Nordic Area

Seaborne exports	3,6 mt
Seaborne imports	1,4 mt
Seaborne domestic distribution	3,8 mt
Total seaborne movements	7,4 mt

Atlantic Area

Seaborne exports	7,0 mt
Waterborne imports	5,5 mt
Waterborne domestic distribution	8,6 mt
Total Waterborne movements	15,9 mt

Mediterranean Area

Seaborne exports	13,1 mt
Seaborne imports	5,4 mt
Seaborne domestic distribution	5,5 mt
Total seaborne movements	18,6 mt

● CEMENT PLANTS WITH WATERBORNE CEMENT AND / OR CLINKER DISTRIBUTION

Overview Europe cement trade and distribution

2011 (Est.)

Total seaborne cement and clinker exports in Europe 23,7 mt

of which 12,3 mt imported within Europe

Exported to other continents 11,4 mt

Few imports from other continents

Total waterborne domestic distribution in Europe 17,9 mt

Total waterborne cement and clinker transportation in Europe 41,9 mt

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Key statistics

Overview Europe cement trade and distribution

Total waterside facilities in Europe

66 Cement plants involved in waterborne cement and clinker transport

58 Grinding facilities receiving clinker or slag by water

247 Cement terminals

Part of networks

62 Plants

36 Grinding facilities

221 Terminals

Not connected

4 Plants

22 Grinding facilities

26 Terminals

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Key Statistics (2)

Overview Europe cement trade and distribution

	Seaborne exports	Seaborne imports	Waterborne domestic distribution	Plants	Grinding facilities	Terminal
Nordic region	3,6	1,4	3,8	10	2	84
Atlantic	7,0	5,5	8,6	18	25	63
Mediterranean	3,1	5,4	5,5	38	31	100
Total	23,7	12,3	17,9	66	58	247

Key Statistics (3)

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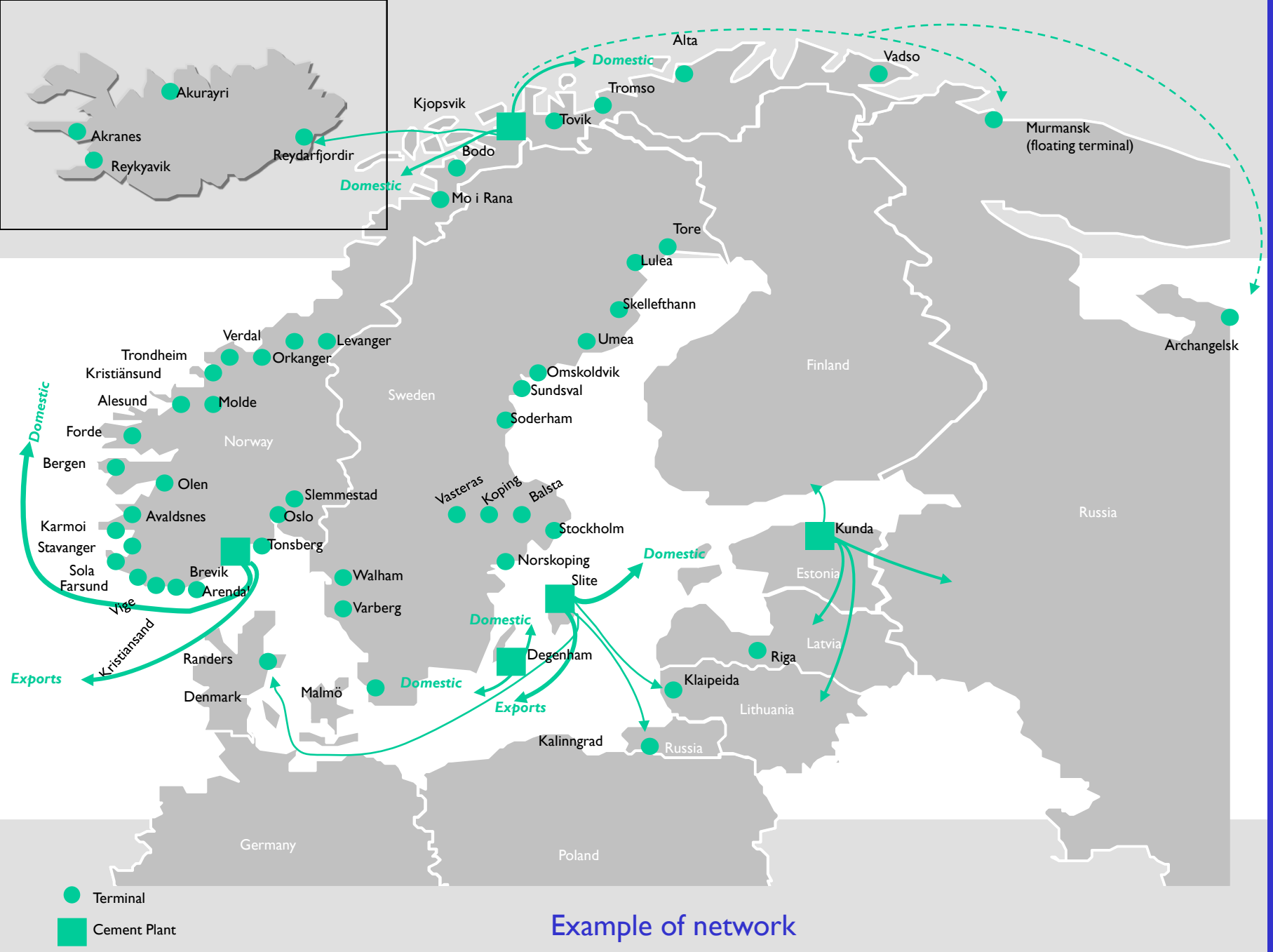

