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ENGINEERING PROJECT PLANNING AND CONTROL SOFTWARE TO ENABLE THE 'ADEPT' TECHNIQUE

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Keywords: DSM, Planning, Control, Management, ADePT Design Builder, ADePT Design Manager

1 INTRODUCTION

The Analytical Design Planning Technique (ADePT) is a planning and control methodology which incorporates DSM as a key component. The development and application of this methodology has been presented at all but one of the past DSM conferences [see for example 1, 2, 3, 4]. It has now been applied to around 75 real projects, mostly construction projects, by some of the UK and Europe's largest construction companies and is now being adopted in the US. Commercial software tools have now been released to allow ADePT to be implemented without the need for consultants to be appointed, and this paper describes those tools.

2 THE ANALYTICAL DESIGN PLANNING TECHNIQUE

Many programme over-runs and cost over-spends in the construction industry are the result of contractors working with poorly co-ordinated design information. The 'ADePT' technique and associated software suite are used to develop Integrated Design Programmes (IDPs) which ensure that designers are able to work together to generate a fully co-ordinated design – note that without an IDP this can be very difficult to achieve and co-ordination is often still being sought during the construction itself.

ADePT is a highly structured approach to planning, and subsequently managing, the design activities within a project. The approach is aimed at development of a design programme which is fully integrated across the design disciplines and sub-contractors and based on the critical flows of information between members of the design team. Subsequent management of information flows is regarded as a much better way of controlling the design process than simply monitoring production of deliverables or rate of fee spend. There are three stages to planning with ADePT, and a further management stage (Figure 1).

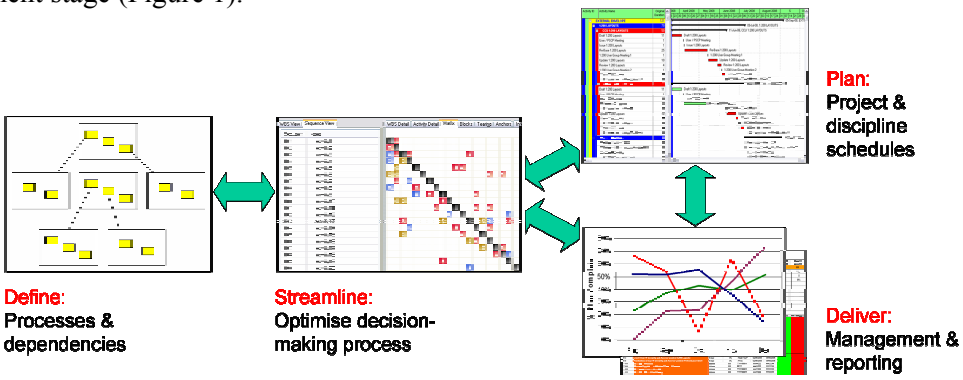

Figure 1. ADePT

ADePT identifies a sequence of activities which minimises the iteration in the design process and ensures any assumptions which the team need to make are ones which can be made with confidence. This is achieved by weighting the dependencies between activities. The calculation of a sequence prioritises the availability of outputs associated with the most critical dependencies. Any interdependent, iterative groups of activities which remain in the process following sequencing are often multi-disciplinary. They represent places in the design process where design team members should work concurrently to solve the interdependent problem. Usually they also represent elements of the construction, and therefore of the design output, which require co-ordination.

Having produced a target design schedule, the design process needs to be controlled. ADePT incorporates an approach to process control which pre-empts deviation from the target schedule by analysing constraints, which then allows the schedule to be kept up-to-date and used in meaningful way.

3 THE 'ADEPT DESIGN' SOFTWARE SUITE

The demand for ADePT on projects now outweighs the capacity of Adept Management Ltd to support all projects. Therefore software tools have been developed to enable project teams to implement the approach themselves. Two products have been developed: ADePT Design Builder and ADePT Design Manager (Figure 2).

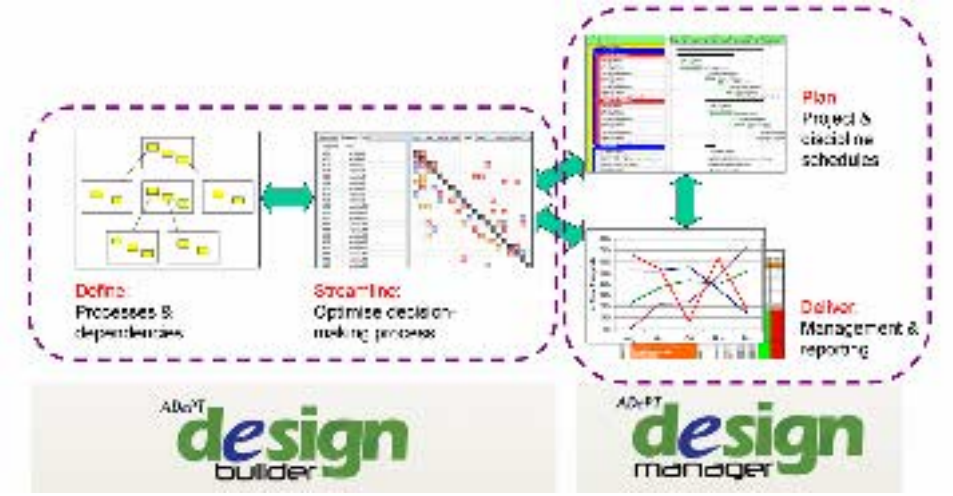

Figure 2. ADePT software tools related to the methodology

3.1 ADePT Design Builder

ADePT Design Builder (Figure 3) is the planning tool which is to define the scope of a project and to sequence design activities.

