



Construction logistics

Models for consolidation



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Foreword

The Heathrow Consolidation Centre is much more than an award-winning innovation. It is one of the milestones along construction's path of continuous improvement, an exemplar of the Constructing Excellence strategy to deliver world-class products and services.

The first of our three objectives in Constructing Excellence is to achieve a step change in performance. A consolidation centre does this by imposing discipline on how materials are supplied to the workplace. In taking on-site distribution out of the hands of trade contractors it frees them to focus on what they are good at – constructing. That means better products and higher productivity.

Secondly, we believe construction needs to refresh its image if it is to gain wider respect as an efficient, safe industry which creates prosperity for individuals, communities and the nation. A consolidation centre brings logistics professionals into the construction team, with the expertise to revolutionise supply chains along the same efficient lines as retail distribution. It is an outstanding example of how construction can learn from keen engagement with other sectors.

Our third objective is to bring about improved performance and image by engaging with the widest range of individuals and organisations and encouraging them to take action. It is evident, from the examples cited in this case study, that the Heathrow Consolidation Centre engages trade contractors head on in better logistics and improved productivity. So many small and medium-sized contractors – who erect hoardings, perform groundwork and site maintenance, lay flooring, and install toilets and partitions – are enjoying the smooth-running logistics at Heathrow. And the local community benefits from less traffic noise and fumes.

Construction faces stricter environmental controls and pressure to become a more sustainable industry. It is rare to find an innovation responding, with measured results, on so many fronts. The bonus is that it invites contractors, their suppliers and hauliers to behave in a more integrated way, with rapid benefits.

It would be easy to dismiss consolidation as relevant only to 'special' sites such as Heathrow Airport, but this case study suggests ways to replicate the idea to serve the wider construction industry.



Dennis Lenard

Chief Executive
Constructing Excellence

Overview

Why is construction taking a fresh look at logistics?

- Tougher planning controls on vehicle movements mean many local authorities will no longer permit ad hoc deliveries to sites.
- Road congestion and limited access to sites press construction managers to find a better way to deliver materials to site and take away waste.
- Construction managers have noticed how just-in-time deliveries can boost productivity.
- Public opinion is moving the environmental and social problems caused by construction up the corporate agenda.
- Clients are recognising the knock-on benefits which better management of logistics brings to the performance and image of their businesses.

THIS CASE STUDY traces the evolution of consolidation centres in the UK with reference to Wilson James and its partners, and suggests models for future consolidation solutions.

AN INDUSTRY RIPE FOR CHANGE describes what an effective logistics system does and why construction needs to change its approach. Concepts borrowed from manufacturing and retailing show how consolidating deliveries imposes discipline on suppliers and offers construction the productivity benefits of just-in-time supply.

MODELS FOR CHANGE sets out eight guiding principles of logistics and shows how consolidation addresses all of them. In its *first-generation* model, Wilson James managed a just-in-time delivery process from a distribution point within Stanhope's Mid-City Place development in London. In its *second-generation* model, Wilson James and construction manager Mace designed and operate the Heathrow Consolidation Centre, a dedicated distribution centre serving BAA's Terminals 1-4. The *third-generation* model shows Wilson James's ambition to take the consolidation centre concept beyond the confines of Heathrow into regional centres to serve a variety of projects and customers. *Other ways to consolidate* suggest alternative answers to the logistics question.

HOW A CONSOLIDATION CENTRE ACCELERATES CHANGE shows that consolidation addresses many of the themes in the Strategic Forum for Construction's report *Accelerating Change*.

RESOURCES contains a list of references, websites, people to talk to, and who's doing R&D.

Wilson James profile

Seven years after setting up in 1991, Wilson James Ltd appeared in the *Sunday Times* list of the 100 fastest growing UK companies. Through its three divisions (construction, aviation and security) it provides logistics, security and 'front of house' services. Annual turnover exceeds £40m and the company has some 1300 directly employed full-time staff, many with military backgrounds.

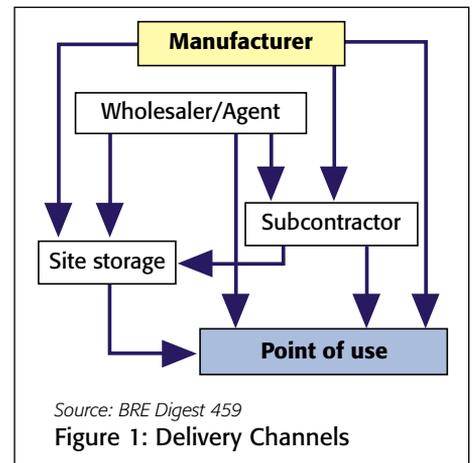
Wilson James's role in construction is to eliminate waste in the supply chain by getting the right materials and services to the site, just in time for processes to be completed efficiently. This improves productivity, exploits economies of scale, wastes less material, cuts traffic congestion and CO₂ emissions and reduces injuries caused by manual handling. It does all this by making best use of technology, offering incentives to encourage its staff and learning from the best practices in other industries.

