INDUSTRIAL MINERAL TRANSPORTATION and MARKETING

TRANSPORTATION CONCEPTS

- Overall transport is 21% of US economy
- Often >50% of delivered IM cost
- Bulk *versus* value
- Place value
- Value added
- Quality retention or "do no harm"
- Efficiency, luck, and risk

Transport

Often exceeds 50% of delivered cost (highest except food)

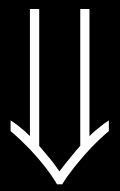
Industrial Mineral As $ per short ton	Mine $	Shipping $	$ End User	% of del $
Construction aggregates	4–7	2–6	6-13	27-52
Industrial glass/foundry sand	7–12	6–10	13-22	39-51
frac sand	15–12	25–40	40-52	65-75
Cement				
domestic	40–50	8–14	48-64	15-24
imported	26–30	8–14	34-44	22-33
Pumice (import)	10–15	9–12	19-27	42-49
Coal	19–28	10–17	29-45	30-42
Gypsum	5–10	10–15	15-25	57-67
Feldspar (ground)	40–50	40–60	80-110	47-57
Lime	35–50	15–25	50-75	26-37
Kaolin (slurry)	30–45	20–35	50-80	45-48

GEOLOGY

existence

Development

TRANSPORTATION



Production

profit

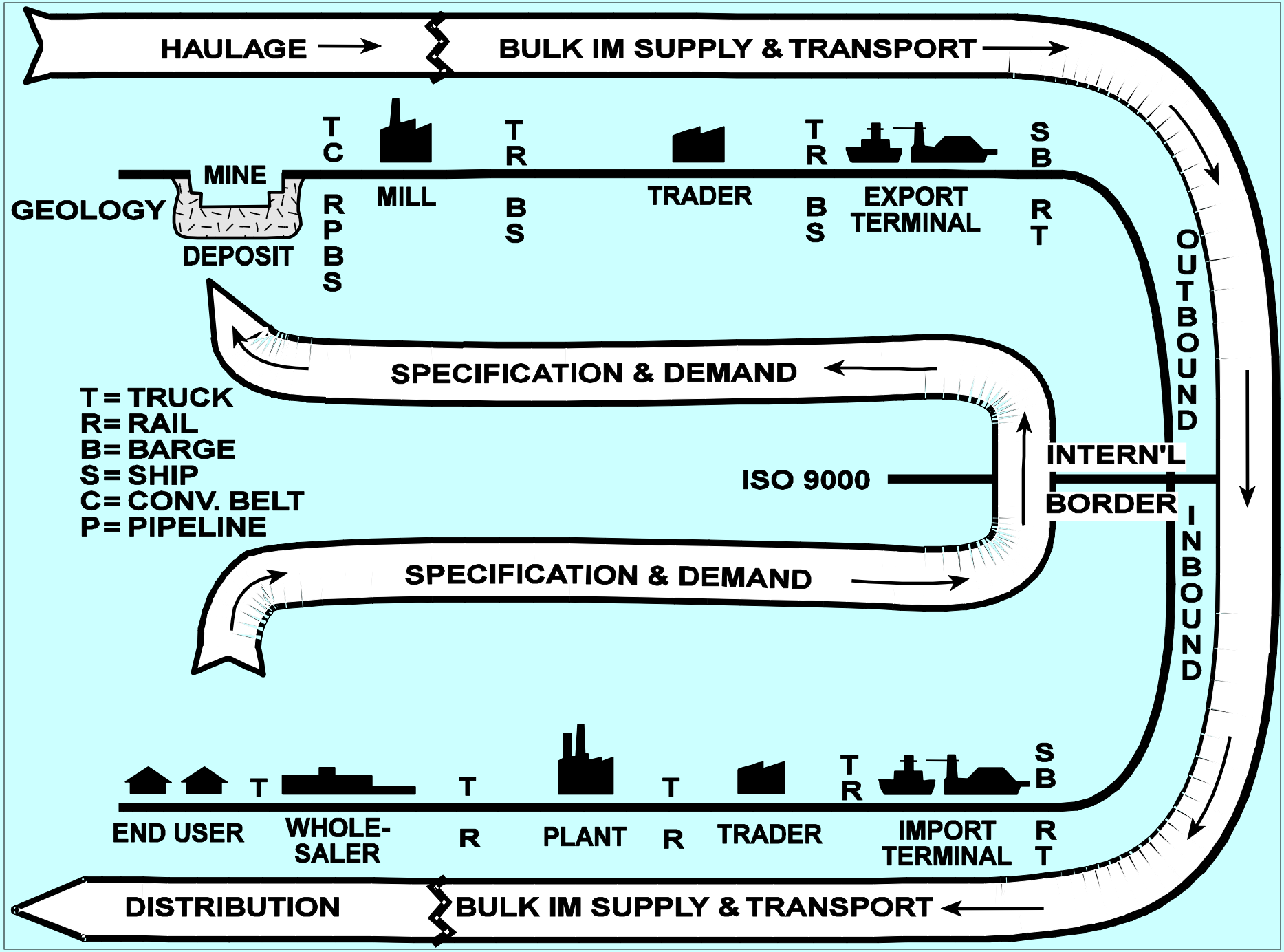
MARKET

TRANSPORTATION AS MARKETING

7 R's of Transport	4 P's of Marketing
Right product	Product
Right quantity	
Right condition	
Right place	Place
Right time	
Right customer	
Right cost	Price
	Promotion
	Service

"THE MARKETING CONCEPT"

- Focus all activities towards total customer management and satisfaction
- Make products consumers want *vs* making consumers want a product
- Transportation can ⇑ customer satisfaction
- Industrial marketing better for IMs than consumer marketing approach
- Industrial marketing focuses on customer satisfaction


HAULAGE
BULK IM SUPPLY & TRANSPORT
T C
T R
T R
S B
MINE
GEOLOGY
DEPOSIT
R P B S
MILL
B S
TRADER
B S
EXPORT TERMINAL
R T
OUTBOUND
SPECIFICATION & DEMAND
T = TRUCK
R = RAIL
B = BARGE
S = SHIP
C = CONV. BELT
P = PIPELINE
ISO 9000
INTERN'L BORDER
SPECIFICATION & DEMAND
INBOUND
T
T
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T R
S B
END USER
WHOLE-SALER
R
PLANT
R
TRADER
IMPORT TERMINAL
R T
DISTRIBUTION
BULK IM SUPPLY & TRANSPORT

IM TRANSPORT COST FACTORS

- IM volume & processing
- Wet or dry; bulk or packaged
- Transport distance
- Availability, schedule & transit time
- Equipment & support facilities

…more factors

- Distribution, terminal, & port facilities
- Support services or lack thereof
