

# BENEFITS DERIVED FROM USE OF DSM AS PART OF THE ADePT APPROACH TO MANAGING ENGINEERING PROJECTS

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*Keywords: ADePT, benefits, construction, AEC*

## 1. INTRODUCTION

Papers have been presented on the ADePT planning and management approach at DSM Conferences going back to 2000. The approach is now in widespread use in industrial applications, ranging from a US\$4M building fit-out project to a £4Bn urban redevelopment project, and a number of practices have been established to ensure design planning and control is undertaken in the most effective way possible.

The impacts of the approach's use have recently been assessed, highlighting a number of areas where benefit is derived and showing a significant return on the investment required to implement the technique.

## 2. BACKGROUND

The ADePT methodology comprises four stages. In the first stage, the scope of the design process and dependencies between activities are defined. In the second, the sequence of the process is determined based on the dependencies between activities and the iteration within the process. The third stage entails the representation of the design process in the form of a programme, enabling the integration of the design process with procurement and construction. Finally, the fourth stage is where the design process is monitored and the flow of work is controlled.

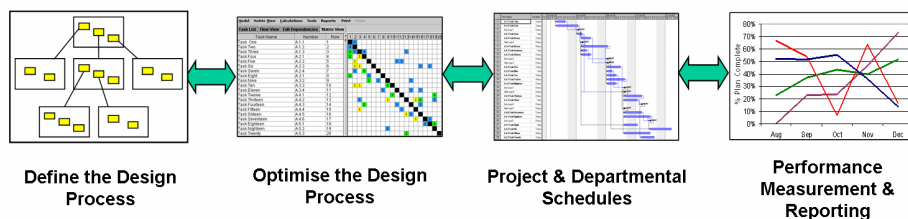


Figure 1 – The Analytical Design Planning Technique

## 3. PRACTICAL IMPLEMENTATION OF ADEPT

### 3.1 Dealing with Iteration in the Design Process

ADePT identifies iteration within the design process. This in turn must be represented on a programme. Usually this is achieved by grouping activities together in the programme and running them concurrently over a period of time which is deemed necessary to develop a co-ordinated design solution, thus representing the concurrent, cross-disciplinary working that is needed to develop the co-ordinated outputs from the interdependent activities.

The more significant challenge (and opportunity) lies in defining tactics to manage the design team as they work concurrently on an interdependent design problem. There is no single solution as the number of activities and deliverables, number of team members involved, and time required to develop the design will dictate the approaches used. What is important is that each of these issues is thought about in turn and that an appropriate approach is put in place. Recording the approach in the form of a procedure or method statement focuses the design team on these iterative co-ordination problems and provides a guide for undertaking the work during each period of concurrent working.

### 3.2 Integrating Design with Procurement & Construction

When integrating a design programme with a construction / procurement programme, information and document release dates must be tied into dates when those same deliverables are required for tender or construction. Rarely does all the required design information meet with the target construction dates, particularly around the early

elements of construction. In these cases, design must be expedited through the introduction of assumptions and fixity. The assumptions / fixes and their effects can be observed in the matrix stage in ADePT to ensure that only the necessary ones are made.

Where required design information does not meet with target tender dates, it is not always necessary to introduce assumptions to ensure that 100% of design information is available. Rather, tender information can be released incomplete and assumptions can be made in the pricing which can then be firmed up later. Analysis such as that allow the procurement team to clearly see: (i) the remaining time required to achieve 100% complete design information; (ii) the completeness of information on the target tender date; and (iii) an indication of cost certainty based on that level of completeness.