An industry ripe for change

Why is change needed?

Glenn Hawkins, Head of BSRIA's Process and Productivity Department, explains what a big problem ill-conceived storage and handling strategies can be. "In our research projects we directly observe operatives. We consistently find about 8–9% of the working day is lost by a typical tradesman waiting for or collecting materials, tools and equipment. Initially we looked at M&E trades only, but recently we've noticed the same in other building trades."

The Logistics Business (a supply chain consultancy and software developer) summarises eight principles of good logistics practice and highlights where it believes construction lags behind best practice in manufacturing and retailing:



Understanding customer needs	Customer needs and service levels are poorly understood, hence they are neither monitored nor improved.
Supplier partnerships	There are too many suppliers managed in adversarial contracts rather than by service level agreements. Selection is by price not value. Relationships tend to be secretive.
Information technology	Construction is not yet investing enough in technologies which enable the sharing of information between customers and suppliers.
Data management	Capture and management of data does not generally extend beyond purchasing.
Control materials and information	There is little visibility of goods in the supply chain. Standard technologies in other industries, such as bar coding, have made little impact. Hence it is difficult to reduce material waste because it cannot be tracked.
Supply and delivery channels	Figure 1 shows how materials go from the manufacturer to the point of use via at least eight different channels. The way goods are sourced and distributed is largely driven by supplier price with little consideration of the value to the customer. It is a confusing system of distribution which conceals waste, for example double handling, and supports mark-ups by intermediaries whose value added is questionable.
Eliminating waste – getting lean	Material waste is taken for granted and built into the cost plan. The most common forms of waste are time related, but these are not well understood. Waste of any description is not widely monitored and few targets for improvement are set.
Reducing lead times – agility	Agility is about reducing wasted time. Do companies in construction really know what they need to do to become more responsive?

Logistics is often seen just as storage and transport management, yet this is far from the whole picture. Leading contractors are investing in logistics research and development for five reasons:

An effective logistics system:	eliminates waste and reduces cost by:
■ cuts the number of suppliers	reducing the number of transactions and exploiting economies of scale
■ reduces vehicle movements onto the site	minimising congestion and queuing
■ minimises the materials stored on site	saving losses due to damage, theft or simply being mislaid
■ tracks goods, materials, equipment and people	utilising resources efficiently, without duplication
■ plans how resources will be used and allocated	ensuring that all needs are met at the right time and place.



Les Beaumont
Senior Consultant
The Logistics Business

What can construction learn from other industries?

In my experience there is no single transferable model, but look for processes and technologies that others have developed, such as:

JIT – ‘Just in time’ means frequent replenishment in batches according to task and location.

Line-side supply – This eliminates on-site storage.

IT – By this I mean systems for transferring and sharing information about orders and schedules.

Product identification – Bar coding is the basic system and RFID (radio frequency identification) offers more sophisticated opportunities.

Onboard computing – These are notification systems like those used for public transport arrivals.

Organising the site – Use systems that work in factories for daily planning and spatial control.

Sub-assemblies – These reduce assembly on site to the bare minimum.

Activity-based costing – Understand the process by mapping out the activities, then cost each activity including its associated overheads.

Is there a cultural issue here?

Yes, I think so. A lot of construction people have a tendency to get on with it without much planning. They like to solve today’s problems rather than think what can they plan today to avoid having to solve problems in a month’s time. Also, construction people tend to think of every building as a new project. Perhaps many people don’t realise they’re actually making something. It’s the production mentality that needs to be cultivated, without losing focus on the customer. Some construction companies are leading the way but many have not yet understood the opportunities.

What's happened in other industries?