- Ex-Im tariffs, bonding & customs
- Governmental & environmental regs.
- Cultural or regional differences
- Insurance & risk-avoidance

TRANSPORT RISK

Truck
Rail
Barge
Ship

Lower Risk
⇓
⇓ ⇓
Higher Risk

TRUCK TRANSPORT

- Unlimited year-round movement
- Load & unload quickly
- Operate independently with small crew
- Flexible
  - Small lots & variable sizes
  - infrequent shipment
- Very expensive; 10–25¢ per ton-mile

TRUCKING 2

- Transports about 60% of US cargo
- Highest cost per ton mile
- Very flexible
- Rates fixed (common carrier) or negotiation
- States set common or contract carrier
- Common carrier serves all = highly regulated
- Contract carrier negotiates with each customer
  - separate, confidential contract rates
  - based on many economic and competitive factors

RAIL TRANSPORT

- Slow; limited to track
- Inflexible
- Expensive, 2–4¢ per ton-mile
- Time, volume, distance interaction
- Railcars/service often unavailable
- Railroads often difficult to deal with

Rail 2

- Subsidized or nationalized except in U.S.
- Haul about 25% of freight
- Railroads restrict interchange points & reciprocal switching agreements with other railroads
- Today most material moves under commodity, scale, or contract rates held confidential for competitive advantage
- Hauls from producer to user over a single railroad are cheaper than joint-line movement
  - profits are shared
  - some expenses duplicated

Railcar service

- Mingle car--100 t or less, very slow, high rates
- Multiple car—1200 t or more, slow, moderate rates
- Trainload--4000 t or more, cars loaded and unloaded together, fast, low rates
- Unit train--contract tons per time in set number of cars, continuous turnaround service, very fast, lowest rates
- Some railcar types used by IM producers are:
  - hopper
  - rapid discharge
  - gondola
  - covered
  - pressure differential
  - and special service

Railroad Cost Factors

- Loading time
- Volume moved
- Distance
- Unloading time
- Rail equipment
- Rail equipment owner
- Competing transport
- Competing rates
- Value of service

BARGE TRANSPORT

- Slow
- Inflexible
  - needs river, canal or waterway and locks
  - oriented to large bulk cargoes
- Limited access; grain season (Aug.–Nov.)
- Inexpensive; 0.75–1¢ per ton-mile