Example of network

NORDIC AREA – HEIDELBERGER seaborne trading and distribution network

Overview Europe cement trade and distribution

Cement and clinker facilities involved in waterborne transportation

	Plants	Grinding facilities	Cement terminals
Heidelberg (Nordic)	5	0	51
Heidelberg (Atlantic)	3	6	3
Heidelberg (Mediterranean)	1	0	6
Heidelberg Total	9	6	60
Lafarge (Atlantic)	3	2	5
Lafarge (Mediterranean)	7	3	13
Lafarge Total	10	5	18
Cemex (Nordic)	2	1	12
Cemex (Atlantic)	2	1	8
Cemex (Mediterranean)	3	1	14
Cemex Total	7	3	34
Holcim (Nordic)	0	0	1
Holcim (Atlanctic)	2	4	9
Holcim (Mediterranean)	2	3	14
Holcim Total	4	7	24

	Plants	Grinding facilities	Cement terminals
Italcimenti (Atlantic)	1	1	3
Italcimenti (Mediterranean)	4	4	8
Italcimenti Total	5	5	11
CRH (Nordic)	2	1	4
CRH (Atlantic)	1	2	5
CRH Total	3	3	9
Cementir (Nordic)	1	0	11
Cementir (Mediterranean)	1	0	13
Cementir Total	2	0	14
Valderivas (Atlantic)	1	0	4
Valderivas (Mediterranean)	3	1	1
Valderivas Total	4	1	5
Lagan (Atlantic)	1	0	2

Networks versus individual trade

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Overview Europe cement trade and distribution

Cement and clinker facilities involved in waterborne transportation

	Plants	Grinding facilities	Cement terminals
Tudela Veguin (Atlantic)	2	0	6
Cimpor (Atlantic)	1	2	6
Cimpor (Mediterranean)	0	2	1
Cimpor Total	1	4	7
Titan (Atlantic)	0	0	2
Titan (Mediterranean)	2	0	5
Titan Total	2	0	7
Cimsa (Atlantic)	0	0	1
Cimsa (Mediterranean)	2	0	7
Cimsa Total	2	0	8
Secil (Atlantic)	1	0	3
Colacem (Mediterranean)	3	0	7

	Plants	Grinding facilities	Cement terminals
Buzzi Unicem (Mediterranean)	2	1	3
Oyak (Mediterranean)	2	1	3
Nuh	1	0	1
Independents (Nordic)	0	0	5
Independents (Atlantic)	0	7	7
Independents (Mediterranean)	4	15	14
Total Independents	4	22	26

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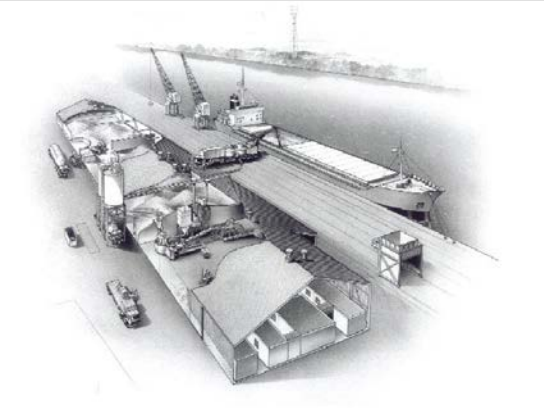
Networks versus individual trade

Overview Europe cement trade and distribution



- Europe is dominated by networks
- Coastal trade with many small terminals
- Europe is a big export base for global trading
- Still independent terminals and grinding plants around
- Rich variety in export and import facilities

Networks versus individual trade

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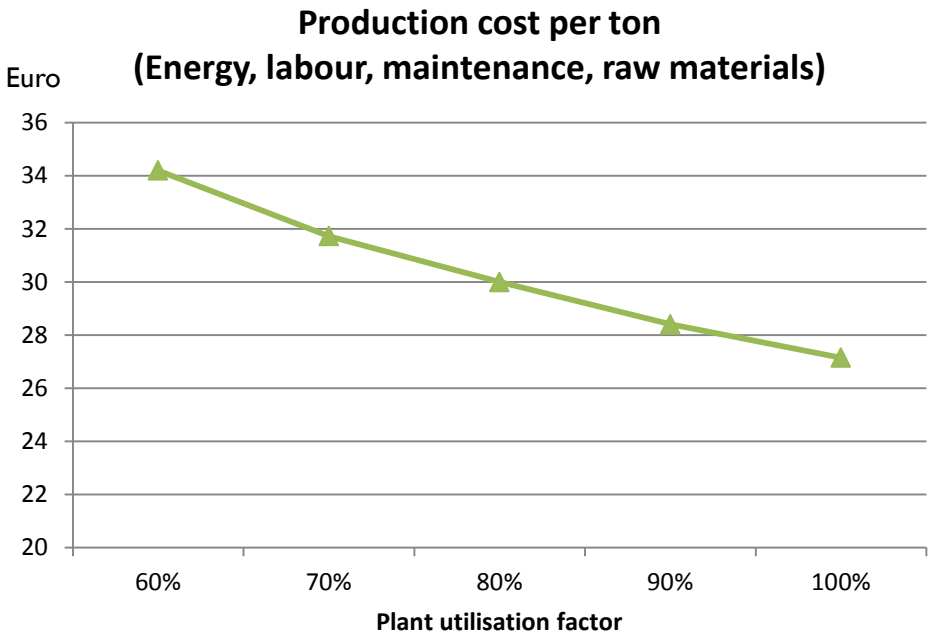
Economical Mechanisms