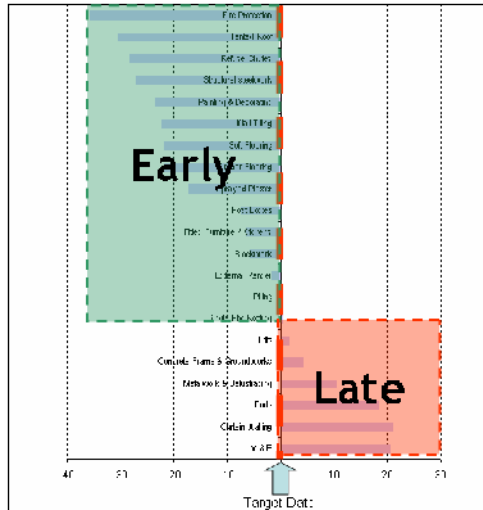


Figure 2 – Design information delivery dates compared to targets for procurement

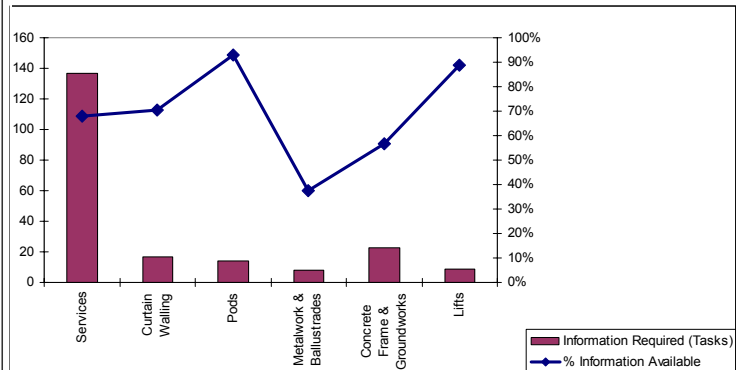


Figure 3 – Assessment of information completeness at target dates

Of course it is important to understand which information is missing and the impact of this upon achieving adequate cost certainty. However, when this level of understanding is required, supplementary analysis can be introduced to augment the indication given in (iii) above.

### 3.3 Managing Constraints & Measuring Progress

As an output from the implementation of ADePT, reports on forthcoming activities are produced intermittently for each design team member, typically fortnightly. These cover the designers’ ‘work plans’ (activities to be undertaken in the next period) and ‘look-ahead schedules’ (activities due immediately following the next period). The reports, which are in the form of to-do lists, are much easier for the design team to digest than a detailed programme which may have been changed in fairly subtle ways.

At the end of each work plan period (which is, of course, the point where constraint-free activities in the look-ahead schedule are promoted to the next period’s work plan), the design team report the progress made and the status of any constraints. Progress is reported as ‘% complete’. Overall progress is generally measured in two ways: (i) the proportion of activities due for completion which are completed (‘percentage planned complete’); and (ii) the proportion of activities due to be progressed which have been (‘work in progress’).

The first of these measures is the most important since it is only upon the completion of a design activity when all of its outputs can be said to be fully co-ordinated and complete.

The measure focuses the team upon fully completing activities since a report that all activities are 90% complete scores a PPC of zero. So, the scenario where an activity’s progress develops over time by 0, 50, 80, 85, 90, 95% can be replaced by 0, 50, 100%.

Having reported progress and on any constraints affecting activities due in the next work plan period, the design programme can be updated. This then creates the new work plan and look-ahead schedule which is issued to the team and the process starts over.

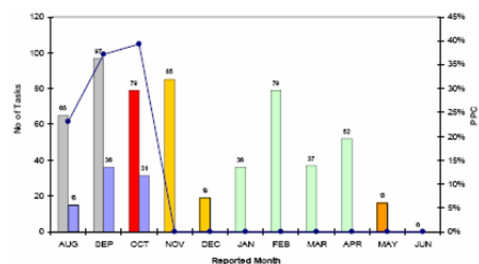


Figure 4 – Design performance report

## 4. IMPACTS

Robust underlying evidence of the overall impacts of ADePT's implementation has recently been gathered by an independent consultant, Capita Symonds<sup>5</sup>. Two projects have been examined in detail and senior project representatives have been interviewed in a structured manner. Despite the fact that the two projects were of a different size and nature (being a c£35M retail development and a c£380M healthcare project) and undertaken by entirely different teams, this process has identified largely common areas of impact:

- ADePT identifies and removes "turbulence" from the project process;
- It provides greater certainty of design co-ordination;
- It offers an ability to better prioritise design work;
- It integrates sub-contractor design with consultant design in an effective way;
- Management of design change is more effective than is typically the case;
- Collaboration between design team members is improved;
- Workflow control focuses the team on task completion;
- It fosters a 'self-policing' design team; and
- The relationship between delivery of outputs and design fee is made clearer.

Three particularly stark examples of these impacts which were identified by Capita Symonds are:

- Design co-ordination - 32 week saving on achieving co-ordinated design in one complex work package;
- Change management - at least 5 man-weeks saved in avoiding the knock-on effect of a change; and
- Design outputs - c£75K saving where design fees were linked to achievement of design outputs.