Barge 2

- Relatively unregulated rates; private contracts
- Contracts negotiated via market forces
- Inland waterways carry 12% of US freight for 2% of US freight billings
- Inland waterway is about 23,200 km of which the lower 400 km are accessible to ocean-going vessels
- Coastal seaways (Gulf Intracoastal Waterway from Texas to Florida is also important
- The Rhine, and its feeder ports on the North Sea (Rotterdam, Antwerp, Amsterdam), connect via canal to the Danube and the Black Sea

SHIP TRANSPORT

- Slow
- Needs extensive infrastructure
- Very inflexible
  - not now geared to IM cargoes
  - not usually a factor inland
- Seasonal (grain, iron, coal, fertilizer; E↔W)
- Very inexpensive; 0.1–0.15¢ per ton mile

SHIP TYPES AND SIZES

TYPE	GROSS DWT	DESCRIPTION
CAPESIZE	100,000–200,000+	Too big for Panama Canal; transits Cape of Good Hope or Cape Horn
PANAMAX	60,000–80,000	Maximum to transit Panama Canal; 32.2 m beam and 275m length
HANDYMAX	40,000–52,000	Inexact term
HANDYSIZE	20,000–35,000	Inexact term

SHIPPING CONTRACT RISK

Through Rate — Lower Risk

Liner ⇓

Trip Time *or* Voyage Charter ⇓⇓

Contract of Affreightment ⇓⇓⇓

Time Charter ⇓⇓⇓⇓

Bare Boat — Higher Risk

…more risks

- Accidents
- Weather (time to avoid)
- Breakdowns
- Stowage errors
- Port problems (either end of voyage)
- Political problems

Shipping

- Tramp
  - **Voyage:** single voyage, rates from spot market
  - **Contract of affreightment:** lift specific tonnage over several voyages for a set period
  - **Time:** voyages for a specified time under direction of charterer who bears most costs except wages, victuals, and insurance as "disponent owner"
  - **Bare boat:** charterer takes vessel for specified time, staffing and operating it without restriction
- Liner (schedule with conference)
- Coastal or coaster
- Short sea
- Long sea

Shipping, cont.

- Underutilized in past by industrial minerals
- Big 3+ = wheat, iron ore, coal, (fertilizer)
- Brokers critical; history of ship helpful to limit contamination and other problems
- Bulk shipping
  - Unregulated
  - Cyclical
  - Fixtures by negotiation

Shipping, even more

- Control over commodity transport greatest if shipping FOB load port and fixing a vessel
  - Leaves control in hands of IM producer
  - Ensures vessel type, contamination level, ship-owner reliability, on-time arrival
  - Flexibility to respond to the freight market
- Charter on a delivered basis
  - Cost and freight, or C&F
  - Leaves control in the hands of the ship-owner
  - Causes some uncertainty and lowers flexibility

Shipping Brokers

- Cable, cargo, and ship brokers lessen risk
  - canvass the shipping market,
  - evaluate freight offers and services,
  - provide relatively unbiased opinions
- Worldwide shipping market
  - cyclical
  - dominated by supply and demand
  - operates 24/7
- Correct choice of discharge port is critical
  - based on distance to customer and transport available
  - shortest distance is not always the cheapest

TRENDS

- ⇑ Deregulation & integration
- ⇑ Marketing & transport distance
- ⇑ Just in time delivery; mostly by truck
- ⇑ Use of brokers, traders, trade groups
- ⇑ Distribution centers
- ⇑ Bulk or container terminals

