

IS OFF-SITE INSIGHT?

The arguments in favour of off-site construction systems have been known for many years. But is the construction industry ready to adopt such systems? Margo Cole and Nathan Stevens speak to some key industry players to seek their views.



In any other industry, if producers were told there was a way of manufacturing that is quicker, gives consistently higher quality and enables the workforce to operate in carefully controlled conditions, most would leap at the opportunity to give it a try. In construction, however, it seems that, no matter how persuasive these arguments, most people prefer to stick with what they know – however inefficient and inconsistent the results may be.

The arguments in favour of off-site construction have been well known for many years. As former Chairman of Rethinking Construction, Alan Crane, says: “The frustrating thing is that we are still having to debate and discuss what in reality is just basic common sense. If you construct things or fabricate things in the controlled environment that a manufacturing plant gives you, then you should get a significant number of benefits that you don’t get on a construction site open to the elements.”

He says the “obvious” advantages are quality, health and safety, and control, handling and storage of materials, but adds that there are other benefits less frequently mentioned. “Off-site construction gives much greater flair for designers to exercise their design skills,” he says. “If you look at other manufactured products created in a factory environment you will see things in shapes, styles and colours that are almost impossible in a site environment. And talking about environment, there is enormous potential for reducing waste from surplus and damaged materials.”

The recent history of off-site construction is one of consistent – if not spectacular – growth. Beginning from the low point of the 1980s, when the spectre of ‘60s pre-fabs still hung over the industry, factory-produced building components and systems have built a respectable share of the market in

Alongside this programme is an equally ambitious plan to build an estimated three million new homes in areas currently suffering housing shortages. Many of these new homes will be aimed at key workers, and up to 300,000 of them will be in the overcrowded South East of England.

The UK construction industry does not have enough skilled people to build all these schools, hospitals and houses if they are to be constructed using ‘traditional’ site-based techniques. This is particularly acute in the residential sector, where bricklayers are in very short supply.

Yorkshire-based contractor, S Harrison Construction, for example, has turned to off-site manufactured solutions as a result of problems recruiting tradesmen to build the inner leaf of blockwork on its projects. As Project Manager on a recent scheme in Scarborough, Neville Senior, explains: “On the East Coast, as elsewhere, there are problems of both recruiting and retaining tradesmen, especially bricklayers. In this respect (off-site manufactured systems) have proved ideal, not just by reducing the amount of blockwork required, but, more importantly, taking it out of the critical path.”

In the health and education sectors, many clients have already experienced the benefits of off-site construction, and are committed to continuing down that route. As a result, the boom in spending in these areas is likely to see a dramatic increase in orders for factory-produced building components.

Peter Bonfield, Managing Director of BRE’s Construction Division, says: “Off-site construction is ideal for the health and education sectors because you can fully fit out an operating theatre or school room in the factory. Then, during the school holidays, you could add new classrooms without affecting the operation of the school, or extend a hospital wing without disrupting the existing wards.”

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But off-site construction is still seen as something ‘new’ or ‘unusual’, rather than a normal part of what the construction industry does.

As Chris Drury of TPS Consult, partner with Haden Young on prison projects in Scotland, says: “There is still a great deal of caution about prefabrication – typical of the UK construction industry that likes to see things tried and tested and be sure that they work before going down that route.

“There are many benefits to off-site production, especially if you’re doing repetitive work, such as hotel rooms and prison cells. Through off-site prefabrication, time and cost are improved, with better quality and safety. There is great potential for services to be prefabricated and if you are going to take it seriously, you need to start at day one from the design stage.”

The time is right

Those people working in or championing the off-site sector believe the time is right now, more than ever, for the widespread acceptance of off-site solutions on a major scale in the UK construction industry. While clients, designers and constructors may have chosen to ignore the benefits before now, the current political climate – combined with acute skill shortages – tips the balance firmly in favour of off-site manufacture and construction.

The current government has committed itself to a massive programme of public-sector spending, most of which involves capital expenditure on new buildings. This is most acute in the health and education sectors, where the government has pledged to spend over £8.5bn on new schools over the next three years, and has given the go-ahead for 56 new hospitals since 2000.

In housebuilding, where skill shortages are at their most acute, Bonfield claims there is no option but to use off-site manufacture. “When you look at the announcements the government has been making recently and the number of houses they’re talking about, builders will have to give serious consideration to the use of off-site construction and transferring output to the factory floor,” he says. “Equally, the impact on health and safety on site will be highly noticeable.”

Guaranteed workload for the manufacturers

The one thing that the new spending commitment will bring – and that has been lacking in the off-site construction sector until now – is guaranteed workload for the manufacturers. This, in turn, will bring prices down.

Many developers and housebuilders who acknowledge the benefits of off-site manufacture cite cost as the main reason for not adopting it. Darren Richards, Operations Director of off-site consultant Mtech Group, admits “there is still an issue regarding off-site solutions being more expensive than traditional solutions.” But, he adds: “In most instances people don’t know how much it costs them to build traditionally, because they don’t put a cost on inefficiencies, or returning to sort out defects.”