It is clear from these examples that there are significant benefits to be derived from the implementation of ADePT. Of course, these benefits are not derived without any sacrifice on the part of the project team. The team must be prepared to invest in the adoption of a new approach. This means time contributing to the design planning process and a charge for consultancy support and the tools to deploy the ADePT technique.

## 5. CONCLUSIONS

The analytical design planning technique (ADePT) offers an approach to planning and controlling design processes in a manner which is more effective than is typical in current practice. The practical implementation of the technique involves a structured, facilitated approach but this provides opportunities to establish the optimal sequence of the process and to understand the interface between design and construction. The workflow element of ADePT enables the design process to be monitored and controlled effectively.

Overall the technique provides a range of benefits, and these have been shown to be significant. Anecdotal evidence of the benefits has now been backed up by robust and independent analysis.

## REFERENCES

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## 9TH INTERNATIONAL DSM CONFERENCE

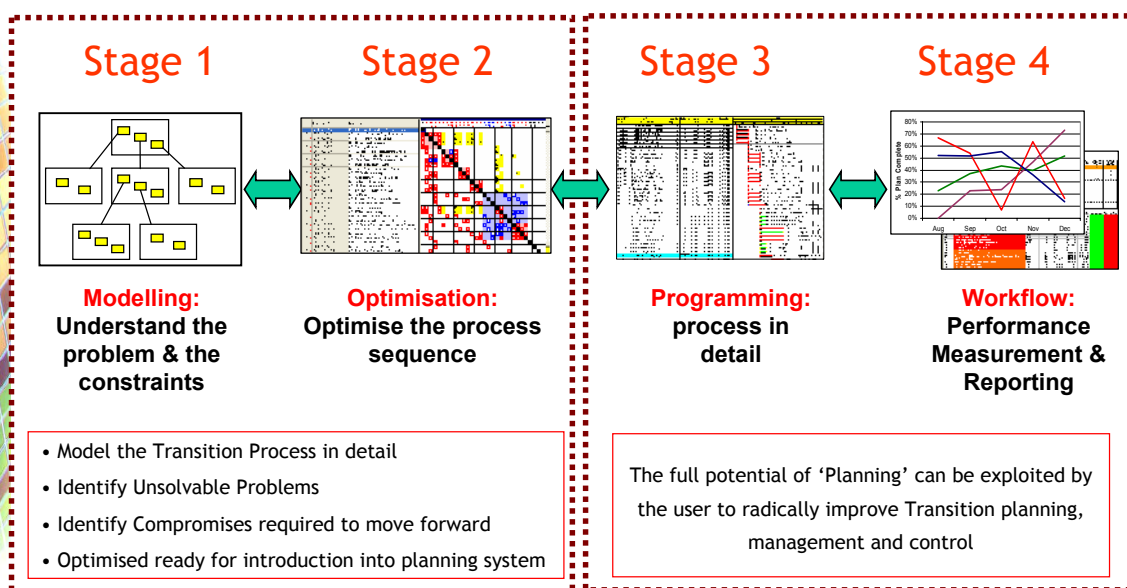
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adept management ltd