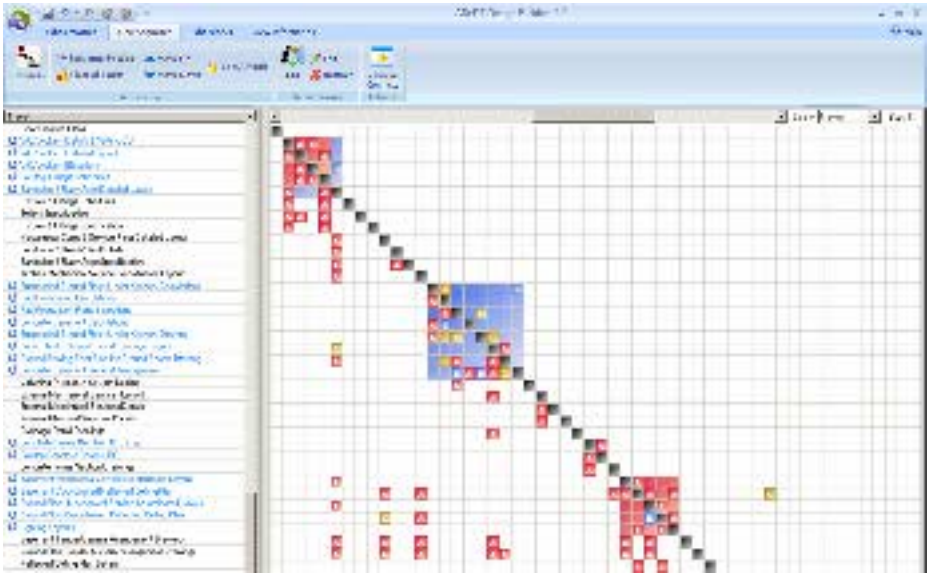

Figure 3. ADePT Design Builder

ADePT Design Builder enables users to:

- Establish a work breakdown structure (WBS) for the design;
- Identify a clear division of design responsibilities;
- Identify all information dependencies and classify them based on their criticality;
- Schedule all deliverables to be produced by the design team;
- Record key project stages, target dates and durations;

- Sequence a design process across all designers to exploit the availability of design information;
- Identify key risks and decisions required by the team and client / owner;
- Establish coordination requirements based on iteration in the design process;
- Integrate the design process with the project procurement strategy; and
- Publish a target design plan in Primavera or Asta Power Project.

ADePT Design Builder is supplied complete with a generic design scope template (activities and information dependencies) for a building design project. This allows planners and design project managers to define the scope of their project quickly and easily.

3.2 ADePT Design Manager

All too often deviation from the target design plan means that very quickly it stops representing the reality of the design process. It is then close to impossible to implement action to get the process back to the target plan and the deviation increases to the point where the plan is meaningless. Therefore, having produced a target design plan, the design process must be managed and controlled.

ADePT Design Manager enables design and project managers to maintain control of the design:

- Publish short-term look-ahead plans;
- Capture progress and the root-cause of any failures;
- Ensure activities and coordination are closed out by the team;
- Identify and manage constraints such as resource and information shortages;
- Report design team performance in an objective way;
- Identify trends in the project delivery;
- Publish clear management reports of progress, performance and trends;
- Assess the impacts of major design changes; and
- Import progress reports to maintain a meaningful plan.

4 CONCLUSIONS

ADePT Design Manager is supplied with easy-to-use constraint management and progress reporting data entry tools for use by all design team members. These include an on-line data entry tool.

In Summary, the ADePT methodology and software suite provides a means of planning, managing and controlling the delivery of a project on the basis of co-ordinated interdisciplinary working. There are many benefits to decision-makers from utilising this approach: the number of assumptions that cannot be made with confidence is minimised; risk and cost implications can be understood and subsequently managed; wasteful iteration can be eliminated; and focus can be given to taking interconnected decisions quickly and effectively. Ultimately, the approach offers a means of planning, controlling, and managing projects in an informed, coherent, and achievable manner.

REFERENCES

[1] Hammond, J., Mockler, S. & Steele, J. DSM: the starting point for effective workflow management in design. *6th International DSM Conference*, 2004, Cambridge, UK.

[2] Steele, J. & Waskett, P. Implementing DSM in a large fragmented engineering project team. *7th International DSM Conference*, October 2005, Seattle.

[3] Newton, A. Defining the Benefits of Deploying ADePT. *8th International DSM Conference*, October 2006, Seattle.

[4] Austin, S., Newton, A., Steele, J. & Waskett, P. Benefits derived from use of DSM as part of the ADePT approach to managing engineering projects. *9th International DSM Conference*, October 2007, Munich.

