



SEEING THE BIG PICTURE

SOMETIMES DESIGNERS CAN SEEM LIKE THE BAD GUYS, ESPECIALLY WHEN THEIR FALSE ASSUMPTIONS HOLD A PROJECT UP. BUT WITH PLANNING SOFTWARE ADEPT, EVERYONE KNOWS WHERE – AND WHEN – THEY ARE.

KRISTINA SMITH REPORTS

'UNDERSTANDING DESIGNERS A BIT MORE'

Contractors curse designers. The drawing is late. Or it's missing some information. Or a detail doesn't work once you try to build it. But if those contractors were able to understand the complexities of the design process – how the many elements are interlinked, how some activities must be repeated as the design is refined – they might not be so quick to judge.

More and more firms are making that mental leap, and are starting to manage the whole design process in a completely different way, with the help of a system called ADePT (Analytical Design Planning Technique), which helps design managers build, manage and control programmes that realistically represent the design process. Existing users include Costain, Skanska, Vinci, Balfour Beatty, Kier, Bouygues and Laing O'Rourke.

"We are trying to make sure that contractors understand designers a bit more, giving them credit for the process they have to go through," says Dave Prangley, design management consultant at ADePT creators Adept Management. "Also, designers are beginning to understand how important their input is to the different stages of procurement and construction."

It provides many practical benefits. On a recent major hospital project in the UK, ADePT was brought in to get the design back on track because it was seriously threatening the start – and finish – of construction. The process of producing the design programme also shaped the way procurement was being managed.

"It helped us to identify what information was required when by the supply chain, and also what information the designers needed," explains the design manager. "It also helped identify which supply chain members should be brought on board earlier. Without the methodology in place, we would have been seriously challenged."

Across the other side of the world, on the island of Grand Cayman, the priorities for the Camana Bay project (pictured, and see box overleaf), are different. Justin Howe, who is overseeing the development of a new town, is using ADePT to help ensure an optimum design to achieve the high quality required. He says: "The tool increased time certainty through the design phase. It also improved the completeness and correctness of the design which in turn improved the cost certainties ©"

KEEPING THE DESIGN ON TRACK

If you work in construction, a task that is 90% complete sounds pretty good: you're nearly there. But a design task at 90% can be a different matter.

That last 10% could take weeks of effort, and most likely there are other designers waiting for information from the completed task so they can get on with their work. Without that information, their only option without falling behind schedule is to make an assumption and do the design anyway, introducing risk.

ADePT enables this risk to be identified. As well as measuring progress in terms of design days, ADePT looks at how many tasks have been completed, as this gives a more reliable picture of where the design process is and how that will impact on procurement and construction dates (see graphs right). Different projects will find different metrics and comparisons useful, so each will have its own project dashboard to provide a snapshot of progress and issues to date.

Adept has developed a system drawn from lean production thinking, based on an adaptation of the Lean Construction Institute's Last Planner™, which is used to manage trade packages for construction. Each week – or fortnight, depending on what suits the project – the design manager issues a list of tasks to each designer which should be completed within that period. At the same time, a look-ahead list is issued flagging up activities coming soon.

THE FACT ADEPT MANAGED THE WHOLE DESIGN PROCESS TO A DETAILED SCHEDULE, WHILE ACKNOWLEDGING THE SCHEDULE CHANGES, HELPED KEEP EVERYTHING ON TRACK

JUSTIN HOWE, CAMANA BAY PROJECT

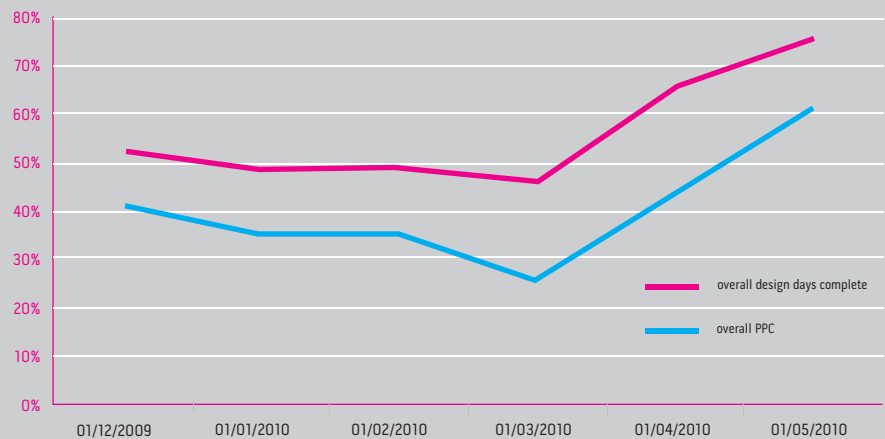
At the end of the week or fortnight, the designers report back on the percentage each task is complete, and where tasks are not complete to plan they must give a reason. This guides the design manager in the actions he must take to keep the project on track. The designers are also asked to flag up potential constraints in the look-ahead list, so that they can be dealt with.

