A matter of

Construction consolidation centres are likely to become mandatory, as cities look to reduce congestion and pollution. What does this new breed of logistics management offer, asks Kristina Smith.

LAST YEAR THE CITY OF LONDON CORPORATION, which controls development in London's central financial district, granted planning permission for a new high-rise office block with a significant caveat attached: 22 Bishopsgate must use a consolidation centre for all its deliveries, when occupied and during its construction.

Consolidation centres for deliveries to shops and for goods ordered online have been around for some time, although their use is growing as authorities work to reduce congestion and pollution in urban centres. Construction consolidation centres (CCCs) are less common, but we can expect to see many more of them on the outskirts of cities around the world.

In London projects including Crossrail and the London Underground Station Upgrade programme are using CCCs. A European research project, SUCCESS (Sustainable Urban Consolidation CentrES for construction) has seen the establishment of trial CCCs in Luxembourg City, Paris, Valencia and Verona with findings from the pilot projects now being disseminated.

With CCCs, comes the added dimension of logistics experts from outside the construction sector. John Spottiswood of Wilson James runs one of the world's longest-established CCCs at Heathrow Airport. The Colnbrook Logistics Centre (CLC) at Heathrow services a huge amount of ongoing construction work at Europe's busiest airport, over £50m every month. Among current programmes is the refurbishment of the main road tunnel and cargo tunnel, being carried out by BAM Nuttall, VVB and Mott MacDonald.

For contractors to work with a CCC requires a change of mindset, says Spottiswood, a 'lean' proponent whose background is in electronics supply chain businesses. Rather than stockpiling more-than-enough material at the job site, site managers must now trust that what they need for the next day will be there on time.

Above: John Spottiswood of Wilson James is Director of Heathrow Logistics Integration

Top: Wilson James' Fulcrum software helps ensure that over 600 contractors are guaranteed deliveries within half an hour of their requested time

"I guarantee to my building colleagues that any load will arrive within half an hour of when they book it and that we will get it there in a safe, clean manner," says Spottiswood. KPIs of 98% and 99% delivery accuracy help convince those site managers that their goods will be there.

Long time coming

The first CCCs started to appear at the turn of the century. In 2002 Stockholm established a CCC to support a large housing development called Hammarby Sjöstad, with BAA's (now Heathrow's) CLC starting operation a year later in 2003.

In 2005 a pilot consolidation centre was set up in Bermondsey in Southeast London for Transport for London (TfL) and various construction industry partners. Wilson James ran the centre, and continued to do so after the trial period, albeit in a different location in Silvertown in East London, which is still operational today.

The current push towards CCCs comes in

logistics

Above: Heathrow's Colnbrook Logistics Centre has been running since 2003 and served the construction of Terminal 5's new baggage tunnel.

Right: As well as servicing over £50m of construction work a month, Heathrow's consolidation centre has the added complication of working in a live airport environment

response to rising congestion. In September 2016 TfL published a directory which provides details of 12 CCCs around the periphery of the capital as part of a wider programme to reduce the impact of construction freight. Of the 12 CCCs, seven list tunnelling jobs among the list of major projects they serve, predominantly Crossrail which is now in its systems installation and fit-out phases.

Heathrow's CLC is perhaps the most complex because it services a live airport with all the incumbent security and safety risks that involves. Not only does it 'consolidate', reducing the number of vehicle movements in and out of the airport by a factor of 3.6, it also carries out checks on every vehicle and reports in to the UK Government. The centre is considered 'airside' and all deliveries are escorted by CCC personnel onto the airport to ensure that they remain 'sterile'.

Wilson James developed a bespoke software system to handle the various elements of the centre's role. "We developed it because we had to," says Spottiswood. "There was nothing in the market place that delivered what we needed: a booking tool, a vehicle management system and a security, vetting and search tool that could report to the Department of Transport. You don't get all three that work together."

The result is Fulcrum, a software system launched three years ago and refined numerous times since then into a system which has over 700 users. Three tier 1 contractors, each with perhaps 50 or 60 projects and supply chains for each of these projects. Users can log in to order materials, check on deliveries or find other logistics-related information.

