Shipper Logistics: Understanding Customers Challenges
With 37,400 people in 166 offices throughout 43 countries, WorleyParsons supports our customers with global technical expertise and deep local knowledge.
WorleyParsons Customers

Resource Infrastructure
Urban Infrastructure
Ports & Marine Terminals
Water & Wastewater
Transport
Environment

Advanced Coal
Coal
Gas Turbine Based Plants
Nuclear
Renewable Energy Transmission Networks

Base Metals
Coal
Chemicals
Ferrous Metals
Alumina
Aluminium
Iron Ore
Gas Cleaning

Arctic
Gas Processing
Heavy Oil & Oil Sands
INTECSEA
LNG
Onshore Production & Enhanced Oil Recovery
Pipeline Systems
Offshore Topsides
Petrochemicals
Refining
Sulphur Technology
Unconventional Oil & Gas
WorleyParsons Transportation Consulting Services

- Feasibility Studies
  - New rail corridors
  - Renew colonial railways
  - Freight villages / logistics parks
  - Dry ports
  - Terminals

- Improvement
  - Benchmark studies
  - Best practices
  - Performance measures
  - Root cause gap analysis
  - Process reengineering

- Strategy & Policy
  - Mergers & acquisitions
  - Investor support
  - Buyer’s engineers
  - Government regulators
  - Concession disputes
  - PPP structuring

- Market and User Analysis
  - Pricing and yield management
  - Facility location / planning
  - Logistics & carrier sourcing
  - Fleet management
  - Competitor assessment
WorleyParsons combines expertise in Transportation, Advanced Analysis, Master Planning, and Materials Handling to help clients minimize total raw materials costs through supply chain optimization.

Industrial freight shippers make myriads of decisions like this every day.

- Price
- Time
- Reliability
- Safety
- Ease of doing business
- Value added services

We collaborate with clients to optimize sourcing and purchasing processes, reduce logistics and operating costs, reduce working capital, and improve service.
Most people (even transport professionals) assume big companies generally do a good job managing their business, including transport and logistics.

There are huge groups of quantitative professionals dedicated to studying and improving transport and logistics:

- Routing
- Inventory management
- Mode choice
- Facility location
- Procurement / Contracting
- Intermodal
Who are some of the big shipper companies that we generally think are good at logistics?

- Wal-Mart
- P&G
- Frito Lay
- Budweiser
- Dell
- Amazon
Where are the industrial companies ???

► Major Steel Company
  ● “We are doubling production, do we have the logistics capacity?”

► Large Coal Company
  ● “We are a mining company, not logistics specialists”

► International Agribusiness Firm
  ● “Our corporate culture prides itself on decentralized decision making”
More Anecdotes from Major Rail Shippers

► Giant manufacturing conglomerate
  - “My first job was working as an expediter for airplane parts. Why does that job even exist??”

► Very profitable chemical firm
  - “We have used this Mom & Pop trucker for 10 years and they always have spare capacity, are extremely customer sensitive, and do anything we ask.”

► Large Midwest steel products manufacturer
  - 12 production facilities
  - 200 different carriers, many of them off-contract
  - Majority of money spent to move stock between their own facilities
Over a 20 year period where inflation rose 61%, the real value of rail shipments went down while the value of truck shipments went up.

<table>
<thead>
<tr>
<th>Mode</th>
<th>1993</th>
<th>2002</th>
<th>2013</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>$55,000</td>
<td>$75,000</td>
<td>$85,000</td>
<td>55%</td>
</tr>
<tr>
<td>Truck</td>
<td>$640</td>
<td>$725</td>
<td>$1,226</td>
<td>92%</td>
</tr>
<tr>
<td>Rail</td>
<td>$176</td>
<td>$205</td>
<td>$246</td>
<td>40%</td>
</tr>
</tbody>
</table>

While the railroads are gaining market share, their portfolio is becoming increasingly concentrated around low value commodities

- Structural market changes account for some of this trend
  - Automobile industry now driven by mixing centers and shorter hauls
  - Chemicals production becoming more integrated, reducing intermediate movements
  - Pallets to Stores being replaced by Parcels to Doors

Shippers need to see rail as part of a supply chain solution, not just a point to point conveyor of bulk materials

- TBD: Will growth in Domestic Intermodal turn this trend?
Consumer companies have different supply chain objectives than Industrial companies