### ADePT



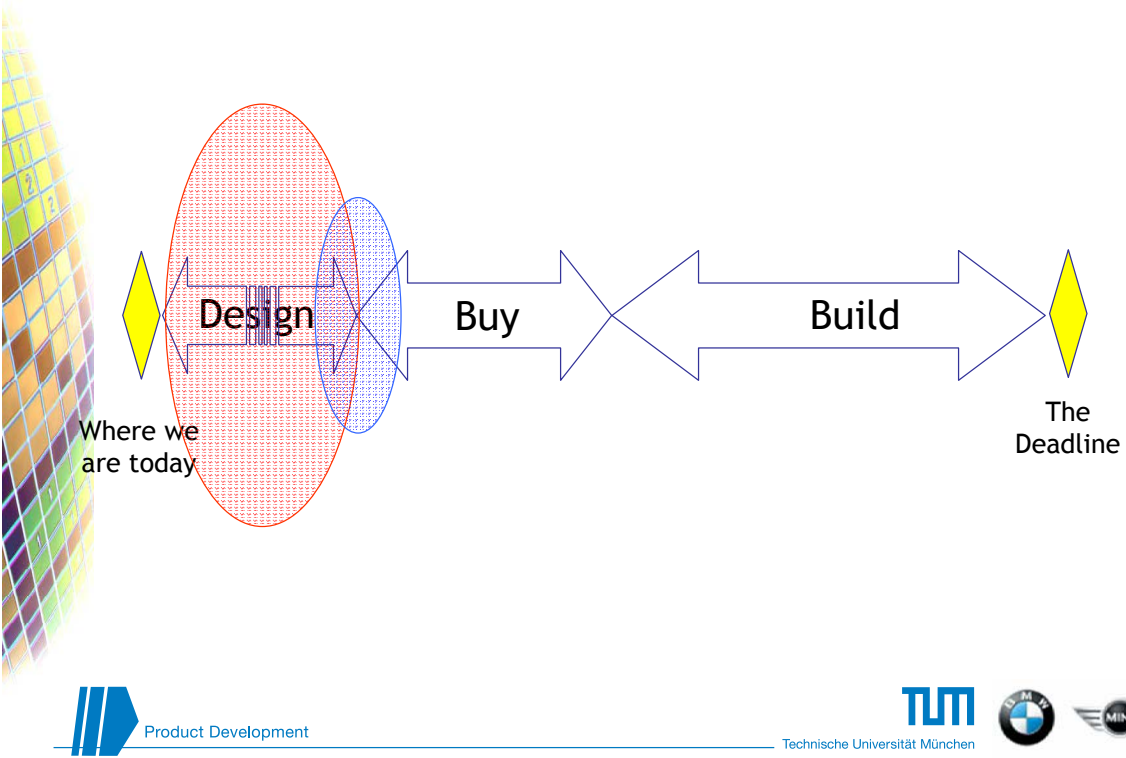
Customers

Product Development

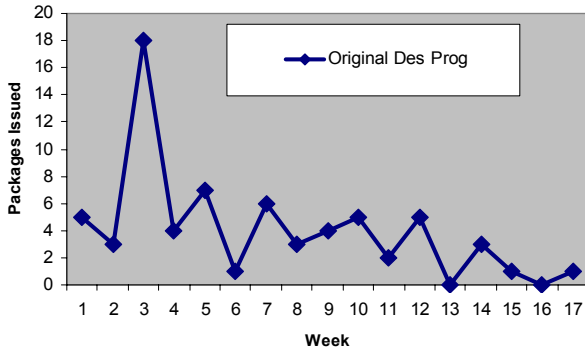
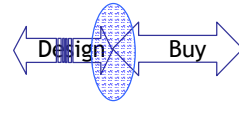
Technische Universität München

9th International DSM Conference 2007- 3

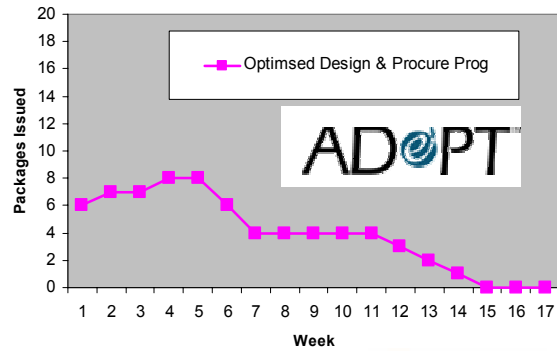
Planning a typical project with ADePT



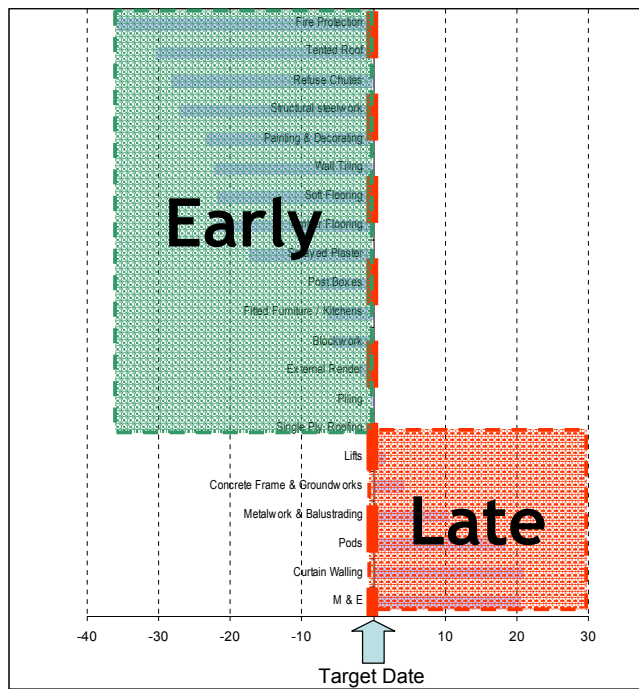
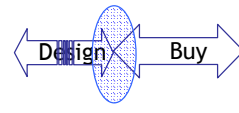
### Benefits at the Design-Buy Interface