The ADePT Design Manager software measures many different aspects of design performance, including standard production metrics such as “percentage planned complete” (PPC), that is, what proportion of all the tasks planned each period have been

completed and “work in progress” (WIP), which is the proportion of tasks started and progressed (but not completed) to plan. These metrics can be presented in a number of ways. The Milestone Tracker shows what impact the current progress of the design is likely to have on the key construction and procurement dates.

“Design managers like that,” says Andy Newton, one of Adept Management's directors. “They can see where they need to focus their resources. It flags up tender milestones and construction information milestones at risk; action can then be agreed to ensure key dates are maintained.”

COMPARISON OF OVERALL DESIGN DAY REPORTING AND PPC REPORTING

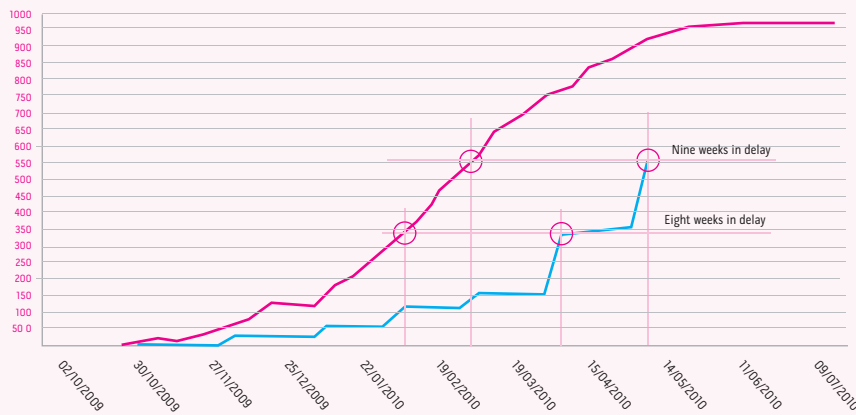


through the construction phase. And it increased our confidence that we would not hit any problems we weren't aware of during construction.”

The usual approach for contractors is to shoehorn the design into a construction-type programme, working back from key procurement and construction milestones. What this means in practice is designers have to make all sorts of assumptions to progress their part of the design. This works just fine, until someone says: “Why is that duct that size? And why is it there?” And then it's back to the drawing board. Or worse, if the project is on site, it's time to issue a change order. Either means delay and cost.

The founding directors of Adept Management, all designers, had experienced these frustrations and decided to address them head on by developing ADePT. Starting as a web-based service, the company later began to offer their services as design managers, using their software to build design programmes and then manage the delivery process for clients before, in 2007, releasing ADePT as off-the-shelf software: ADePT Design Builder and ADePT Design Manager.

ACTIVITIES COMPLETED vs TIME



Left: This graph indicates the number of activities that should have been completed against the number that have been completed. This measure shows a worst-case delay to the project, as well as where additional resources may be required for a period to enable a large number of activities to be completed.

Below left and below, far left: Measuring the percentage of design days spent vs design days planned doesn't tell you anything about what those days have been spent on. Measuring the percentage of tasks completed vs those planned to be completed ("percentage planned complete" or PPC) provides a very different perspective on performance.