…more trends

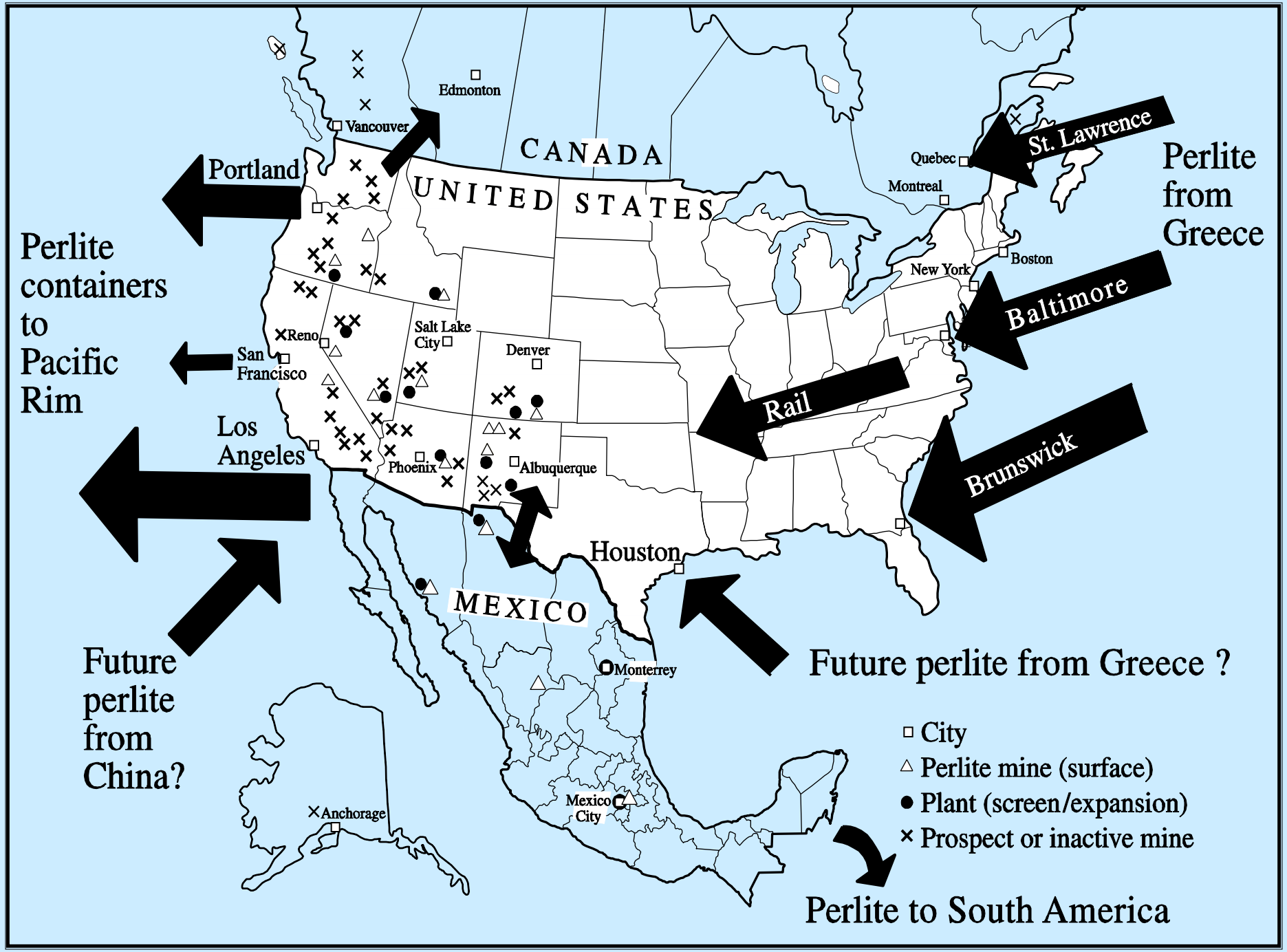
- ⇑ Use of rail & water transport
- ⇑ Large ships serving fewer ports
- ⇑ Use of containers on inland waterways
- ⇑ Importance of transport managers
- ⇑ Internet information & commerce

SUMMARY OF TRANSPORTATION TYPES

	TRUCK	RAIL	BARGE	SHIP
US cents/ton-mile	10-25 (high)	2-4 (moderate)	0.75-1 (low)	0.1 (very low)
Rates & Regulation	Negotiated (→ regulated)	Negotiated (→ regulated)	Negotiated (↓ regulated)	Negotiated (~ free market)
Flexibility	Very high	Moderate	Low	Very Low
Capacity (Typical) US	25 t	100 t	1200 t (15-40)	60,000 dwt
Europe	Varies	Varies	1500 t (4-6)	150,000 dwt
Subsidy type	Roadway	Track	Locks	Ports
Containers	Yes	Yes	Yes	Yes
Negotiations (Mostly confidential)	Easy; often via regional dispatcher	Hard; RR often not very responsive	Easier with broker, harder without	Less hard with broker, very hard without

North American Perlite
A transport example

- Greek imports to East Coast of USA
- Trans-loading from ship to railcars
- Market focus reversal to West Coast
- Containers to Pacific Rim
- Also Gulf access (Mobile; Houston)
- Panama Canal, Cape Horn


Edmonton
Vancouver
CANADA
UNITED STATES
Portland
Perlite containers to Pacific Rim
Reno
San Francisco
Salt Lake City
Denver
Los Angeles
Phoenix
Albuquerque
Houston
MEXICO
Monterrey
Mexico City
Anchorage
Future perlite from China?
Future perlite from Greece ?
Perlite to South America
Quebec
Montreal
St. Lawrence
Perlite from Greece
Boston
New York
Baltimore
Rail
Brunswick
City
Perlite mine (surface)
Plant (screen/expansion)
Prospect or inactive mine