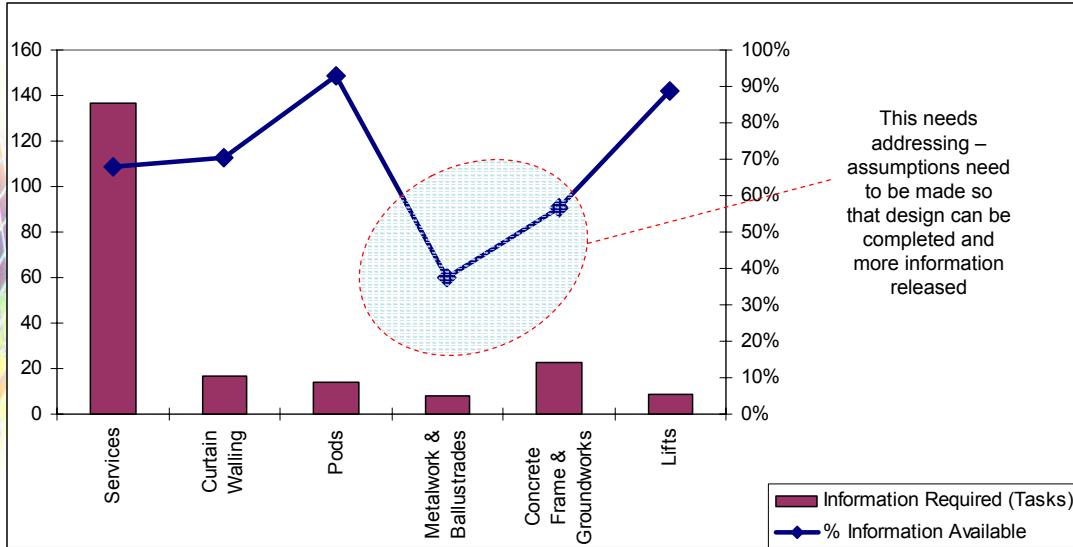
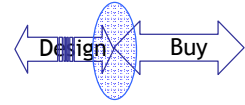
Measuring the Release of Information in the Buying Process



### Benefits at the Design-Buy Interface

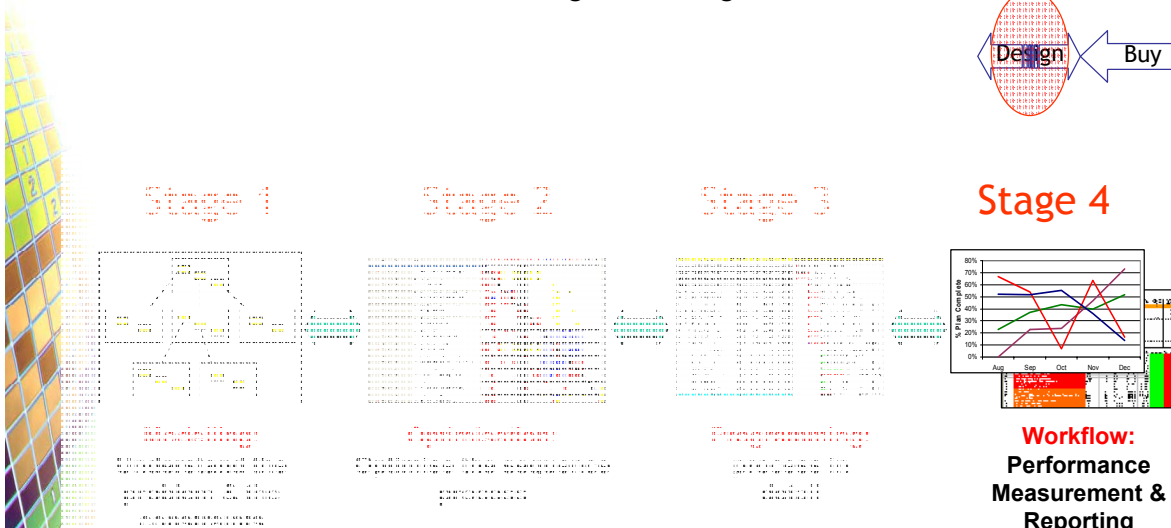
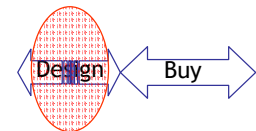