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10TH INTERNATIONAL DSM CONFERENCE

Engineering project planning and control software to enable the 'ADePT' technique

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Technische Universität München

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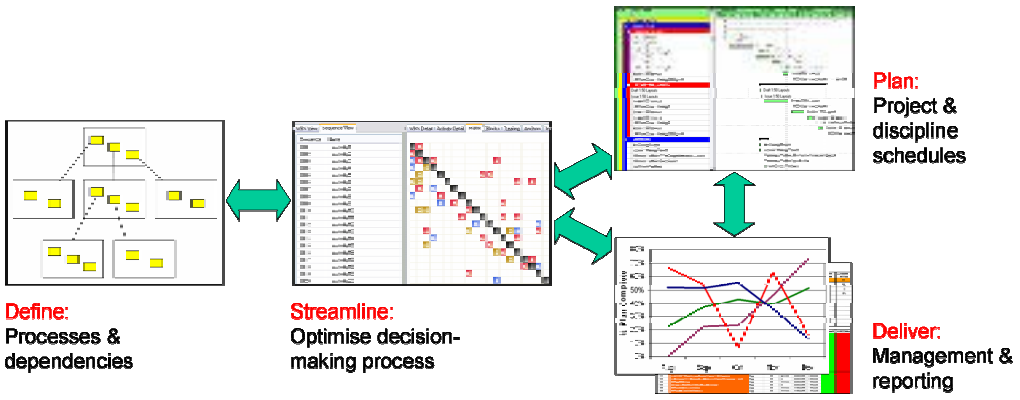
Presentation Structure

- What is 'ADePT'
- Process planning with ADePT Design Builder
- Process control with ADePT Design Manager
- Benefits of ADePT

Technische Universität München

Overview of the ADePT methodology



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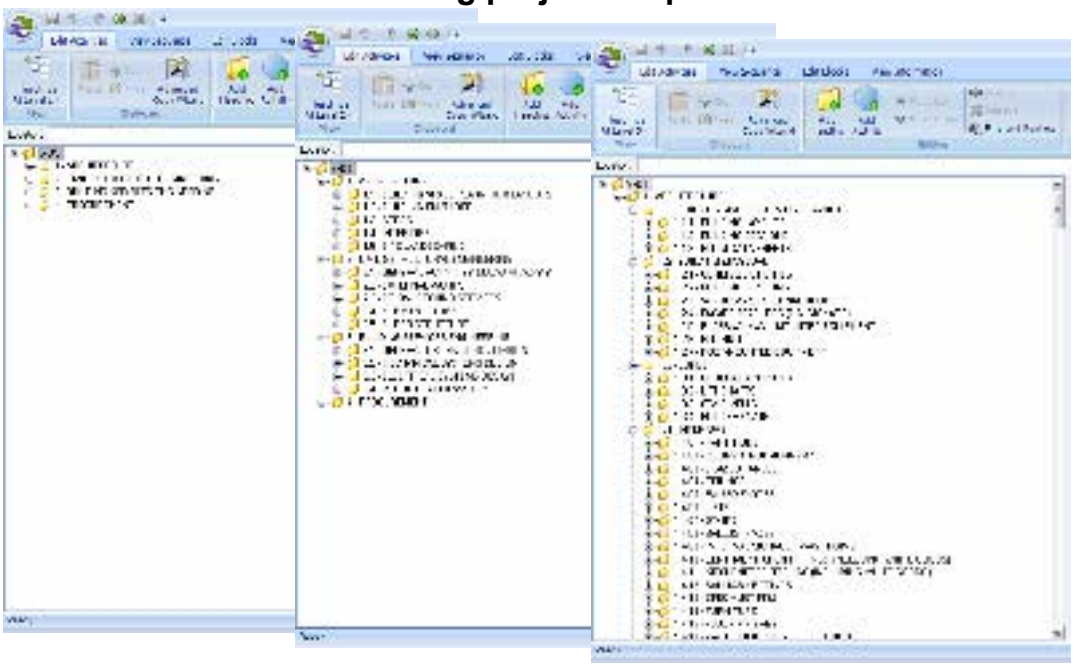
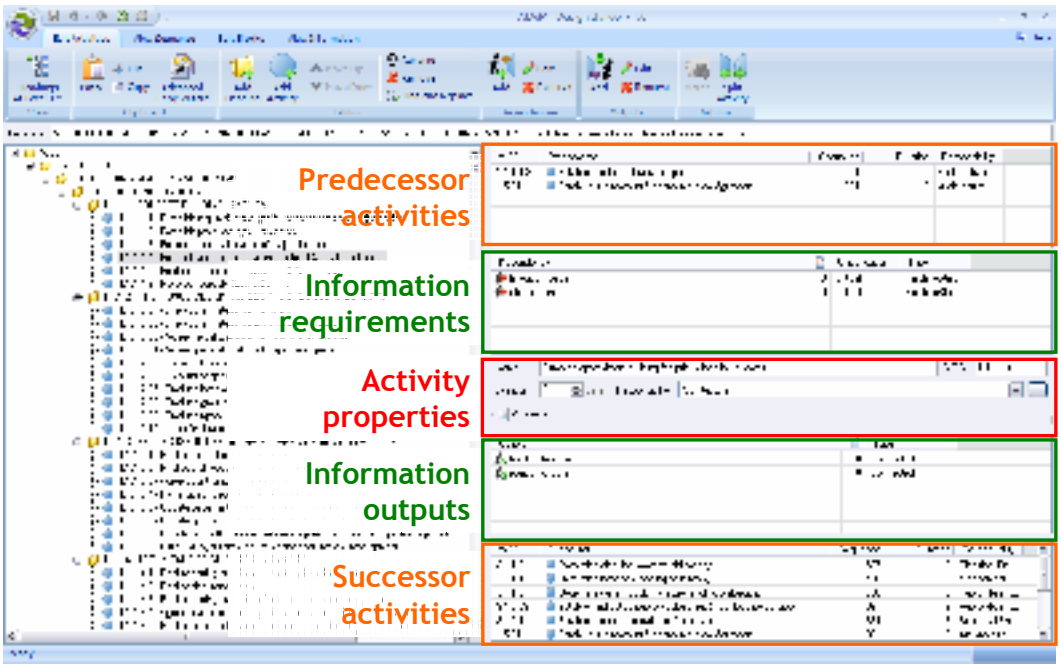
Defining project scope