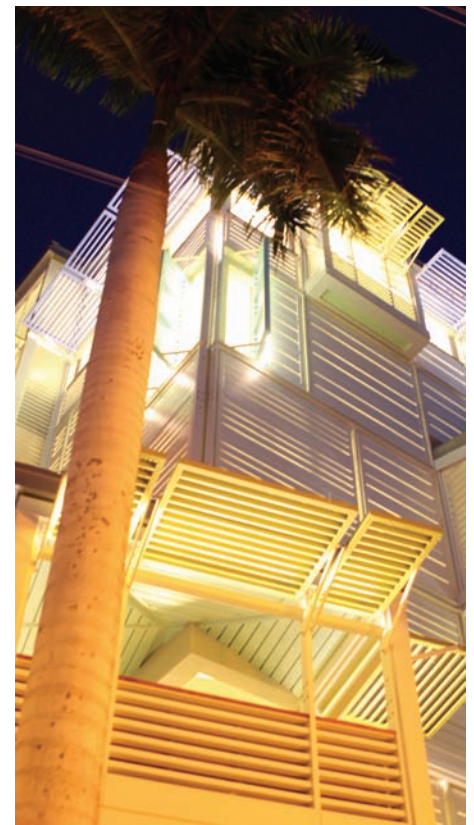
MEASURING DELAY BY DESIGN DAYS COMPLETED

MEASURING DELAY BY PLANNED PERCENTAGE COMPLETE

	Actual/target design days completed at report date	Actual/target days of overall design days in schedule	Overall design days progress	Actual/target activities completed	Percentage planned complete
Architect	5,986 days	69% of total	87%	701	70%
	6,905 days	79% of total		995	
Structural engineer	4,399 days	54% of total	64%	369	44%
	6,834 days	85% of total		838	
Services engineer	9,296 days	71% of total	76%	349	42%
	12,287 days	93% of total		816	
Trade contractor	1,453 days	64% of total	87%	82	87%
	1,670 days	73% of total		94	
Overall	22,483 days	66% of total	77%	1,717	55%
	29,492 days	86% of total		3,097	

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ADePT has now been used on projects in the UK, US, Australia and Middle East, from schools to prisons, hospitals to office blocks. To satisfy the growing demand for design management tools and consultancy services in the US market, in early 2009 the company also launched its first overseas arm, California-based AML Technologies.

Unusually for a tool rooted in construction, ADePT has found success in other industries, too. A recent project to improve the engineering design processes of a large marine defence contractor resulted in the tool and process winning an award for improving productivity, reducing project timescales and providing demonstrable cost savings.

BUILDING THE PROGRAMME

ADePT takes a collaborative approach to planning the design process. Although the ADePT software has embedded design process data that enables users to set up an integrated design programme in a matter of hours, to generate programmes without input from designers would be risky. Firstly, because designers must be

involved in order to feel that the programme is theirs rather than imposed. And secondly, because everybody does things just that little bit differently.

"It's really important to do this, because you want to produce an integrated design programme created by the designers," says Howe. "If the programme is imposed on the designers and then they are monitored against it, you get less reliability."

So Adept produces each project's tailored design programme through a series of workshops with the designers, a process which requires about two days' total input from each design discipline, over a two to three week period. Adept works through a typical list of activities with each designer, refining them to suit the way a particular firm works. The scope of each designer's work is mapped, and the information flows between activities are checked.

In the next step the software calculates the optimum sequence of activities, removing unnecessary rework cycles. More workshops identify decisions that will further reduce the number of iterations in the process. Those



tasks that remain in iterative loops are sequenced in a way that minimises back-tracking at a later date. “That’s the clever bit of what Adept does,” says Howe, “because they are bringing a lot of experience in design management to the table.”

During the workshops, the designers are encouraged to develop strategies for working through these iterative loops of activities, perhaps producing method statements for how the design process will be managed.

Once this programme is in place, the design manager must ensure that key dates in the procurement, and sometimes construction, programmes have been met and adjust the design programme accordingly. To achieve this, the ADePT software plugs into planning software such as Primavera, Asta Powerproject and MSProject.

ADePT uses lean production planning principles to monitor progress and flag up problems (see box Keeping the design on track). Each week designers receive a list of tasks they are responsible for and at the end of that week must report what percentage of each task is complete, and where tasks aren’t finished to plan, give a reason.

This reporting system results in percentage planned complete (PPC) and work-in-progress (WIP) measurements for individual firms and the whole project. As well as providing a broad brush picture of progress, it flags up resourcing issues and recurring problems.

Translating this information and using it to oversee and control the design closely is one of Adept’s strengths, says Howe. “The fact that they managed the whole design process against a very detailed schedule, all the while acknowledging that the schedule changes, helped to keep everything on track,” he says.

WINNING THEM OVER

Not everyone takes kindly to Adept’s intervention, however. In a world where the architect has less and less power, some may find that losing responsibility for running their own process is a bitter pill to swallow.

