Consolidation in construction logistics

Methods of logistics
Why change is needed
What is consolidation
Benefits
Business case
Reverse logistics
The future
Consolidation in construction logistics

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Logistics is...

“The art of applying timely resources”

Results measured by:
- Time to construct
- Build quality
- Economy
- Health and safety
- Environmental impact

Flawed logistics, no matter how competent the constructor, is the developer’s and local community’s nightmare.
## Methods of logistics

<table>
<thead>
<tr>
<th><strong>Traditional</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method 1:</strong> The business goes to the supplier to pick up materials</td>
<td>About 10% of industry</td>
</tr>
<tr>
<td><strong>Method 2:</strong> The business has materials delivered to site</td>
<td>About 50% of industry</td>
</tr>
<tr>
<td><strong>Method 3:</strong> The business uses portfolio analysis to segment ordering processes and call off arrangements</td>
<td>About 35% of industry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Alternative</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method 4:</strong> The business co-ordinates a start-to-end process and tags information, people and materials flows</td>
<td>About 5% of industry</td>
</tr>
</tbody>
</table>
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Methods of logistics

**Why change is needed**

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WHY is change needed?

TRADE CONTRACTORS bulk order materials

TRADE CONTRACTORS call off

\[ T \times S \times D = \text{Chaos at the gate and on the site} \]
WHY is change needed?

TRADE CONTRACTORS bulk order materials

15% over-ordered

TRADE CONTRACTORS call off

WASTE caused by
- damage (3-25%)
- off-cuts (5-20%)
- packaging - both inappropriate and poor (1-5%)
- design change (1-5%)
- programming and planning (1-10%)
WHY is change needed?

Congestion
Pollution
Carbon emissions

TRAFFIC continues to increase as the built environment develops
London Freight Plan

The vision:
‘…the safe, reliable and efficient movement of freight and servicing trips to, from, within and, where appropriate, through London to support London’s economy, in balance with the needs of other transport users, the environment and Londoners’ quality of life…’

The fact:
The planned growth of London will lead to a **15% growth** in demand for freight and servicing by 2025.

Without intervention this will increase freight’s impact on congestion and climate change.
Figure A2: London’s transport dilemma
Modern logistics techniques (in Method 4)

Logistics planning across full supply chain
Consolidation centre
Just-in-time delivery to the workplace
4th party logistics
Logistics specialist on site
Demand smoothing
Integrated ICT system across full supply chain
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What is consolidation?

Consolidation centre = a distribution facility that receives materials, equipment and plant, and delivers to sites in consolidated loads.
WHAT is consolidation?
Distribution to several sites

Figure 8: How consolidation simplifies distribution at Heathrow Terminals 1-4
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The benefits of consolidation

**Environmental** – local traffic, pollution and nuisance
Typically 70% less for freight via consolidation centre (40% overall)
MEASURED IN LONDON

**Productivity on site**
Typically 0.5 hour per day
MEASURED IN LONDON

**Productivity of hauliers**
Typically 2-hour saving in a driver’s typical 10-hour day
MEASURED IN LONDON

**Materials**
Up to 15% saving
POTENTIAL

POTENTIALLY ABOUT 8% OF CONSTRUCTION COST
Consolidation is effective
But consolidation alone is not enough

We call this the CONSTRUCTION METHOD
Techniques in the *construction* method

<table>
<thead>
<tr>
<th>Technique</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics planning across full supply chain</td>
<td>✗</td>
</tr>
<tr>
<td>Consolidation centre</td>
<td>✓</td>
</tr>
<tr>
<td>Just-in-time delivery to the workplace site</td>
<td>✓</td>
</tr>
<tr>
<td>4th party logistics</td>
<td>✗</td>
</tr>
<tr>
<td>Logistics specialist on site</td>
<td>✗</td>
</tr>
<tr>
<td>Demand smoothing</td>
<td>✗</td>
</tr>
<tr>
<td>Integrated ICT system across full supply chain</td>
<td>✗</td>
</tr>
</tbody>
</table>
Complete supply chain management