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

Maximizing plant utilisation

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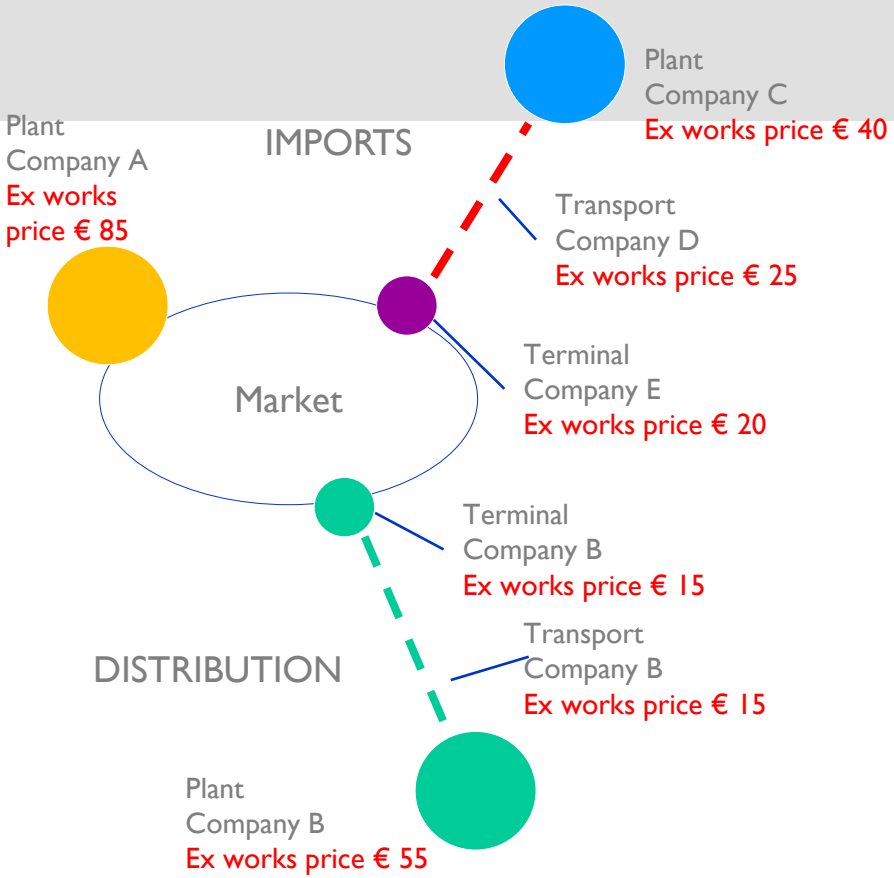
Economical Mechanisms

- 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.