“Generally, structural engineers love it, because they can see the logic,” says Mick Cahill, a design manager who has been with Adept for six years. “The architects will probably say it has made more work for them, as do

CAMANA BAY

Justin Howe is overseeing the development of a 500-acre new town on the Caribbean island of Grand Cayman. In 2005, he was at a Chicago conference, on the lookout for ways to improve the construction process. Instead, Howe came across a new way to plan and manage design: ADePT.

Camana Bay, which developer Dart Realty will deliver over several decades, was experiencing the usual issues in the design phase, says Howe: “We had the challenges that everybody has. Schedules were challenged and that manifested itself not only in the design phase but in the construction phase as well.”

The design philosophy of the development is “new urbanism”: communities where people can live, work, study and play without having to resort to the car. High quality environments are part of this idea. “The town centre has to set a level,” says Howe. “Dart Realty Cayman wanted to do something for the long-term.” Any issues around details during construction could potentially jeopardise the quality.

Howe had bumped into Jamie Hammond, one of the directors of Adept Management, at the Chicago construction conference. Howe quickly saw that ADePT, a tool to help design managers build programmes which realistically represent the design process, could have knock-on benefits in the construction phase.

the M&E guys on occasion.” The reason for this is that designers tend to jump from task to task in response to the questions others are asking. The ADePT process tries to record all the activities and order them. It’s a change in the way people work, and for some that’s a struggle.

When they first started using the ADePT Design Manager’s production control principles, Adept found some designers were still ploughing on ahead, making assumptions so they could advance their part of the design beyond where the programme said it should be.

In response, Adept has adapted the software so that activities done out of sequence are flagged up and the reasons must be recorded. This gives much greater certainty in the design that is produced.

Designers who do accept the ADePT way of working can find that the design programme becomes their friend. Adept Management director John Steele was brought in to help a project where the designers were being pulled this way and that by the procurement and construction teams, all demanding information yesterday.

Howe tested Adept out on a reasonably small fit-out project in Camana Bay first. Pleased with the results, he then used the company on a multi-purpose hall for the new international school, an accommodation block and a commercial office building.

The latter project had a drop dead date to hit, when the anchor tenant, an international law firm, was due to move in. “The challenge was to keep the quality of design and construction consistent with the other buildings that were being built, while still hitting that date,” says Howe.

There was some resistance to this new way of working at first. “Initially some of the Camana Bay designers put up barriers and reasons why it wouldn’t work,” says Howe. “They even took us to one side and let us know that they really didn’t think it was a good idea”. Others, he says, were more open and receptive.

And it took time to change ingrained working practices: “We were exposing certain behaviours,” says Hammond. “Like the MEP guys who kept getting up to 90% complete and then sitting on that for weeks and weeks. They said ‘we have done the work, but we’re expecting the floor plans to be changed.’”

Root cause analysis demonstrated that the MEP designer was building in time for rework, because bitter experience had taught him that architects always make changes. One of Hammond’s roles was therefore to challenge and change people’s existing mindsets.

“I had to explain that there’s no harm in doing the work again, if there’s a change and it needs to be done,” says Hammond. “At the same time, it’s about trusting the information received from others: if they say it’s complete, you use it to do the work, declare it complete and then move on.”

Howe’s aim is to have as near perfect a design as possible to take into the procurement and construction phases. They are not there yet, but things have improved: the number of change orders during construction has been lower on the projects where Adept was involved and time certainty – and therefore cost certainty – has got better.

“We will definitely continue to use Adept going forward,” says Howe. “We have all been massively impressed with what they do and the way they go about their business.”

One issue that emerged is a relatively common one: “What the designers were telling us very early on was that although they knew what packages had to be delivered, they did not know the scope of the packages,” says Steele. “The procurement guys say: ‘The designers should know what they are delivering to us’, but with so many specialists, designers are finding it hard to understand exactly where one package stops and the next one begins.”

The process of building the programme demanded that the scope of all the packages was properly defined. And Adept built all the construction and procurement milestones into one programme so that the designers were working to one set of shared goals.

For a contractor, the beauty of the system is that it ensures that due diligence on the design has been done. You can be as certain as possible that the drawings in your hand are complete, and that those design assumptions that can lead to problems have not been made. Without it, expect plenty more cursing of the designers to come.