<table>
<thead>
<tr>
<th>Consumer Companies</th>
<th>Industrial Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimize Inventory:</td>
<td>Minimize stock outs:</td>
</tr>
<tr>
<td>- Relatively high cost of goods</td>
<td>- Can’t shut down production lines</td>
</tr>
<tr>
<td>- Perishable nature of goods</td>
<td>- Can’t starve the animals</td>
</tr>
<tr>
<td></td>
<td>- Must have electric and water</td>
</tr>
<tr>
<td>Small Shipment Sizes</td>
<td>Large Shipment Sizes</td>
</tr>
<tr>
<td>- Palletized units</td>
<td>- Dimensions are big</td>
</tr>
<tr>
<td>- Truckloads to stores</td>
<td>- Volumes are high</td>
</tr>
<tr>
<td>- Parcels to homes</td>
<td></td>
</tr>
<tr>
<td>Logistics costs are a small portion of total production costs</td>
<td>Logistics costs are a significant portion of the total delivered cost of commodities</td>
</tr>
</tbody>
</table>
## Typical Transport Costs for Common Railway Commodities

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Delivered Cost per ton</th>
<th>% Total Cost for Rail Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>$50</td>
<td>40%</td>
</tr>
<tr>
<td>Wheat</td>
<td>$260</td>
<td>27%</td>
</tr>
<tr>
<td>Plastic Pellets</td>
<td>$1600</td>
<td>20%</td>
</tr>
<tr>
<td>Chlorine</td>
<td>$450</td>
<td>40%</td>
</tr>
<tr>
<td>Stone &amp; Gravel</td>
<td>$25</td>
<td>50%</td>
</tr>
<tr>
<td>Crude Oil</td>
<td>$560</td>
<td>5%</td>
</tr>
</tbody>
</table>
Strategic Profit Model

Grey boxes indicate areas where corporate financial performance is impacted by supply chain. Example impacts: (1) fixed assets impacted by space and equipment utilization; (2) sales impacted by order fill rate and customer service responsiveness; (3) cost of goods sold impacted by freight costs; (4) accounts receivables impacted by order cycle time; (5) inventory impacted by transport management and reliability.

*Source: Coyle, Ruamsook, Russell, and Thomchick (working paper)*
Supply Chain and ROCE Relationship

Source: Coyle, Ruamsook, Russell, and Thomchick (working paper)
There are many opportunities for shippers and rail carriers to work together that will result in mutual benefits.

Too often, shippers and rail carriers are combative instead of collaborative.

How do we get from this... to this?
Carriers must recognize that large industrial companies are under enormous pressure to reduce logistics costs by tens of millions of dollars.

- Typical industrial company freight model includes:
  - Billions of pounds of product shipped annually
  - Hundreds of millions of dollars in transportation and storage costs
  - Inventory carrying costs can exceed $100 m in working capital
  - In-house railcar fleet of thousands of covered hoppers and tank cars

- Typical industrial company logistics costs:
  - 5% - 10% of revenue
  - Potential hidden costs
    - Inventory carrying costs
    - Terminal handling
    - Product quality testing
    - Rolling stock maintenance & management
    - Insurance and risk premiums
    - Demurrage
    - Special charges
Our experience shows that even companies with relatively low logistics costs often have additional areas of untapped potential.

**Minimize Total Logistics Costs through Supply Chain Optimization**
- Product sourcing ➔ Lower raw material costs
- Carrier choices ➔ Lower direct transport costs
  - Mode choices: rail, truck, LTL, bulk tanker, intermodal, barge, etc
- Inventory management ➔ Lower storage / handling costs, and reduced working capital requirement

**Increase Efficiency through Process Improvement**
- Forecasting
- Decision support systems
- Pipeline management using RFID, GPS, Satellite tracking
- Organizational excellence
- Outsourcing: 3PL, 4PL
- Vendor managed inventory
- Improved management of in-house fleets
  - Distribution
  - Maintenance

**Leverage Value from Strategic Contract Management**
- Maximize competition through bundled offers
- Focus beyond unit price to maximize contract value
  - Performance bonuses / penalties
  - Volume discounts
  - Bundling / Unbundling of value added services
  - Insurance and Risks
- Manage trade-offs between stability and flexibility

**Improve Communication through Transaction Management**
- EDI
- Order tracking process
Make sure the fundamentals are in place before tackling harder issues.

- Centralized purchasing & logistics department
- Streamlined contracts and simplified rate structures
- Reduced number of suppliers

Don’t throw stones . . . . !!
Carriers: take the time to understand your customers’ fundamentals.