Information dependencies



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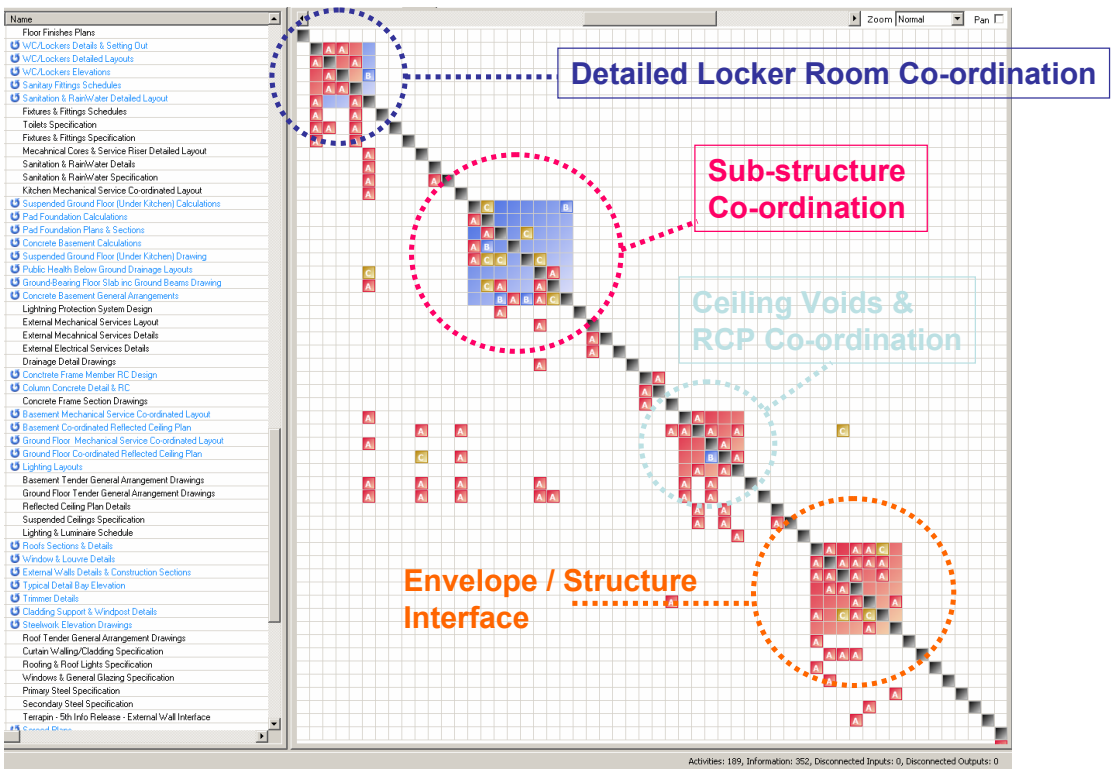
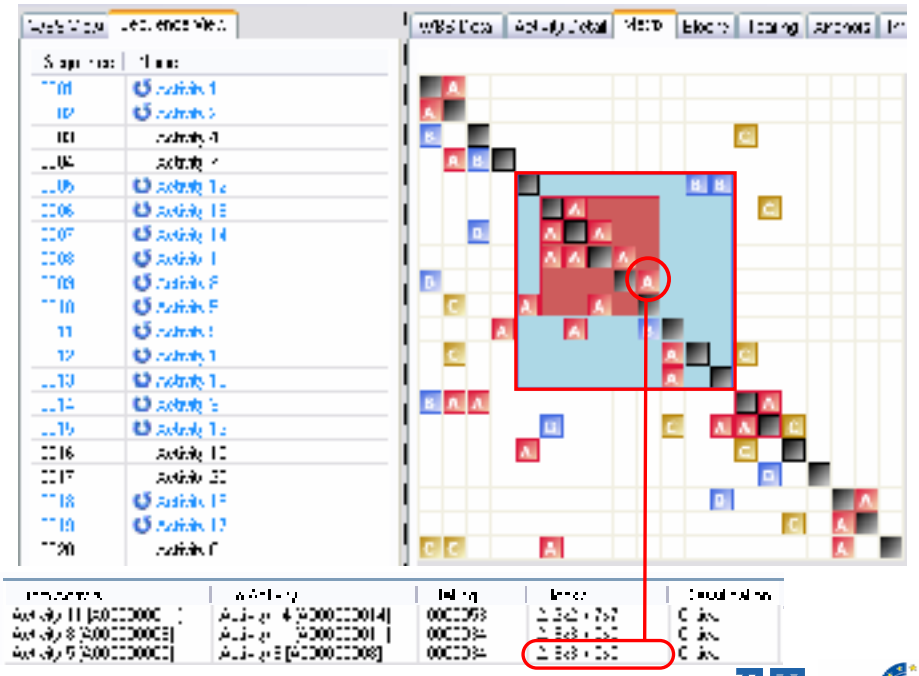
DSM view of process