Cost of transportation aspects

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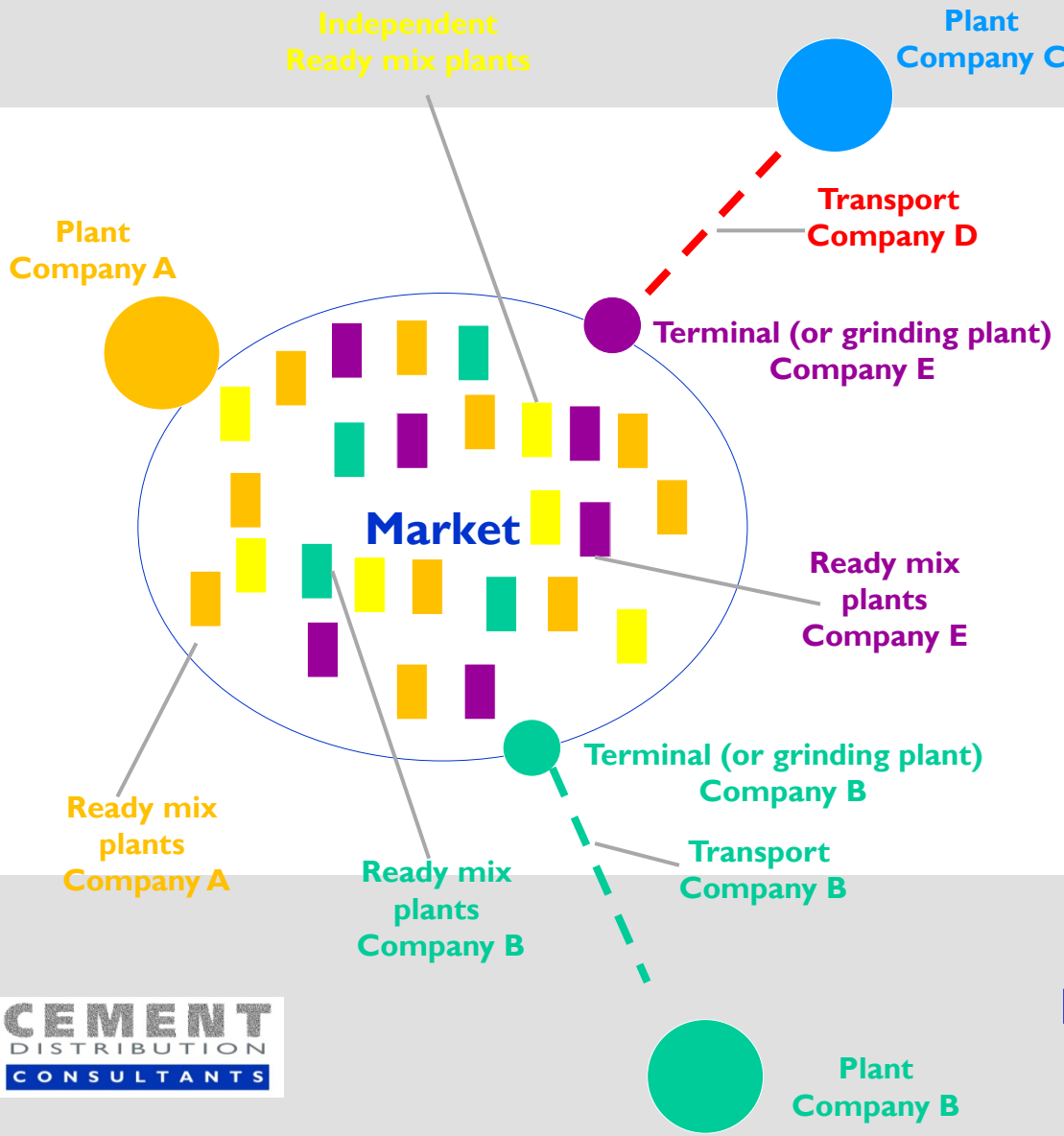
Economical Mechanisms



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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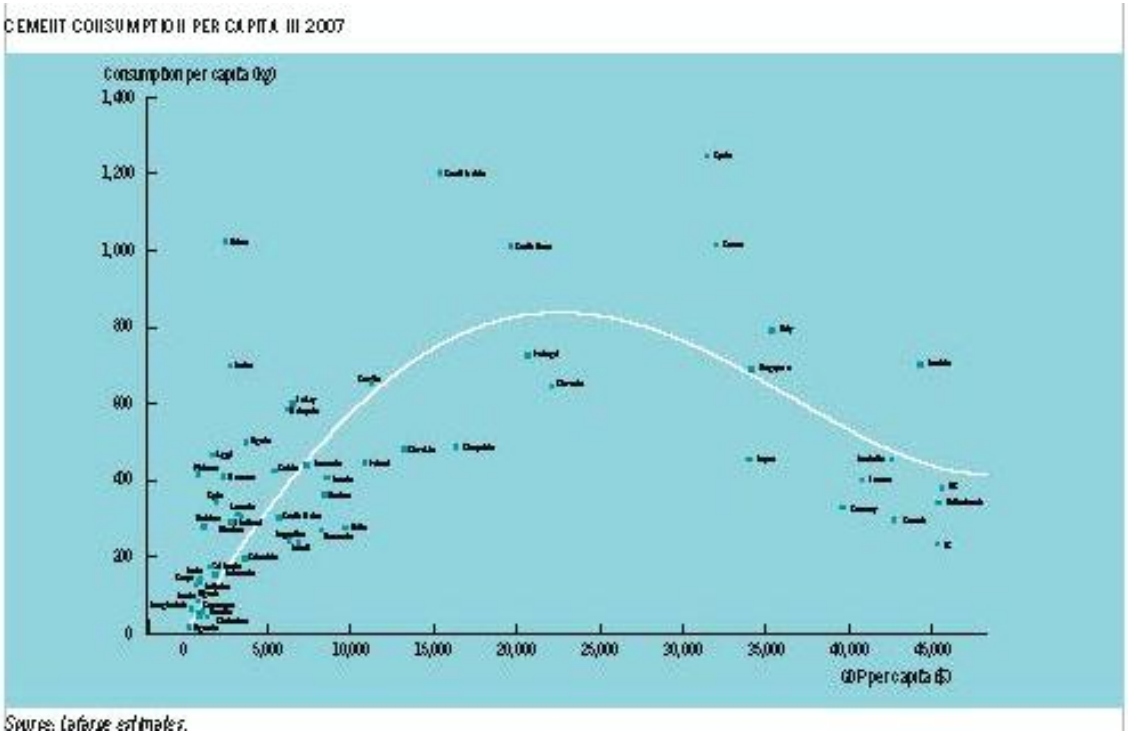
Economical Mechanisms