With plenty of experience gained at the award-winning Murray Grove development in East London – which features extensive use of volumetric construction – Peabody Trust Director of Construction, Michael May, says: “The Trust experience does support the fact that, at present, off-site construction is dearer, around 10 per cent more, than traditional methods. However, we are working to improve the installation time on site, along with the substructure service and external works which should reduce the project time and therefore affect savings in preliminary costs.”

Dr Ashley Lane, Group Technical Director at leading housebuilder, Westbury Plc – a company that has enthusiastically adopted off-site solutions – says: “With some notable exceptions, there has been a



reluctance amongst housebuilders to move away from traditional building methods. Design is definitely not a restriction and cost should be viewed in the context of the whole build, rather than simply the product itself. We are now producing a better quality home more in line with environmental and sustainability interests."

Mtech has carried out studies that show that every hour spent in the factory is 300 per cent more efficient than on site. While accepting that, on capital cost alone, a modular house costs between seven per cent and 10 per cent more than a site-built house, Mtech claims that, in reality, the out-turn cost is much closer. "Savings in prelims alone can bring the cost right down," says Richards. "If you are only on site for a few days rather than the 20 weeks it takes to build a house using traditional methods, then you will be making substantial savings on your site set up and management costs."

Manufacturers must keep pace

But if the UK's off-site industry is to make the most of the spending boom in the housing and public sectors, manufacturers must increase the capacity of their production lines. Most are not at full stretch yet, but will have to invest in new facilities and equipment if they are to meet the projected demand.

Many have put off expansion or major investment because of lack of long-term guarantees and forward orders. They will need to see a sizeable market and some kind of commitment from developers or contractors before spending millions of pounds on new premises or equipment.

"I think what developers and contractors should be doing is partnering with manufacturers," says Richards. "They should be developing long-term supply-chain partnerships and subsidising new products."

Scott Carr, General Manager of Corus Living Solutions (which has recently invested £4M in new plant and equipment), says: "I agree that until recently, the lack of manufacturing capacity has been one of the barriers to the more widespread adoption of modular construction techniques in the building industry. As long as clients remain unconvinced about the benefits of off-site construction, their architects will continue to design conventionally."

Many believe that the volume of work projected for the health, education and housing sectors should provide enough of a guarantee of sustained workload for manufacturers to start to invest and for contractors to look seriously at off-site solutions. But there are additional incentives, such as pressure from the Housing Corporation for local authorities and housing associations to demonstrate they are adopting innovative construction techniques.

"Contractors already appreciate the benefits of off-site construction for certain building types but presently have to re-design the buildings," says Carr. "Corus has taken the view that off-site construction will become the standard way to construct certain buildings and has invested heavily in production capacity ahead of expected market demand."

Government help needed

Richards also believes the government could be doing more, firstly by acknowledging it can only achieve its public spending pledges by employing off-site manufacture, and secondly by helping manufacturers invest in plant and equipment. "We need subsidies at the manufacturing

level," he says. "There are subsidies out there for employment, but they need to generate some initiatives that actively encourage manufacturers to invest in machinery and automated production lines."

Alan Crane is less convinced by the idea of subsidies, but says there is much more the government could be doing. "I don't think the government should be in the business of providing grants or artificially underpinning or distorting markets," he says, "but the government could do more in terms of education and encouragement."

For example, he says, it should be widely disseminating information that shows it is far easier to satisfy the new Part L of the Building Regulations by using off-site solutions.

Crane also advocates support for the beleaguered manufacturing industry. "The whole UK construction economy has been pretty good for the last few years and looks good for the next five years," he says. "We all know that the manufacturing sector has been suffering very badly, and here's an opportunity to do something about that. The government should be supporting the manufacturers and raising awareness of the benefits."

Convincing the designers

All those in the off-site sector seem to agree that the predominant sector that still needs to be convinced about the benefits of off-site construction are the designers. "A lot of designers could benefit from a greater understanding of the capability off-site manufacture could provide," says the BRE's Peter Bonfield. "They tend to think that it restricts them in their design freedom, and there's a perception that you can't create curves or work on unusually shaped sites."

"In fact off-site manufacture can meet these desires. If designers were more open minded they could see that the potential is endless."

Damian Bree of chartered architect and urban designer, Bree Day Partnership, whose practice has worked on numerous developments where prefabricated systems have been specified in the design, sees no sense in the reluctance of designers to adopt manufactured solutions.

"There is no reason why we cannot manufacture a quality product that has individuality, with the certainty of cost, reliability of time and economies of scale," says Bree.

"With off-site fabrication, the client knows exactly what they are getting before the work starts, the design team can move forward with confidence that the design is frozen, you have all the design issues thought through and the contractor can programme the works with precision."

Bree concludes: "To me, it's clear there is no technical barrier, it's just a change of mindset that is required. Those who doubt it can happen, and have influence to make it happen in the UK, should be enlightened by the Japanese experience. We have seen what they have done to the car market here, how long will it be before they offer the same to British industry, if not complete houses to the public, then the technology to the builders?" ■

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