LOGISTICS SPECIALIST calls deliveries to CCC

LOGISTICS SPECIALIST calls JIT to CC/site

LOGISTICS SPECIALIST manages distribution on site

INTEGRATED ICT SYSTEM across the full supply chain

We call this the LOGISTICS METHOD
<table>
<thead>
<tr>
<th>Techniques used in the <strong>logistics</strong> method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics planning across full supply chain</td>
</tr>
<tr>
<td>Consolidation centre</td>
</tr>
<tr>
<td>Just-in-time delivery to the <strong>workplace</strong></td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; party logistics</td>
</tr>
<tr>
<td>Logistics specialist on site</td>
</tr>
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<tr>
<td>Integrated ICT system across full supply chain</td>
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</table>
Releasing potential benefits

TIME TO CONSTRUCT

DURATION
40% fewer vehicles = 40% less time to take delivery

RELIABILITY
The right quantity of the right product in the right place at the right time
Right first time!
Releasing potential benefits

**ECONOMY**

**PRODUCTIVITY**
Supplier delivery to CC Site workforce

*Difficult to identify and share these benefits*

**WASTE**
Remember the over-ordering!

**PRICE** (not to be confused with cost)

*Payments for materials when fixed*
*Service level agreements for logistics suppliers*
Releasing potential benefits

BUILD QUALITY

LOSS & DAMAGE
Relocating material buffer to CC reduces risk
Releasing potential benefits

HEALTH & SAFETY

CONGESTION
Relocating material buffer to CC reduces risk

METHODS
Logistics specialists (not trades) do V&H distribution
Work pack assembly in CC improves ergonomics of V&H distribution

*Suitable containers in CC?*
Releasing potential benefits

ENVIRONMENT

CONGESTION
POLLUTION
CARBON EMISSIONS

70% reduction locally for consolidated loads

Discipline needed
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Business case

Cost of service
0.5% to 3%

Benefits
8%
# Cost

<table>
<thead>
<tr>
<th>Construction type</th>
<th>Construction cost £/m²</th>
<th>Pallets/m²</th>
<th>Consolidation cost £/m²</th>
<th>% of construction cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>2,000</td>
<td>0.45</td>
<td>9</td>
<td>0.5%</td>
</tr>
<tr>
<td>Apartments</td>
<td>1,500</td>
<td>1.0</td>
<td>20</td>
<td>1.3%</td>
</tr>
<tr>
<td>Houses</td>
<td>1,000</td>
<td>1.5</td>
<td>30</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
## Benefits

<table>
<thead>
<tr>
<th>Environmental</th>
<th>If 75% of materials were delivered via the CCC, there would be a 50% reduction in local traffic and emissions.</th>
<th>Discipline Trade contractors and suppliers to work with the logistics specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity of construction workforce</td>
<td>30 minutes a day would increase productivity by 6% and reduce construction cost by 3%</td>
<td>Planning Behaviour Systems to identify and accrue savings</td>
</tr>
<tr>
<td>Productivity of hauliers</td>
<td>10-20% gain looks achievable</td>
<td>More transparent relationships Redistribution of some process and event risks</td>
</tr>
<tr>
<td>Material waste</td>
<td>Eliminating one-half of material waste would cut material bills by 7.5% and construction cost by 3%</td>
<td></td>
</tr>
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</table>
BUT...

In order to make it a success...

Leadership to do something different
Logistics specialist to manage the supply chain
Configure commercial arrangements to favour co-operation
Distribute some benefits to all stakeholders
May need some pump priming
KPIs for Consolidation

Need to measure more than the Consolidation Centre itself!

Stock turns ↑
Floor space utilisation ↑
Supply chain costs ↓
Supply chain delivery reliability ↑
Supply chain responsiveness ↑
Supply chain asset management efficiency ↑
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The future
Demand centres
Demand centres

NW Kent

Medway

Swale
Demand centres

High growth ‘Diamonds’

• Medway
• Ashford
• Reading & Bracknell
• Basingstoke
• Soton/Portsmouth
• Crawley
• Brighton
• Oxford
• Milton Keynes
HOW will this happen?

**DRIVERS** affecting clients, regulators & supply chain

- Improve programme certainty
- Contain costs
- Reduce environmental impact

INCREASING REGULATION
HOW will this be held back?

BARRIERS affecting clients, regulators & supply chain

Ineffective leadership
Ineffective regulations
Lack of clear business case
Industry’s reluctance to change
Lack of effective ICT infrastructure

BUSINESS CASE
Further research

TO BUILD THE BUSINESS CASE

Environment – Transport Statement or Assessment
Productivity – value stream analysis of before and after
Hauliers – survey of before and after
Material waste – survey of before and after
Procurement – map supply chain and processes
ICT – staged development of systems from design output to installation and waste recovery