### Benefits at the Design-Buy Interface



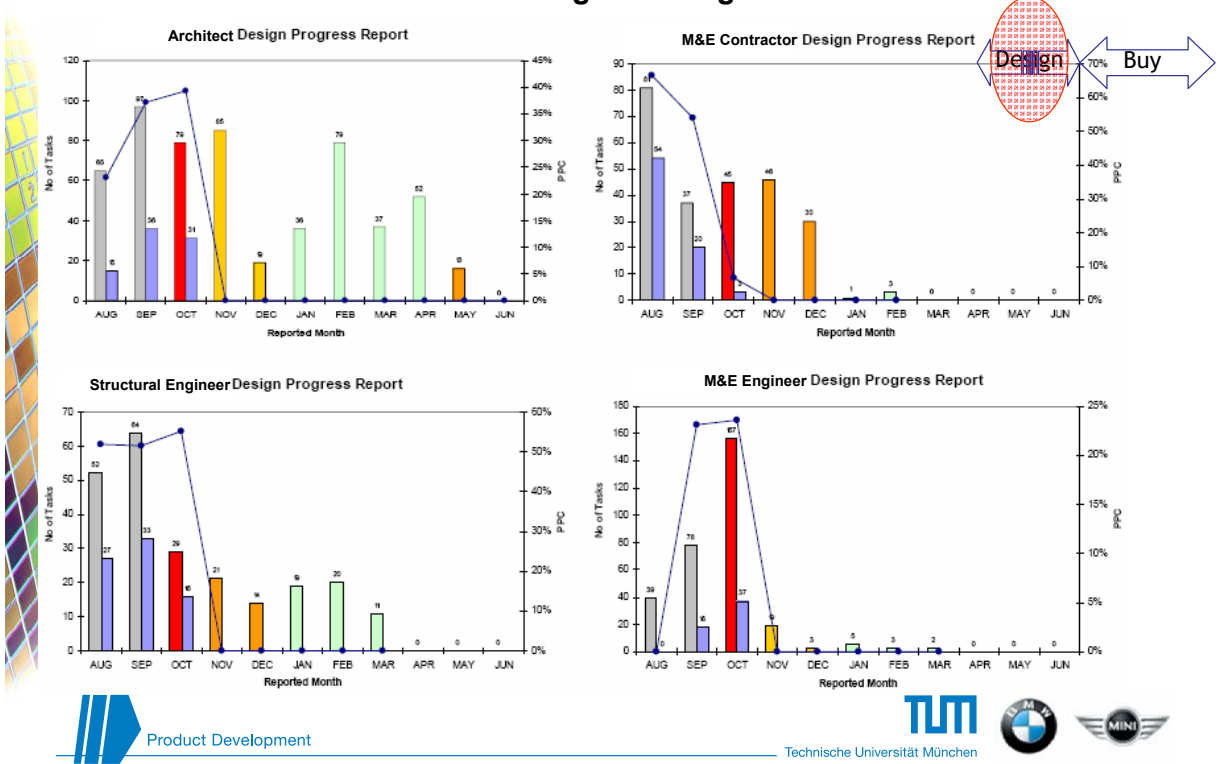
This needs addressing – assumptions need to be made so that design can be completed and more information released