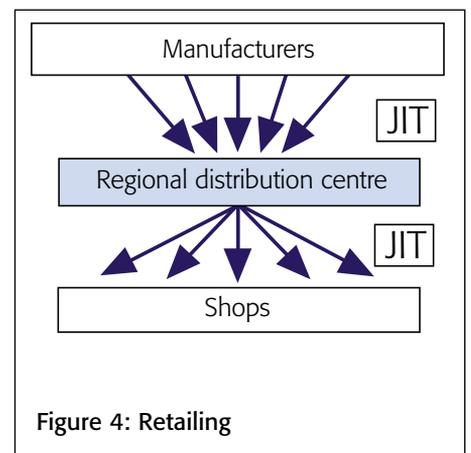
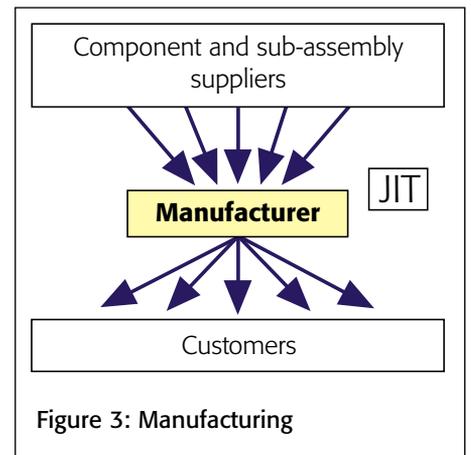
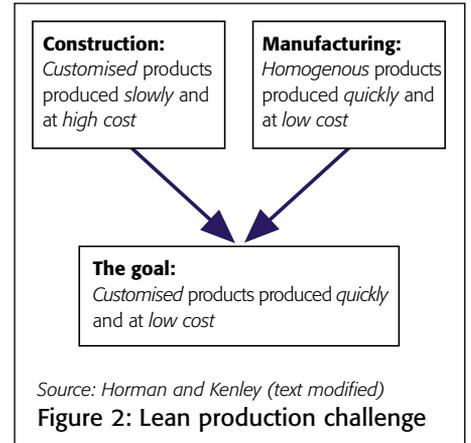
Comparisons with manufacturing are inevitable because it looks fundamentally the same as construction – making things by assembling constituent parts. Yet the two are working from different bases. Figure 2 illustrates how construction and manufacturing respond to the lean production challenge. For construction to follow manufacturing's lead, there may be an intermediate phase of learning to produce homogeneous products quickly and at low cost before it can aspire to the ultimate: customised products produced quickly and at low cost. So learning how manufacturing produces homogeneous products cheaply and quickly merits investigation.

From a logistics point of view, the most significant learning point is delivery of materials just in time for assembly, see Figure 3. Leading manufacturers have achieved it by:

- developing long-term relationships with a small number of trusted suppliers with whom they share design and production information and make continuous improvements
- eliminating the storage of materials in the factory in favour of line-side delivery.

Retailing offers another clue. Retail chains differ from manufacturing companies in that each has a large number of sites (retail stores) compared to the small number of factories that each manufacturer has. Retailing has invented the regional distribution centre, see Figure 4, to avoid a large number of deliveries from each supplier while still enjoying a JIT service.

The models in Figures 3 and 4, combined, are the basis for the Heathrow Consolidation Centre.



Models for change

How a consolidation centre works

A consolidation centre is like a retail regional distribution centre and is so named because it 'consolidates' many different loads onto one site-delivery vehicle. With the exception of some equipment and materials that are more conveniently delivered direct to sites, it is the one-stop point of delivery for virtually all supplies. It does not hold stock for any appreciable length of time but it is a useful distribution buffer. It is responsible for all items in its care.

There are six steps in dealing with materials (see Figure 5):

1. The trade contractor places orders for supplies, specifying delivery to the consolidation centre.
2. The consolidation centre agrees an inward delivery time and takes delivery. Everything is checked and labelled to simplify distribution.
3. About 24 hours before supplies are needed, the trade contractor requests delivery, stating exactly what, where and when.
4. The consolidation centre makes up 'daypacks' for each task.
5. The consolidation centre delivers the daypacks just in time for each gang to undertake that day's tasks.
6. The consolidation centre removes excess materials from the site every day.

This simple process alone has five immediate benefits:

- Proper management of distribution reduces the number of vehicles and consequent congestion and pollution.
- Skilled operatives can get on with what they are being paid to do without the disruption of unloading supplies.
- Over-ordering is reduced because the system enforces planning.
- Trained personnel (using appropriate equipment) place materials where they are needed, thus reducing manual handling risks and damage to material.
- The site is tidier, leading to better productivity and fewer accidents.

Once established, this process opens up many possibilities. Using the consolidation centre makes the whole distribution process simpler and more transparent. Logistics specialists at the consolidation centre can work with trade contractors to help them understand and improve their distribution. The consolidation centre can also help trade contractors to collaborate in purchasing.

If dedicated to one project a consolidation centre is likely to be at or near the site. But it can work equally well some distance from the site. One centre can also serve many sites.

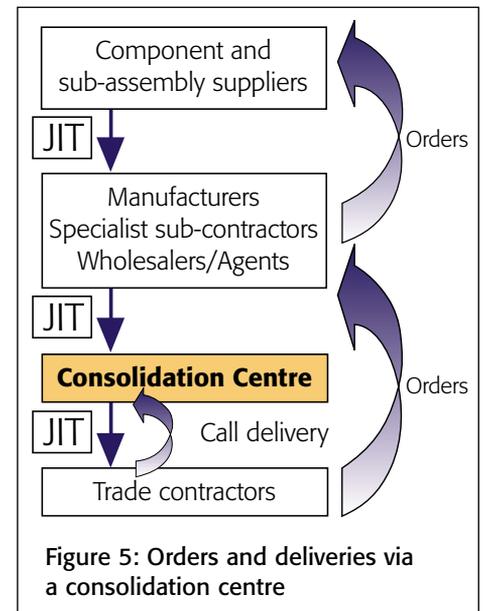
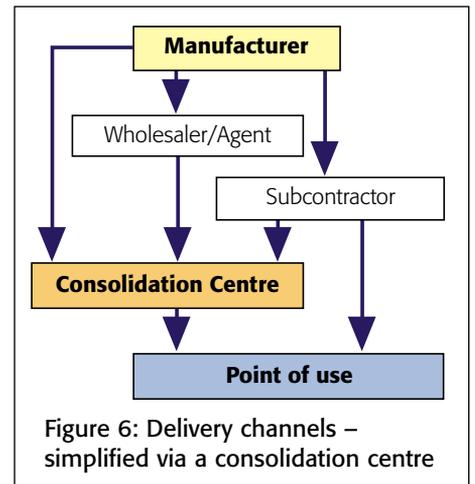