GDP related to cement consumption

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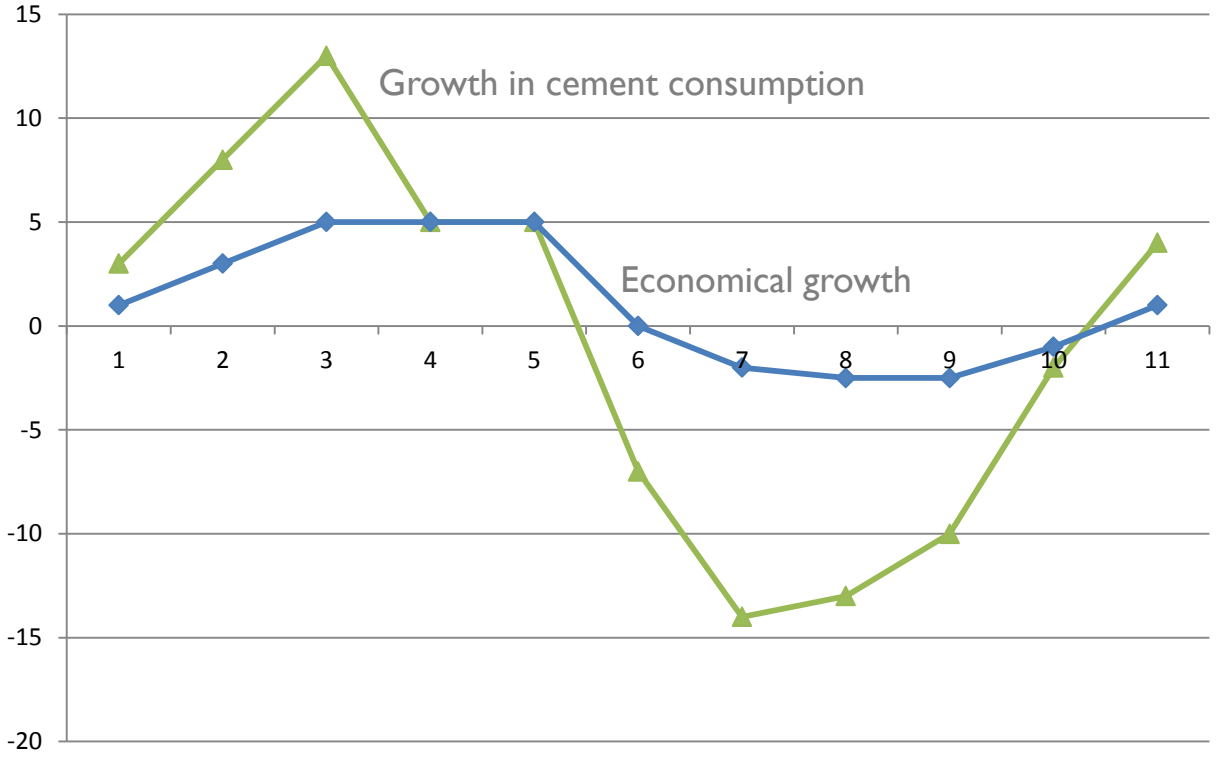
Economical Mechanisms



Acceleration factor of cement consumption

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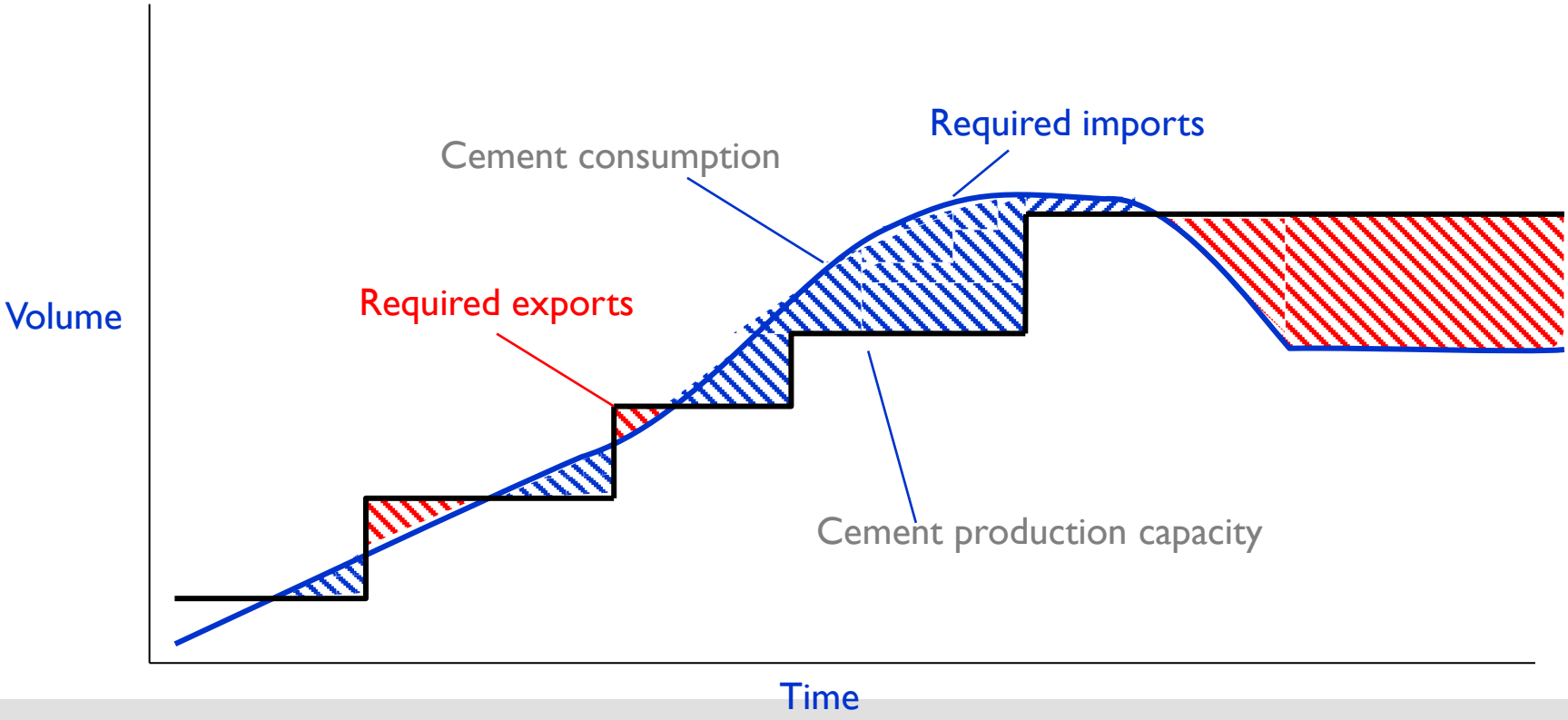
Economical Mechanisms