Tearing dependencies



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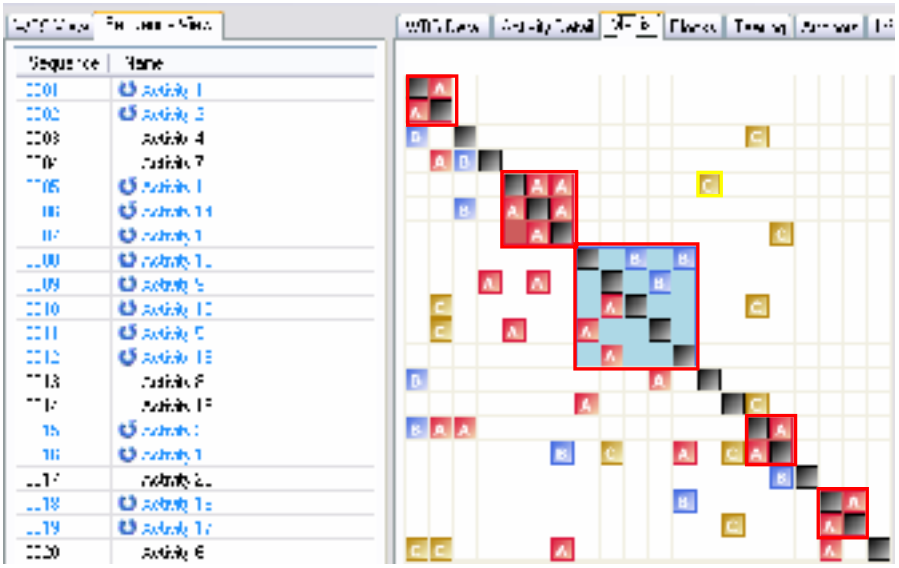
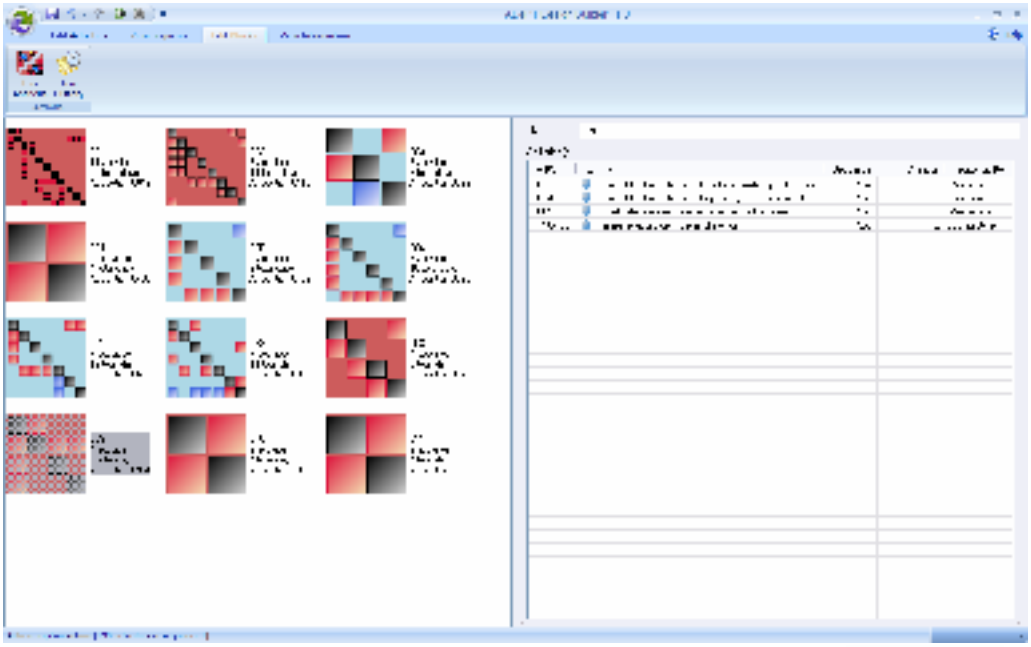
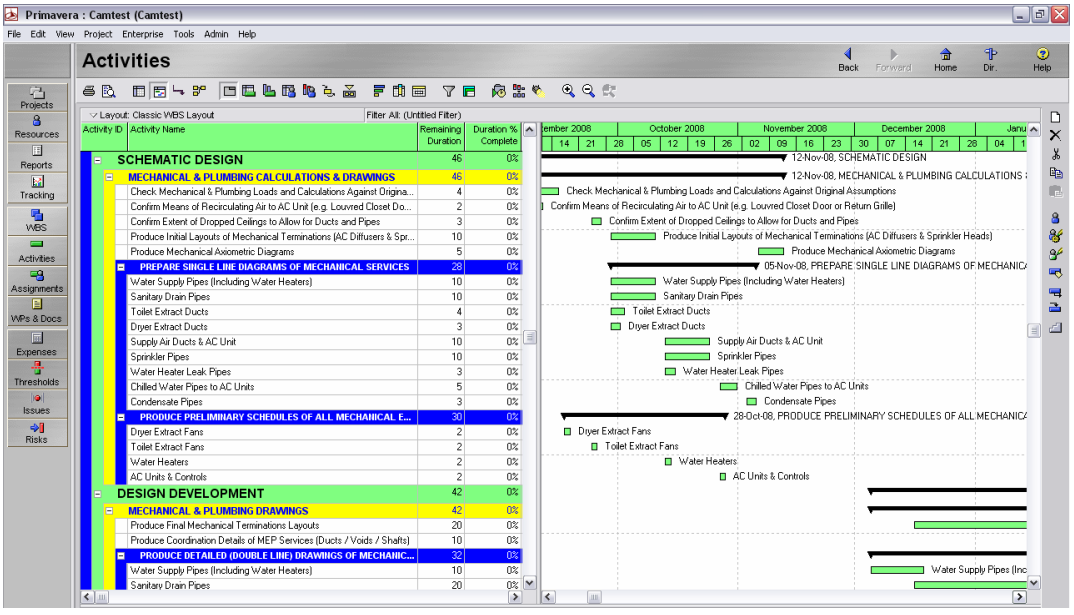
Torn matrix