Figure 5: Orders and deliveries via a consolidation centre

How this addresses the eight principles of logistics

Understanding customer needs	Contractors learn to understand their own needs in logistical terms.
Supplier partnerships	Collaboration is essential.
Information technology	Investment can now be justified.
Data management	The consolidation centre arranges this.
Control materials and information	Logistics IT systems are the tools for trade contractors to use.
Supply and delivery channels. (Compare Figures 1 and 6)	There are only two channels to the point of use, instead of four.
Eliminating waste – getting lean	Less material is consumed. Productivity rises.
Reducing lead times – agility	The consolidation centre is a JIT concept, geared to quick response.



First generation – Mid-City Place

Distribution within the construction site only

Stanhope, the developer of Mid-City Place, quickly recognised that distribution of materials on the site would be a critical issue for the construction manager, Bovis Lend Lease, and encouraged a fresh approach to logistics. Wilson James developed a strategy to reduce multi-handling and repeated moving of materials.

The twin-track solution:

- distributed materials to the workplace just in time for each task
- created the Market Place, a single on-site distribution point for bulk materials and consumables.

Although Wilson James's brief was confined to the site, it influenced, but did not control, deliveries to the gate. However from that point onwards, it took the distribution out of the hands of trade contractors.

The headline results were stunning:

- Mid-City Place was completed in 57 weeks, 11 weeks ahead of the planned programme.
- The build rate was about 8,000ft² per week, 60% ahead of the industry benchmark at that time.
- The building cost was £92/ft², against the Davis Langdon Everest database benchmark of £115/ft².
- There were 675,000 hours worked without a single reportable accident. This compares favourably with BAA's *One in a million* challenge to get reportable accident rates down from the industry average of about 1.3 per 100,000 hours to one in a million hours worked.

Improved logistics achieved:

- some 35% less material waste than benchmark sites
- dry lining waste reduction from 10% to 3%
- distribution with one less pair of hoists than originally expected
- almost 100% performance in materials being distributed in the right time and place
- significant savings in contractors' time related to handling materials.

Wilson James also had a facilities management role at Mid-City Place, taking responsibility for security, hoardings, inductions, welfare and aspects of health and safety.



Mid-City Place is a £53m, 470,000 ft² office development in Holborn, midway between the West End and the City of London, completed in 2001.