- How many plants do you have, where are they located, and what options do you have for adjusting production levels?

- What is your forecast for growth? Can we address day-of-week and/or seasonal peaks?

- Who are your suppliers, and what is the nature of those contracts? F.O.B., spot market, long term, etc.

- Who is your competition and why are gaining/losing market share? How do they handle transport & logistics?

OFTEN, INDUSTRY A + CARRIER A MUST WORK TOGETHER TO COMPETE WITH INDUSTRY B + CARRIER B
Spot treatments don’t cure problems, fixing systems does.

“I yelled at the Trainmaster every day for a month . . . . . and things still didn’t get any better!”

In a high-performance logistics system the three elements – structure, processes and organization – are in complete alignment.
Likewise, shippers can improve transport service with a better understanding of railway carrier capabilities.

- Understand and exploit carriers’ production functions
  - Resource requirements and constraints
  - Network balance and timing
  - Costs and competitive position

Walk a mile in their moccasins !!
Trains do not move unless ALL of the resources are available at the same time. Management capacity can also be the constraint.
Day of Week Scheduling has a huge impact on cost and service.

Key
- HAHT
- Dead Head
- Loaded Train
- Empty Train

Diagram showing scheduling from Origin to Destination with Days of the Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun.
Careful planning can dramatically reduce process failures.

Key:
- HAHT
- Dead Head
- Loaded Train
- Empty Train
Network Balance, Predictability, and Economies of Scale are critical to good railway service.
Rail service is a function of a railway’s cost structure, which in turn underpins rail tariffs.

- **Incremental costs** – a direct result of adding a piece of traffic

- **Variable costs** – changes proportional to overall traffic volume
  - Fuel
  - Labor
  - Maintenance

- **Fixed costs** – can be variable over the long term
  - Depreciation
  - Management
  - SG&A

- **Average costs** – assigns all costs to all traffic using one denominator
  - Cost per carload
  - Cost per net ton mile
  - Cost per loaded car mile

- **Fully allocated costs** – assigns all costs to all traffic using logical activities
Economic costing tries to explain causality.

- STB uses the Uniform Rail Costing System (URCS)
  - Based on multivariate regression models from the 1970s
  - URCS is primarily used to support regulatory proceedings and is NOT used by railroad companies to set prices or as an internal management tool.
  - URCS is a widely accepted tool due primarily to its familiarity and the enormous case history associated with it.
  - One price benchmark is 180% of URCS Variable Cost

- Economists use a production function to assign costs to traffic using activities
  - Fuel – Gross Ton Miles
  - Train crew – Train Miles
  - Track costs - GTM
  - SG&A – Carloads
  - Car maintenance – Car Miles
  - Car capital – Car Hours
  - Locomotive costs – Horsepower Hours
  - Terminal costs – Car Handlings
Along with cost differences, varying pricing goals drive the price differentials between railroads

- Maximize revenue
- Maximize profit margin
- Maximize total profit
- Maximize price per ton-mile
- Maximize market share
- Maximize capacity utilization
The shape of the demand curve is different for each customer, corridor and commodity

Illustrative Relationship between Price and Total Revenue

- Quantity Demanded
- Total Revenue
- Price
- Demand Total Revenue
Overlaying differences in costs and pricing goals, there are price ceilings that limit a carrier’s capacity to set rates.

- Regulatory limit
- Equivalent truck price
- Rail competitors’ price
  - Across-the-fence comparison
  - Open gate vs. closed gate
  - Mixing centers (transload terminals)
  - Baseball arbitration model
- Other modal threats (proposed pipeline)
- Sourcing competition
- Customers’ product market strength
Strategies for Maximizing Shipper & Carrier Business Relationships

- Focus on Supply Chain Process, not anecdotal problems
- Get your own house in order before challenging the other party
- Align measures, organization, and systems internally and externally
- Take time to understand both the shipper’s and the railroad’s production functions and constraints
- Service and price should be part of the same conversation
WorleyParsons achieves results and ensures structural changes translate into better management choices.

**Plant Manager:** When do I order and how much?

**Purchasing:** Where do I source from and how much?

**Manufacturing:** Who is responsible for testing and quality control?

**Transportation:** What carrier should I choose from A to B?

**Strategy:** What services are best outsourced and/or insourced?

**Legal:** How do I minimize risk and liability?

**Contracts:** What terms give me the best rates while preserving flexibility?

**Equipment:** How do I minimize maintenance costs while ensuring safety?
How can we help you?