### Benefits during the Design Phase



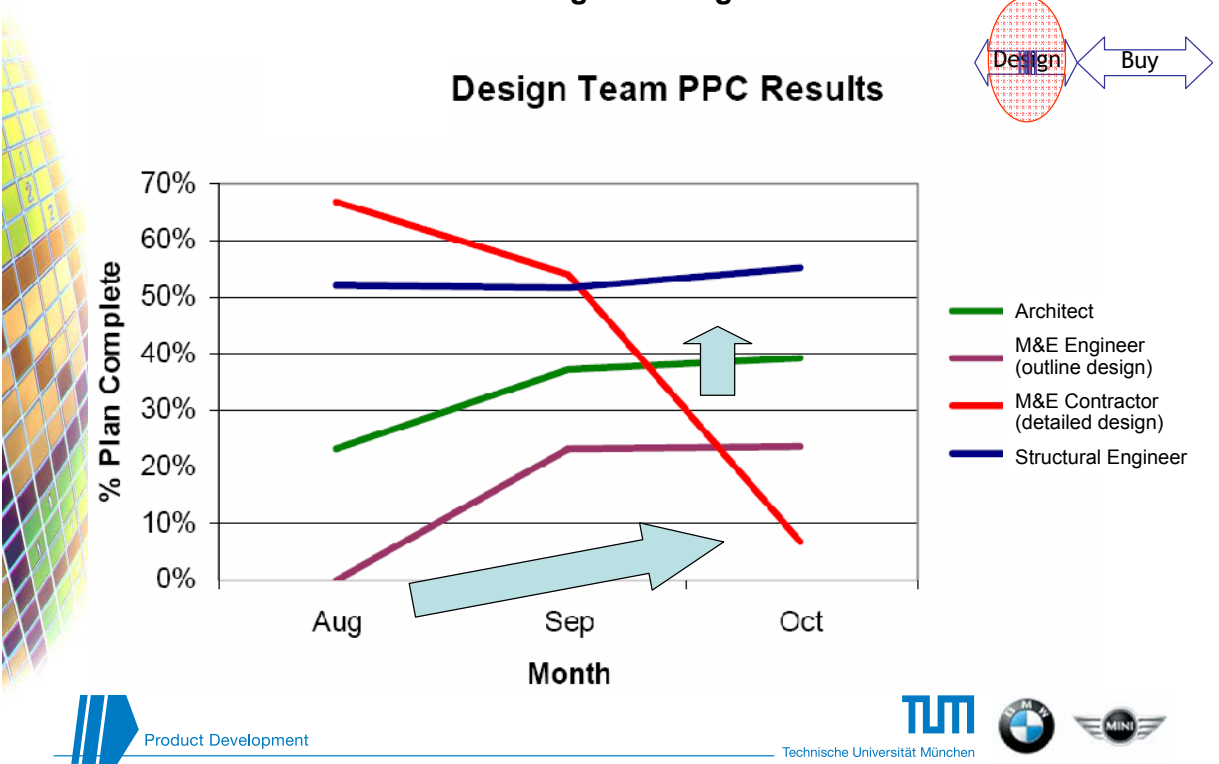


### Benefits during the Design Phase



### Benefits during the Design Phase

#### Design Team PPC Results





## Independent assessment of ADePT's impacts

- Independent review undertaken by Project Management Consultancy
- Senior representatives from two projects interviewed
- Represented two different AML customers
- Projects valued at £30M and £380M
- Findings and quotes confirmed by project representatives



## Benefits Identified

- Identification and removal of “turbulence”
- Greater certainty of design co-ordination
- Ability to better prioritise design work
- Focus on task completion
- Effective integration of sub-contractor design
- Better change management
- Improved team collaboration
- Self-policing design team
- Design fee validation



## Specific Impacts

- 32 week saving on achieving co-ordinated design in just one complex area of the project
- £75K saving where design fees linked to achievement of design outputs
- At least 5 man-weeks saved in avoiding the knock-on effect of a change



## Quotes

- “ADePT gives more certainty of success as you have a defined process.” Project Director
- “It helps get designers to achieve a better understanding of interdependencies.” Project Director
- “The fact that we were achieving outputs meant that process was working well – [management of] interdependencies and information flow was working well.” Project Director
- “ADePT helped us capture and manage the impacts of changes.” Senior Design Manager
- “The project went well because the use of look-ahead reports encouraged the design team to discuss blockages in the immediate future, to think ahead and make sure they had all the information to be able to complete the next design package in a timely and efficient manner.” Project Director
- “The ADePT schedules got us there: we met and bettered every deadline, the job finished early.” Senior Design Manager
- “As far as design planning goes, ADePT is by far the most effective tool I've come across.” Project Director
- “Would I feel comfortable without ADePT on my next project? No.” Project Director



### Repeat Deployment of ADePT



1	AMEC
2	Balfour Beatty
3	Laing O'Rourke
4	Skanska (UK)
5	Alfred McAlpine
6	Taylor Woodrow
7	Bovis Lend Lease
8	Multiplex (UK)
9	Sir Robert McAlpine
10	Galliford Try
11	Costain
12	Al-Futtaim Carillion
13	Carillion
14	Interserve
15	Nuttall

ADePT deployed

Deployed more than once

Source - Contractors File  
- New Civil Engineering Magazine 2006