Figure 7: Mid-City Place

Credits

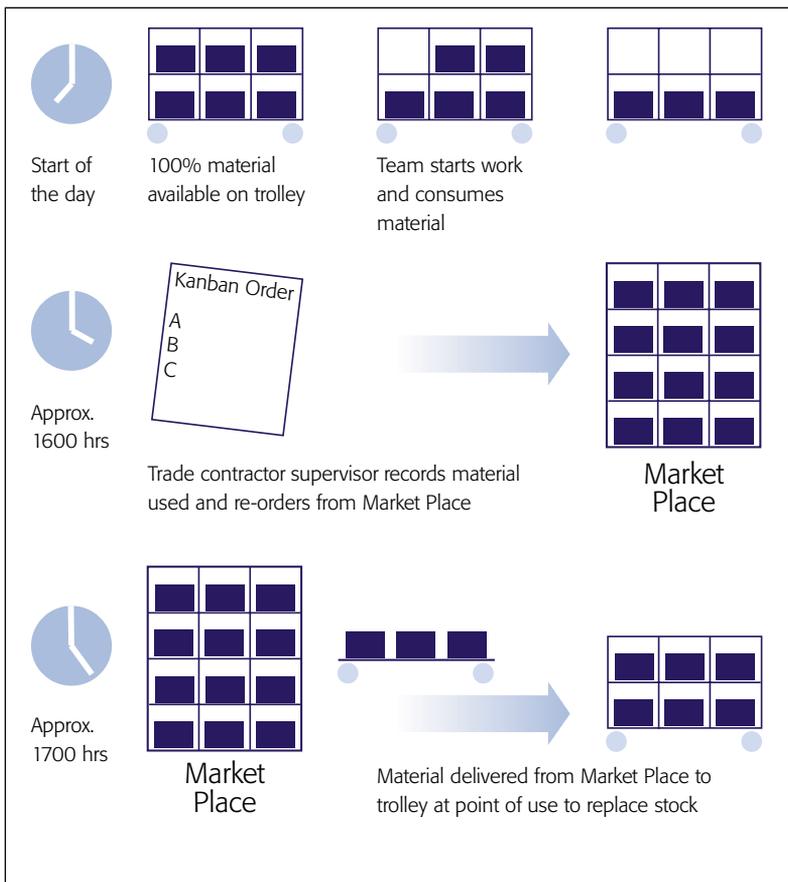
Client – Stanhope

Construction manager – Bovis Lend Lease

Logistics manager – Wilson James

Build planning system – A3D

How the Market Place supplied consumables



Build planning

At Mid-City Place, Bovis Lend Lease and its trade contractors used 4D modelling to produce daily build plans (4D means three dimensions plus time). The 4D model predicts what will happen each day and the build planning tool sets out the tasks to be completed and schedules all the components. Wilson James interpreted what each activity was pulling day by day to create a dynamic schedule of packaging and palletising activities with loading and delivery timings. This ensured JIT delivery and optimal utilisation of the movement team.

The combined 4D modelling and build planning tool used at Mid-City Place is demonstrated at www.architectural3D.co.uk.



Paul Sims

Divisional Director
Bovis Lend Lease

How did this all start?

The penny really dropped when we visited the Jaguar production line with Coughlin Logistics and Wilson James and saw how line-side supply boosts productivity. In construction, skilled labour down tools to unload deliveries. I asked Coughlin to study the potential benefits of line-side supply at Mid-City Place. We could immediately see improvements in productivity and a reduction in both waste production and resources required. It was simple really, so we took the plunge.

Haven't we been here before?

Absolutely. 20 years ago the main contractor had a gang to handle deliveries and keep the site clean. But management contractors no longer have operatives so this role was passed to the trade contractors.

What about the economics?

It's difficult to be explicit because so many of the benefits are hard to measure. But we're sure that Wilson James helped achieve a big improvement. Be aware however, there are many vested interests in logistics remaining disorganised. Every 1% of material you stop going in the skip is a 1% drop in sales.

What would you like to see next?

There is actually a science to this. It takes a lot of planning to control materials flowing onto the site. By 'pulling in' the materials you need to complete specific tasks you complete the work faster and minimise waste. I'd like people to think about that one!

Second generation – Heathrow Terminals 1-4

Delivery from a dedicated consolidation centre

Although it is Terminal 5 making the news, BAA spends a whopping £250m annually on its existing Heathrow terminals. The Heathrow Consolidation Centre serves Terminals 1-4 and won the BAA Sustainability Award 2001, also sponsored by CIRIA and Forum for the Future. It is located in a 20,000 ft² hangar at Hatton Cross near the eastern end of the airport. In addition, a controlled outdoor area holds weather-resistant supplies. The annual running cost is about £2m.

Construction manager Mace and Wilson James jointly designed



the Consolidation Centre. Mace has three people dealing with Centre management, strategic development and integration with construction projects while Wilson James has a workforce of 30 in day and night operations. BAA is convinced of the business case and has a similar facility to serve T5.

“The Consolidation Centre looks like a warehouse, but it works differently,” says Gary Sullivan, Director of Wilson James. “The Centre holds only the materials and equipment actually needed on the site; but only for a few days and there is no triggering fresh orders when stock levels fall. The critical thing is that the Centre is in the loop when contractors place orders. It takes care of deliveries via one gate, records and labels everything, checks quantity and condition, assembles what contractors need for each task the day before, then distributes it to agreed drop-off points while the airport is closed to aircraft overnight.” Figure 8 illustrates the consolidation process.

The Centre handles some pre-assembled modules, but does not handle those modules installed directly from lorries, ready-mixed concrete and steel frames. There are contingency procedures for daytime and emergency deliveries. In almost three years of operation, the Consolidation Centre has served some 40 major projects at Heathrow. There are typically 60 trade contractors on the airport every day, employing some 2000 people.



Chris Ctori

Facilities Strategy
Manager and Chair of
the Consolidation
Centre Board
BAA

What's BAA's objective here?

We're constructing for a one third increase in passenger numbers by 2014. We have two drivers: the need to reduce the local impact of construction and the need to improve productivity, reliability and value for money.

Do you use consolidation processes elsewhere at Heathrow?