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

Price maker or Price follower

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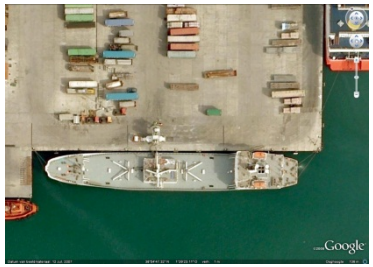
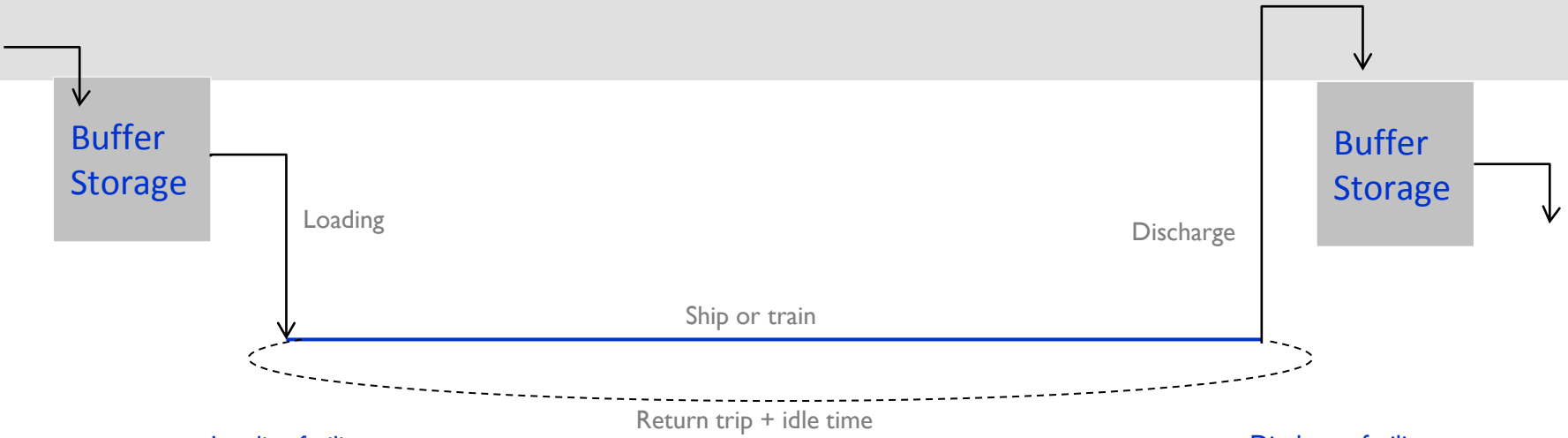
Logistical issues



- Shipping is the determining cost factor in trade and distribution
- Ship size is determined by transportation distance (and 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

Logistics



Loading facility

Annual throughput
Duration of transport project
Capital costs
- Size of facility
- Type of facility

Operating costs
- Labour
- Energy
- Maintenance
- Lease of land

Related

Transport

Long-term commitment
- Stable costs (except fuel)
- Little flexibility

Short-term commitment
- Fluctuating costs
- High flexibility

Discharge facility

Annual throughput
Duration of transport project
Capital costs
- Size of facility
- Type of facility

Operating costs
- Labour
- Energy
- Maintenance
- Lease of land

Related

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Cost of transportation aspects

Logistical issues

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

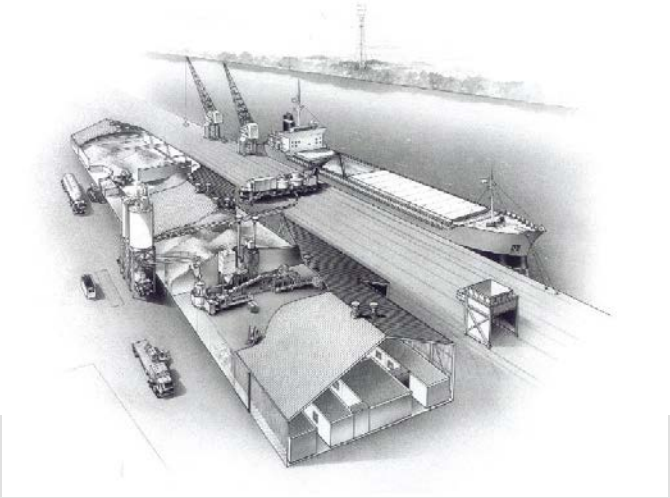
- All weather, highly efficient loading and discharge
- Does not necessarily need a dock, just dolphins and a pipeline to shore
- Cannot take return cargo. Therefore best on short term medium distance routes
- On a specific route it has a fixed annual tonnage capacity. If this tonnage is lower then the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

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.