As well as controlling vehicle movements into the consolidation centre and onto site, Fulcrum also manages muck being taken away, which was around 200 vehicles a day at the time of writing.

The best thing about Fulcrum, says Spottiswood, is that it provides data which can then inform decisions. "Data-driven decision making, that's what Fulcrum and reporting tools and processes give us. I have 57 live reports…vehicles arriving, vehicles going…road closures… I can sit here and make decisions.

It's driven by data…no one can really argue against it."

Spottiswood says that a fair amount of his time is spent 'deconflicting': spotting possible clashes and working out the best solution for everyone. For example, if a huge concrete pour and the arrival of a piling rig are requested at the same time, something has to change.

Heathrow plans to take the concept of consolidation centres further for its planned £16bn expansion of the airport. It is currently assessing expressions of interest for four regional hubs where elements of the new airport facilities will be pre-assembled before coming to site. Once established, these could serve other infrastructure projects too.

Digital revolution

Technology has already revolutionised the logistics process, with mobile communications, smart devices, mapping and web apps and software. "All these have come relatively recently but they are now just a part of life," says Spottiswood, who feels the pace of change quickening.

More extensive use of BIM would be a further gamechanger. "The BIM model should tell you what you want and when you want it," says Spottiswood. "If you could link it to logistics, we would not need to sit down for our forecast meeting. The BIM model would tell me what I needed to know."

Another technology of the not-too-distant future will be autonomous vehicles, predicts Spottiswood. Electric vehicles will become commonplace even sooner: Spottiswood predicts electric vehicles for the last 10 miles of a delivery will be mandated in London and other European cities within the next five years.

Wilson James already uses electric vehicles at Heathrow and by 2020 all vehicles there will be hybrid at the very least, totally electric if possible. All the CCC's escort vehicles are already electric, larger electric vehicles are next on the agenda.

Can CCCs and the experts who run them revolutionise the way tunnelling projects are run? Since efficient logistics is at the heart of any successful tunnelling job, that may seem unlikely. However, even small changes and improvements to processes and communications can add up to better productivity.

It can only be a matter of time before cities around the world mandate CCCs. An open mind and a willingness to do things differently could mean that they add additional benefit – rather than just additional cost.

Left: The Follo Line is Norway's largest current transport project

Feats on the Follo Line

A clever conveyor system is helping the four TBMs on Norway's Follo line tunnels to make history.

Norway's Follo Line tunnel is headline news for all sorts of reasons. It's Norway's largest current transport project, the longest railway tunnel in Scandinavia and Norway's first long twin-tube rail tunnel.

The two 20km-long tunnels will also be among the first large scale tunnels in decades to be constructed using TBMs, rather than the region's traditional drill and blast method. The last time TBMs were seen on this soil was in the last century when they were being used to construct hydro-electric plants.

The conveyor system that's bringing out the Norwegian Granite from the four TBMs is pretty impressive too: almost 80km of conveyor belt supported by 40km of steel structures inside and outside of the tunnels. Four 9km-long tunnel conveyors, each with a capacity of 850 tonnes per hour, feed two dumpsite lines, each consisting of six conveyors which total 1.9km in length and a maximum capacity of 2200 tonnes per hour each.

A switching system which allows the tunnel conveyors to transfer material to either of the two dumpsite lines has created built-in redundancy. "The bypass solution is unique," says Martin Stucki, area sales manager at Marti Technik. "It allows the contractor to easily switch the material to the other line, without having to stop excavating."

At the far end of the system, the bidirectional conveyors discharging into the dump site building can be moved automatically, allowing the excavated material to be sorted.

Marti Technik signed the contract with main contractor Acciona Infraestructuras & Ghella JV (AGJV) in December 2015, and by May 2016 had to start shipping components to site. Most of the installation had to take place in the summer months before temperatures dropped and days shortened.

The Follo Line, which will run between Oslo's central

The tunnel conveyors can be switched to feed either of the dumpsite conveyors