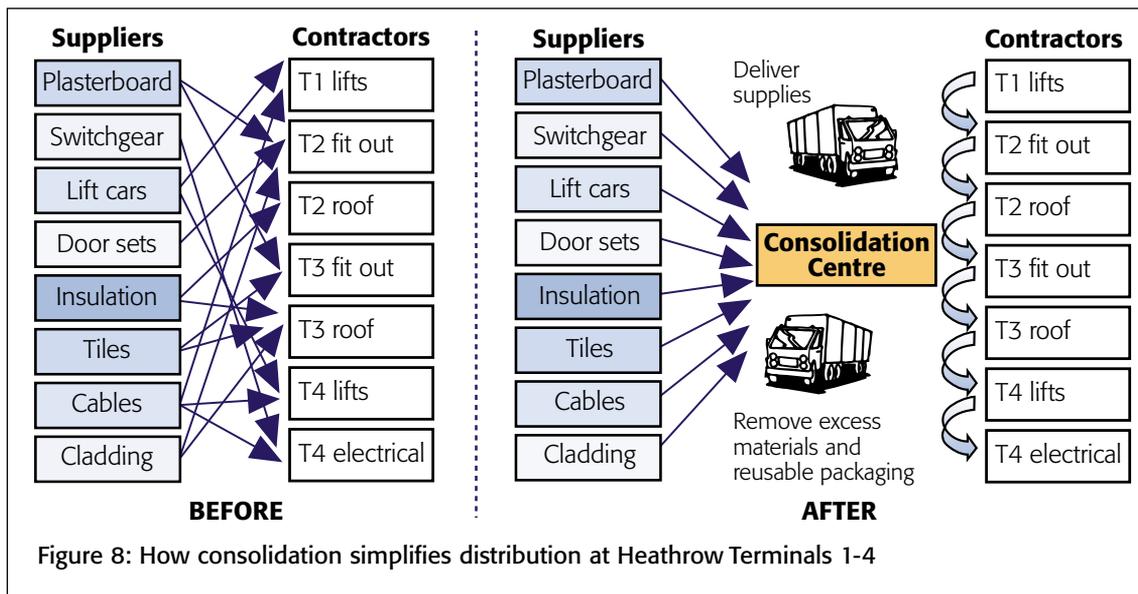
Yes, we use retail logistics to deliver goods airside at all our terminals for much the same reasons as we now do it for construction – it needs fewer vehicles, it's more secure and it costs less.

Is everyone using the Consolidation Centre?

Not quite, we still have some people working around the rules and inducements are on the way to ensure compliance.

What of the future?

Transferring what we've learned to T5 is critical and we need to develop our IT systems. But remember the 10-year construction budget in Terminals 1 to 4 is £3bn, so our Consolidation Centre has a lot of work to do in helping everyone to improve logistics.



What BAA's trade contractors say

"When we lay sheet vinyls and linoleum at Heathrow, having the materials delivered directly to where we're working is a big benefit to us. Productivity is noticeably better than at other sites because our workforce is not unloading and handling material."

Mike Savage, Sales Director, Ideal Interiors (Southern) Ltd.

"Productivity goes up when we fit out toilets and do joinery work at Heathrow. It's having one large delivery to the Consolidation Centre that is broken down into smaller just-in-time deliveries to site that makes the difference."

Chrissie Lynch, Director, Intelligent Modular Solutions Ltd.

"Erecting hoardings, groundwork and site maintenance is what we do at Heathrow. Getting our materials through the Consolidation Centre is certainly more reliable, but it does make us plan ahead because same day deliveries cannot always be arranged."

Michael McCafferty, Director, MMC Building Contractors Ltd.

Performance targets

The economic and environmental impact depends on delivering the right goods to trade contractors in the right quantities and right condition, in the right place and at the right time. A 'dashboard' of Key Performance Indicators keeps attention focused on this primary objective.

JIT deliveries to the work place – The target for the timely delivery of daypacks was 95%. "This would not be a credible target in retailing and we exceeded it in just a few months," says Sullivan. Audits show that 99% of daypacks are complete and delivered to the right place on time.

Credits

Client – BAA

Manager – Mace

Operations – Wilson James

Task completion – A sample of six projects, three completed before and three completed after the Consolidation Centre was commissioned, showed the rate of task completion up from 66% to 76%. Almost half of the improvement was due to availability of materials (see Build planning).

Cost of distribution – A survey of 20 trade contractors carrying out packages valued at £19m reported a saving of £650k in the cost of distribution of materials alone, attributed to the Consolidation Centre. After allowing for the cost of the service, the saving is typically 2% of total construction value, about double what it costs to run the Centre.

The local environment – The headline measurable environmental gain is that the distance travelled by local delivery vehicles fell by 20,000 miles annually. This is a 40% reduction. Under the new regime, the Consolidation Centre specifies delivery times to reduce congestion and it promotes the re-use of pallets and packaging. The Consolidation Centre also contributes to improved airport security, local employment and fewer accidents on the road and on site.

Build planning

BAA prefers to use Last Planner, a favourite with production-savvy contractors (see www.leanconstruction.org/learning.htm). Last Planner helps supervisors assess where and why they are not reaching production targets. They use Last Planner to plan activities with a five-week 'look ahead'. As well as planning the activities, it also identifies the 'make ready' needs, which include the material, plant and human resources. Part of the Consolidation Centre's liaison role with trade contractors is to gain forward visibility of material and plant demands via schedules created with Last Planner.

One of the common reasons for missed targets is not having the right materials in the right place at the right time. Hence, the Consolidation Centre's delivery record leads to a radical improvement in the reliability of completing tasks as planned. Figure 9 illustrates this effect using data mentioned above under Task completion.