A view of all iterative blocks in the matrix



Corresponding design programme



ADePT design builder

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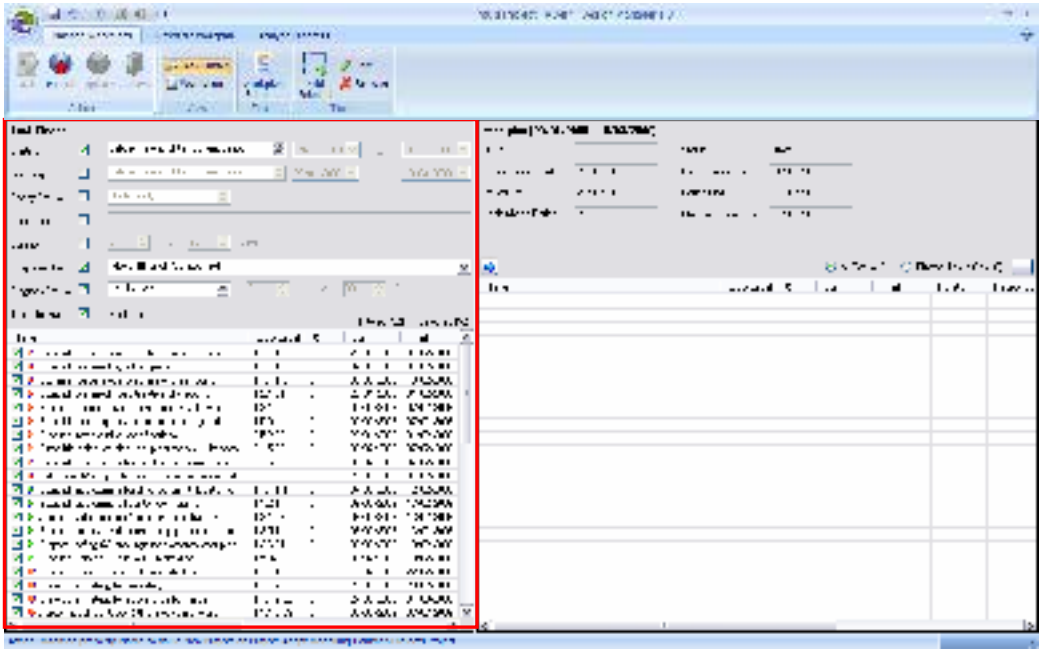
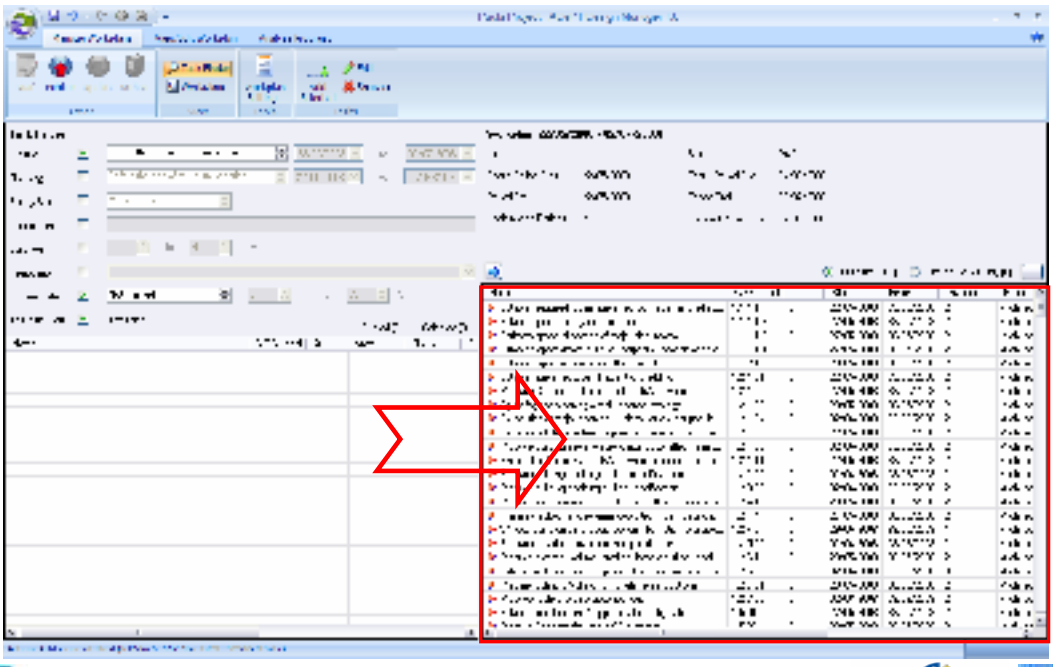
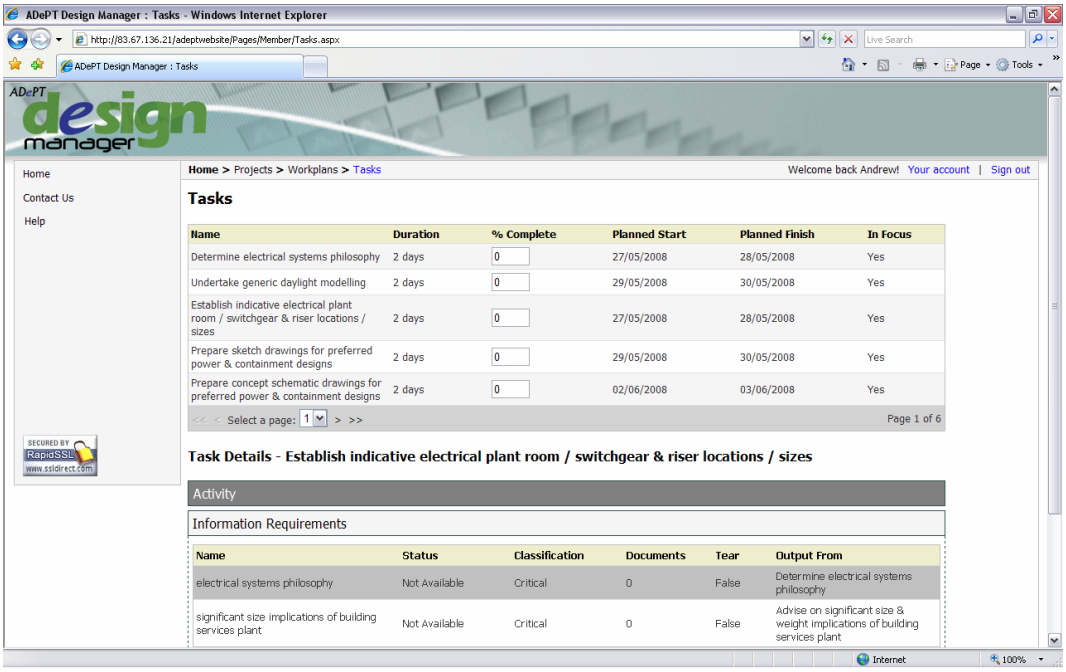
Select tasks to add to the work plan for this period