Logistical issues

- Many different types and sizes of storage facilities available (silo, dome, warehouse, floating as well as combinations) all with a different capital cost, operating cost and flexibility.
- Many different configurations and sizes of ship loading , discharge and handling systems also with different capital, operating cost and flexibility
- Many different port situations that can require specific solutions



Loading and discharge facilities

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Logistical issues

- Secure, stable, high throughput, long-term trade and distribution routes favour solutions with low operating costs and allow for higher capital cost and less flexibility
- Insecure, fluctuating throughput trade and distribution routes favour solutions with the lowest possible capital cost and the most flexibility
- In between there is a wide range of trade and distribution situations that each will have to be considered at their own merits
- Markets, economies, always keep changing. This means that flexibility always has to be a main characteristics of logistics!!

Logistical issues

- Networks which have multiple trade and / or distribution routes usually will have to handle multiple ships of different types and sizes as well as multiple types of cement. This requires port loading facilities with much larger multi compartment storage facilities, multifunctional loading systems and , for bigger networks, multiple docks.

- Networks of growing size require more complex and advance logistical planning both in respect to new trade and distribution routes as well daily operations.

Logistical issues

Cement trade and distribution

- Is much more adaptable and cost efficient to different markets and logistical situations than the limited number of situations that favour clinker.

Clinker trade and distribution

- Requires grinding facility plus storage and handling equipment in the receiving market which represents a substantial investment.
- Therefore only suitable for secure, stable, long-term markets with a substantial throughput.
- Clinker transport and handling can have a lower cost per ton and requires only general bulk handling equipment.
- Clinker can be ground and blended into multiple cement types dedicated to the market.
- Clinker is more widely available than cement
- Clinker is a half product and does not need quality certificates.

Cement versus clinker

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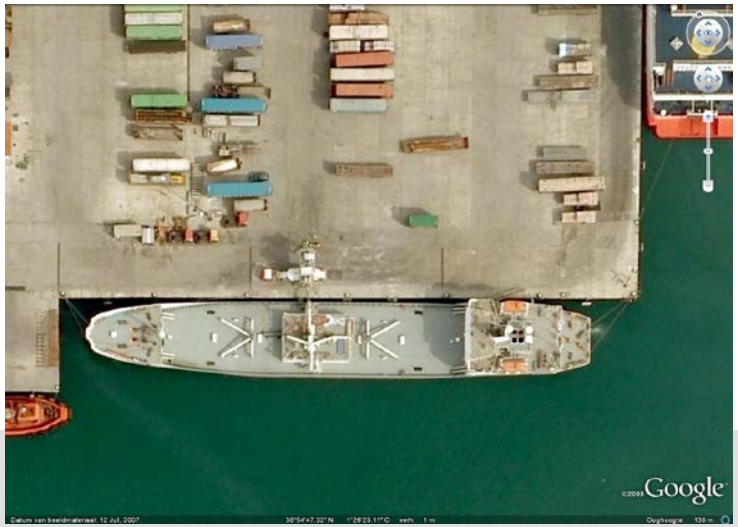
Technology

MV Ronez being loaded by trucks in Barry UK (Lafarge)

and discharge into trucks in Stornoway

Lafarge ship loading operations in Nice



Cemex ship to truck discharge in Ibiza

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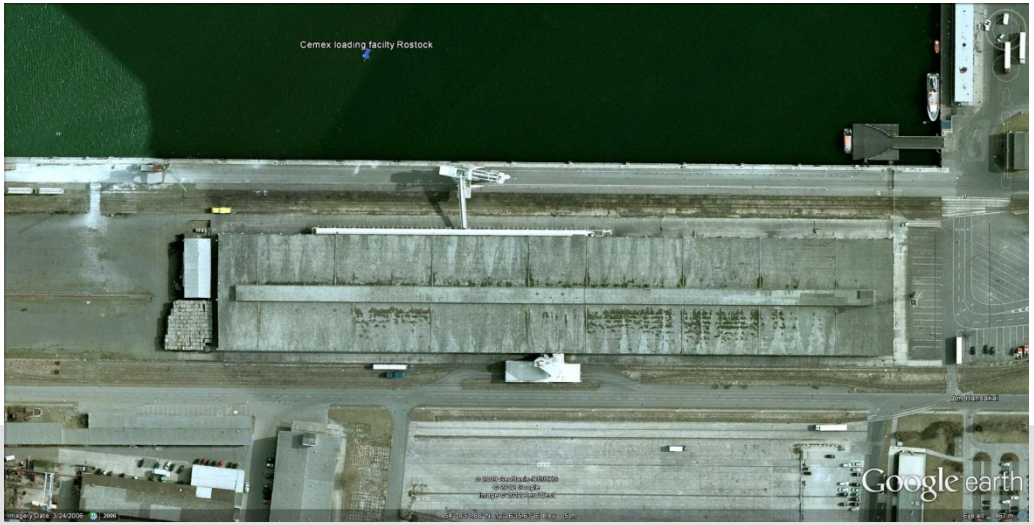
Simple operations