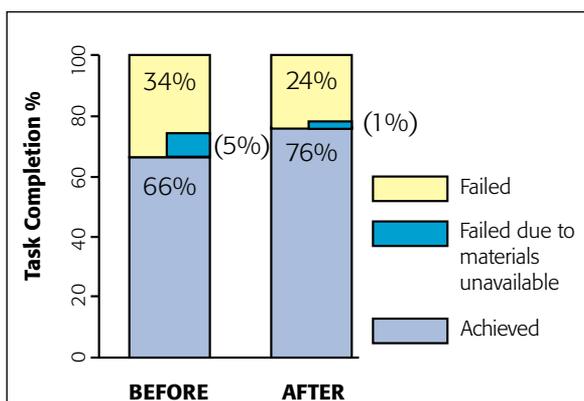


Figure 9: How consolidation improved task completion at Heathrow Terminals 1-4



John Brooks

Project Manager
Mace

How do you reduce vehicle congestion and emissions?

In the first instance, we have reduced the number of local delivery journeys by 40% by directing deliveries away from the busy terminals and through consolidating loads at the Centre. Secondly, we control the delivery routes of deliveries from the Centre to the sites to avoid congested areas at different times of the day and night.

How do you justify claims of improved productivity?

By analysing project results from Last Planner we know that plan reliability on our projects has improved by 4% because of the Consolidation Centre, which leads on to better productivity. In addition, the trade contractors can now concentrate on their core production tasks, rather than having to deal with security checks, off-loading and moving their materials around sites. This is vital when sites have limited working hours.

Does the Consolidation Centre influence off-site assembly?

Only indirectly. I'm sure that the move to off-site assembly would have taken place at BAA without the Consolidation Centre. However, the Centre does influence the palletisation and packing of pre-assembled units, which is important to ensure the safest and most efficient method of mechanical handling is used for each product.

Technology

Although the Consolidation Centre uses spreadsheets to manage inventory, communication with trade contractors and suppliers is largely paper based. This is convenient until an inter-operable warehouse management system is rolled out. Yet it is surprisingly efficient with an operating cost of less than 1% of construction spend.

Several projects have completed bar coding trials. Borrowed from retailing, this technique relies on trade contractors listing every unique item ordered (creating their own catalogue of materials used). The Centre applies bar codes when goods are received, but eventually suppliers may be asked to do this. Bar codes have led to 100% pick accuracy when operatives are preparing daypacks and, importantly, simplify proof of delivery. RFID tags will eventually replace bar codes because their greater data capacity will be more useful in construction processes and subsequent facilities management.

The Centre and inventive trade contractors have introduced various new devices. These include a powered sack barrow that can climb stairs, bespoke lifting trolleys and returnable and reusable containers.

Research

Wilson James led a team comprising Mace, BAA, Transport for London, the University of Glamorgan and Constructing Excellence in a one-year study, under the DTI's Partners in Innovation programme. They documented the processes and lessons learned at the Consolidation Centre, and showed how the principles can be applied in other major construction projects. Their report is published at www.consolidationcentre.com.

A list of people involved in construction logistics research is given under Resources.



Ian Lister

Senior Manager
Special Projects
Wilson James

What's so special about the Consolidation Centre?

It brings order to a pretty chaotic business. Unlike at conventional sites, trade contractors get deliveries directly to where they are working, not the site gate or a loading bay. There can be quite short production windows here; our JIT deliveries let trade contractors take full advantage of the time available.

How do you answer sceptics who say this works only because of the airport environment?

It is true that this process has security advantages, but these are secondary. The two principal benefits are better reliability and productivity. Many others follow on:

- environmental – less congestion and pollution
- financial – reduction of unnecessary inventory, damage and waste, fewer material handlers and trade contractors' vehicles
- social – more local employment and better neighbourhood security.

Can you show that this innovation is transferable?

Oh yes, I'm quite sure it is. The Partners in Innovation project (see Research, left) includes stakeholder interviews, a comparative study and a detailed look at the processes, technology and resources. It's not necessary to slavishly follow the methodology we've set up here. Each application will be a hybrid version to suit individual circumstances.

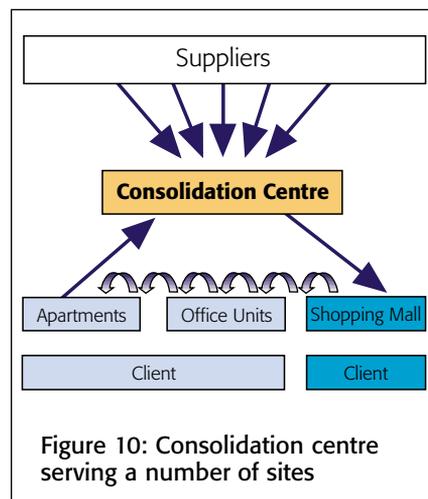
Third generation – Multi-site and multi-client

Moving beyond the confines of Heathrow

Gary Sullivan says: “The Heathrow Consolidation Centre sets a benchmark for logistics in construction but it’s not the finished article.” He thinks it is possible that Wilson James’s next consolidation centre will be located in an industrial area away from traffic congestion. Inwards deliveries will occur in normal business hours. Distribution to site will happen outside normal business hours, probably in the evening after peak traffic. It will serve a number of developers (see Figure 10), each with one or more developments, and many trade contractors. A shift in revenue stream from the client to the trade contractors would encourage them to collaborate with the Consolidation Centre and exploit its potential more fully.