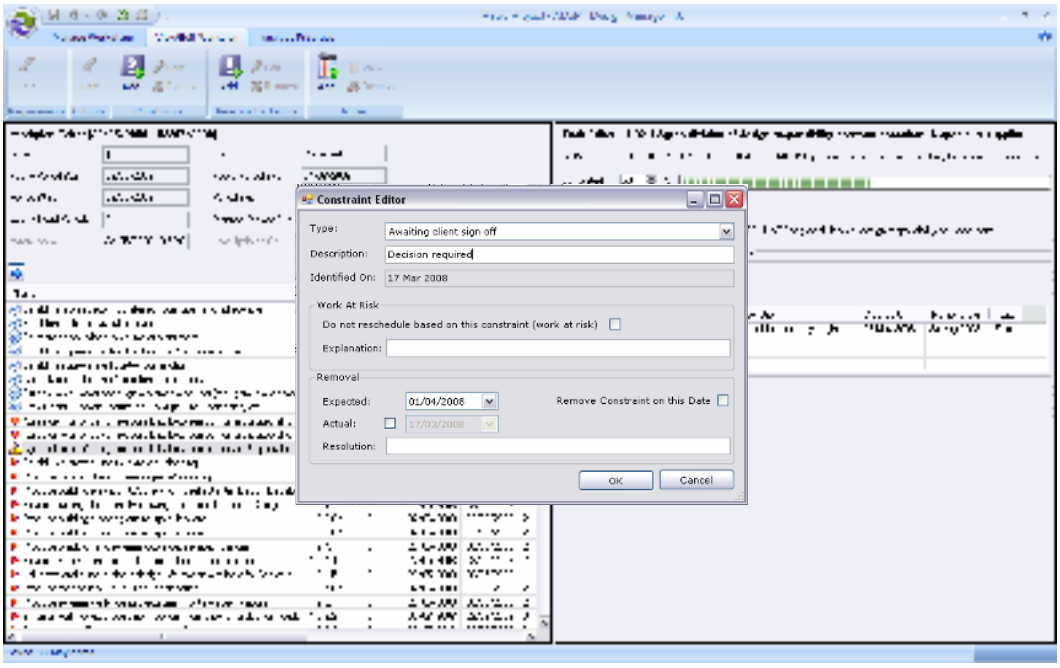
Add tasks to the work plan to create a 'draft' plan