Truck to ship Ship to truck

Technology

Holcim loading facility in Brünsbuttel

supplied by trucks from Lagersdorf plant



Cemex flat storage ship loading facility Rostock receiving cement by rail from Ruderdorf plant

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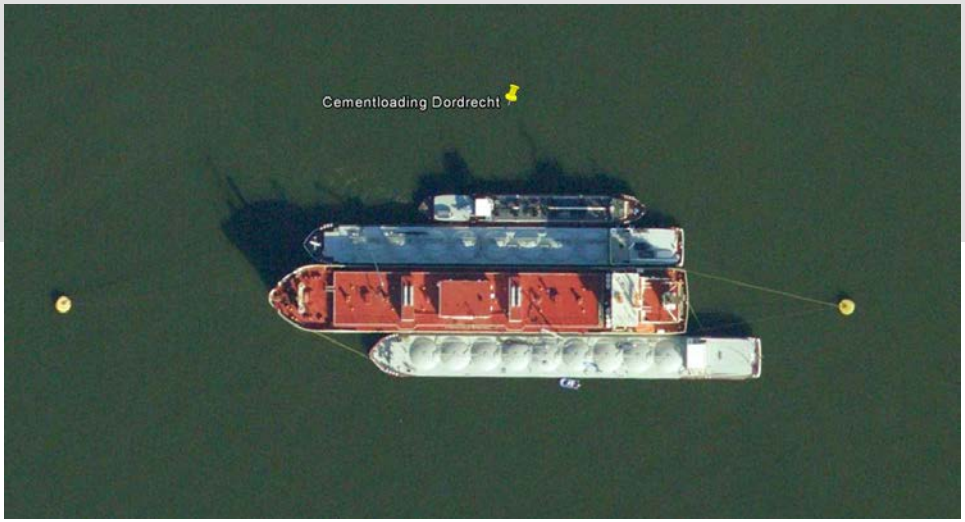
Truck from cement plant to ship loading facility

Rail transport from plant to ship loading facility

Technology



Cement trans shipment in Dordrecht - Self discharging ships

Cement trans shipment in Dordrecht - General cargo ship

Bulk carrier loading in Antwerp

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Inland ship to sea ship

Technology

Secil cement plant Setubal

Lafarge Cement Volos

Cementa (Heidelberger) plant Slite

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Cement plants with substantial ship loading capabilities

Technology

Tudela Veguin loading facility, Gijon

Tudela Veguin terminal, La Coruna

Norcem (Heidelberger) terminal, Alta

Heracles (Lafarge) terminal, Patras

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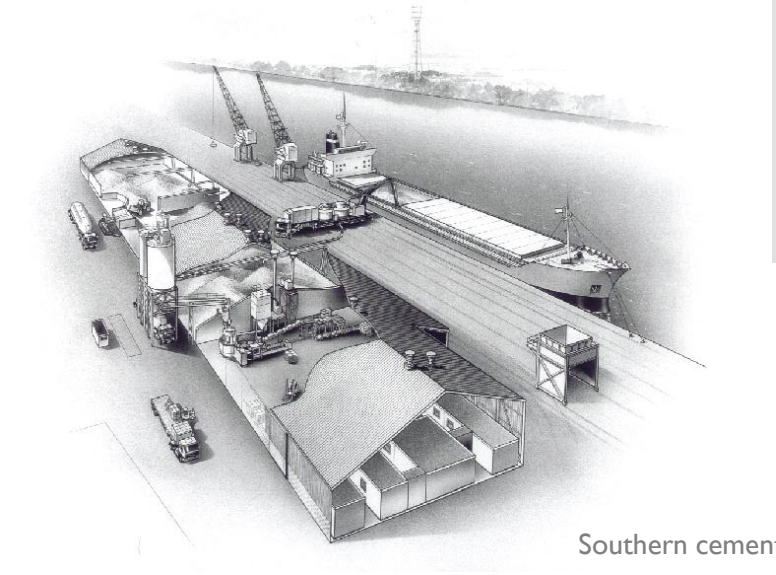
Dedicated distribution systems

Technology



Southern cement (Valderivas) terminal, Ipswich

Trading terminals with low capital cost

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Trading terminals with low capital cost

How to improve logistical costs

Build a business model of the complete trade or distribution route
or complete network to compare different solutions

- Spread sheet with multiple interactive input, calculations and result pages
- Modular approach to easily change terminal configurations, shipping solutions
- Logistical and economical calculations over multiple years on a month by month basis
- Allows for multiple scenarios to be evaluated
- The business model allows comparison of different terminal configurations and network configurations

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To be published December 2012

Global Cement Trade & Distribution Handbook

- Economical mechanisms of cement and clinker trade and distribution
- Overview of global and regional trade flows
- Overview of domestic distribution systems
- Directory of coastal cement plants, coastal grinding plants and coastal terminals
- Multinational trading networks
- Shipping overview

Written by Cement Distribution Consultants

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THANK YOU

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