Wilson James sees an increasing reach for logistics specialists, far beyond the on-site distribution system demonstrated so far at Heathrow. This consolidation centre would help trade contractors to:

- exploit the knowledge of logistics specialists
- understand their distribution networks
- redesign distribution processes to serve their needs and ultimately those of their clients.



Other ways to consolidate

Contractors are exploring a variety of methods, all aimed at reducing vehicle movements and material consumption and ensuring supplies are delivered just in time. These include:

- agreements with suppliers to make comprehensive improvements in how materials and assemblies are designed, packaged, fabricated and delivered to the workplace
- collaborative planning and scheduling techniques, such as the Start suite at www.start-global.com
- delivery to the work place by suppliers and manufacturers, in daypacks sequenced to suit daily tasks.

Builders’ merchants could potentially use their existing warehouse facilities to provide a consolidation service.



Gary Sullivan

Director
Wilson James

Why did you get involved in construction?

Perhaps it was my military background. I knew the consequences of not having the right kit at the right time. Construction seemed ready for this in 1991 when we started Wilson James, and it looks like I was right!

What’s your vision for logistics?

I expect to see four big changes:

Construction sites will look and run more like factories. Once the frame is up the workplace will be sealed to eliminate dust and the effects of bad weather. For that you need cleanliness and none of the clutter you get with an ad hoc delivery process.

Expert material handlers, with state-of-the-art equipment, will relieve construction operatives of the strains of moving supplies to the workplace.

Better handling will demand less packaging and material handlers will remove it efficiently from the site.

Information technology similar to that used in retailing will track every item from ordering, through distribution, installation, operation, maintenance and decommissioning.

How a consolidation centre accelerates change

In 1998, the *Rethinking Construction* report challenged the construction industry to make radical performance improvements. Four years later, *Accelerating Change* refined the strategic direction and identified three main drivers for change:

- the need for client leadership
- the need for integrated teams and supply chains
- the need to address health and safety.

The Consolidation Centre supports many of the themes in *Accelerating Change*:

Achieving client leadership	Stanhope and BAA demonstrate, by the examples cited in this case study, the power of client leadership in driving change.
Creating value through integration	The immediate benefits arise from collaboration between the Consolidation Centre and trade contractors. But it also has the potential to improve logistics via collaboration along the entire distribution chain.
Involving SMEs	Any size contractor or supplier can participate and derive the benefits of better logistics.
Sustainability	Consolidation makes fewer demands on the environment. The concept is also replicable beyond the single client and single site scenario.
Information technology	The consolidation centre concept provides a practical justification for increased investment in information technologies that can be largely adapted from other industries, thereby avoiding hefty development costs.
Attracting and retaining a quality workforce	Consolidation leads to tidier sites that are a safer and healthier environment for work.
Image	Applying professional logistics thinking, which has been developed and proven in other industries, will gradually dispel the public's perception of a wasteful and unsafe industry.
Site conditions	As well as improving distribution of materials, a logistics service provider is ideally placed to support security and workers' facilities to a high standard.
A qualified workforce	Dedicated distribution teams are more likely to be properly trained in handling materials than construction operatives.
Improving health and safety performance	Dedicated distribution teams reduce the need for construction operatives to move supplies around the site, thus reducing the risk in manual handling.
Measuring change	A professionally run consolidation centre measures its key success factors using an appropriate suite of performance indicators.

Resources

These references, websites and people were discovered while researching this case study. It is by no means an exhaustive list.

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Process Dynamics: Identifying a Strategy for the Deployment of Buffers in Building Projects, Horman and Kenley, International Journal of Logistics, v1, n3, 1998

Rethinking Construction: The report of the Construction Taskforce (1998), www.constructingexcellence.org.uk

Site productivity – a guide to the uptake of improvements, BSRIA TN 13/2002, www.bsria.co.uk

Websites

Construction Lean Improvement Programme (CLIP) – look under Services at www.constructingexcellence.org.uk

Construction Productivity Network – look under Members at www.ciria.org.uk

Heathrow Consolidation Centre and the research project at www.consolidationcentre.com

Institute of Logistics and Transport at www.iolt.org.uk

Lean Construction Institute at www.leanconstruction.org

LogisticsZone – look under Topics at www.constructingexcellence.org.uk

People to talk to

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The Centre for e-Business in Construction (Information exchange standards) – Sue Langley, T 0870 112 3639, E sue@cite.org.uk, www.cite.org.uk

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