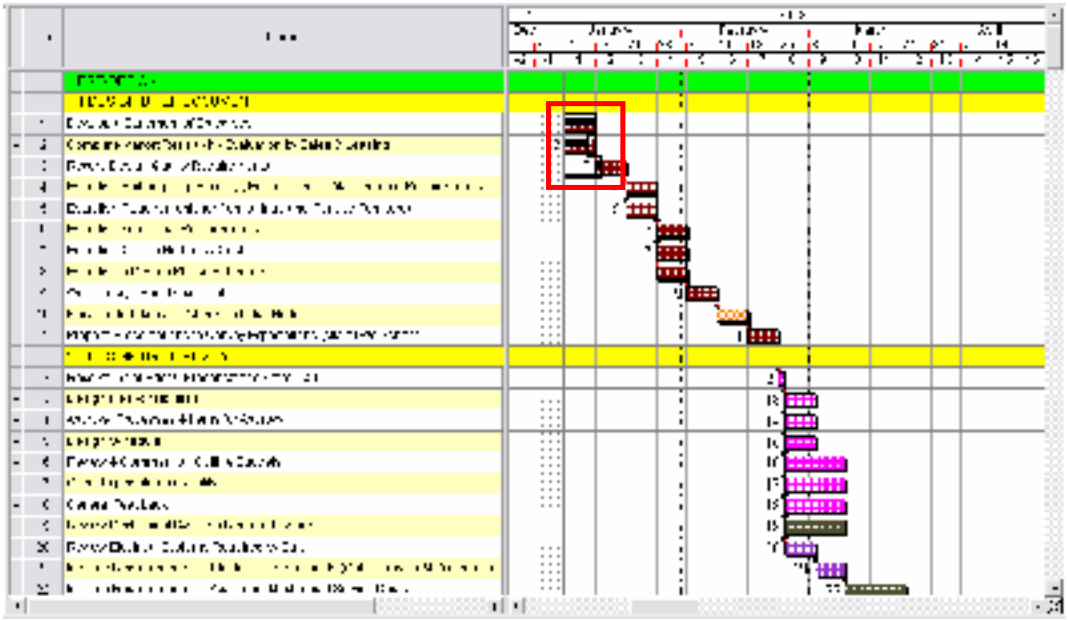
Publish the work plan on-line to the design team



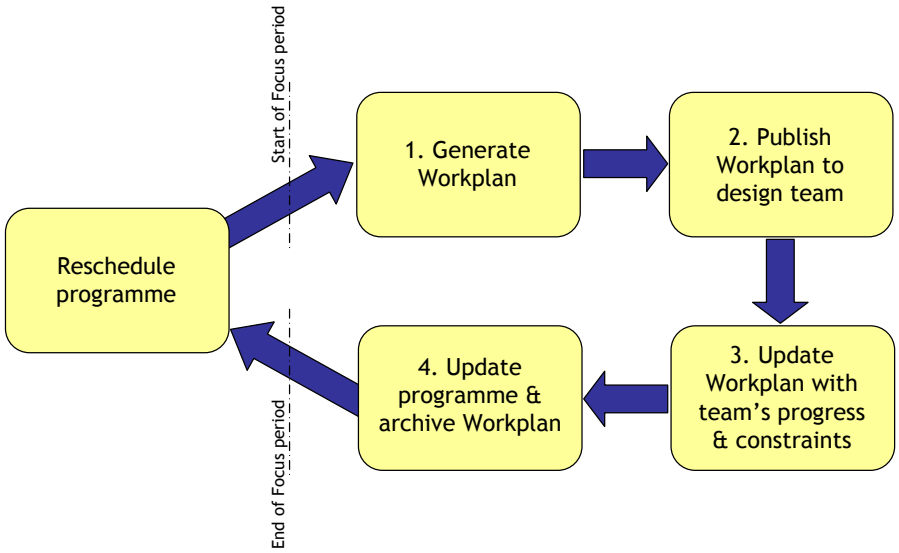
Manage any constraints identified by the team



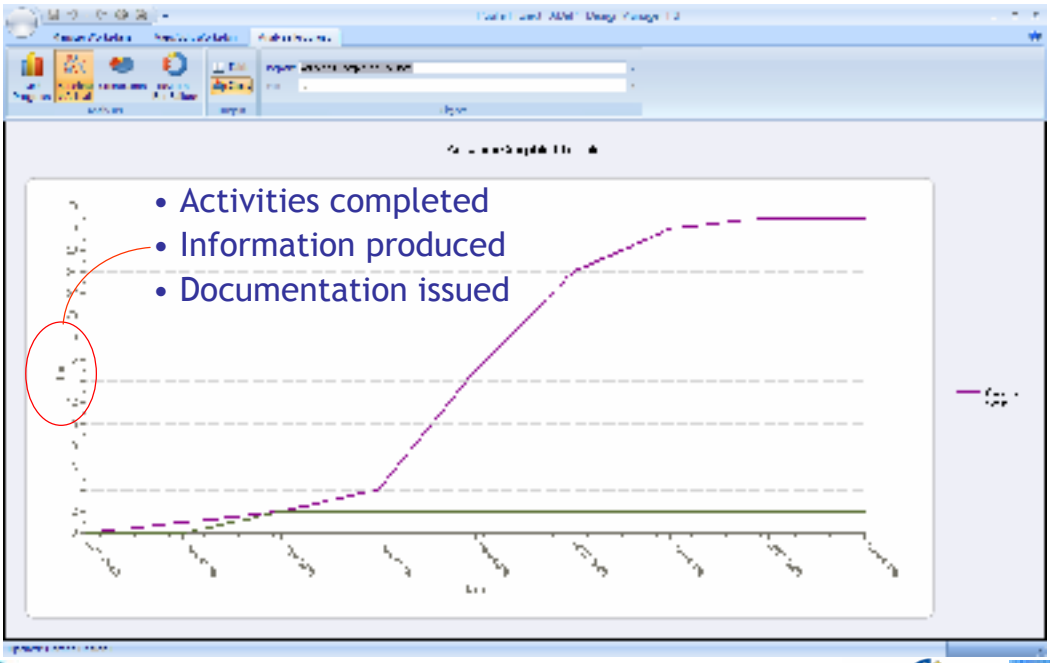
Write progress back to the design programme so that it can be rescheduled



Workflow process in practice



Report overall progress: activities, information or documents



ADePT design manager

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ADePT - 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