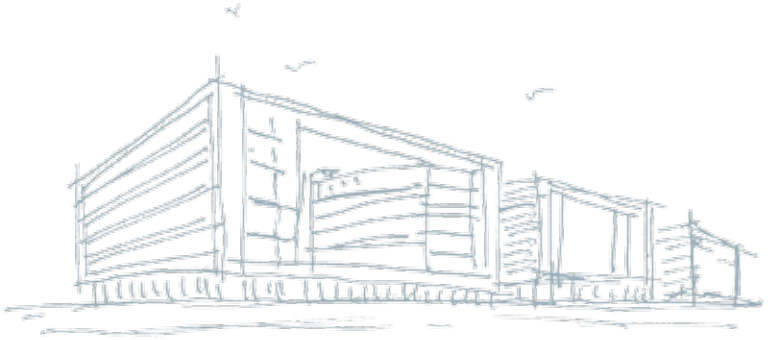
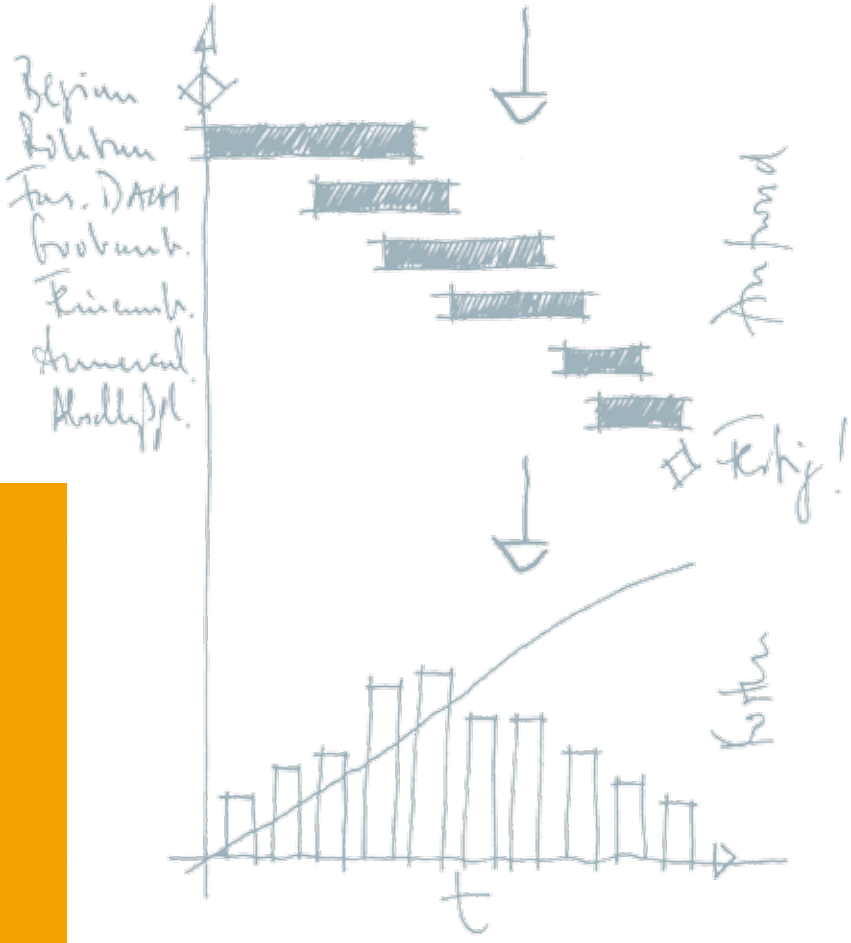
Planworks 5D

Building Information Modeling-Software
for integrated Construction Management





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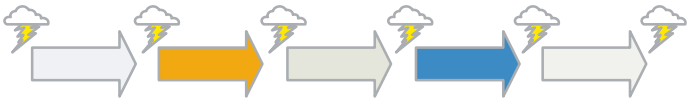
Fully Integrated:

- **3D-CAD**
- **Cost Management**
- **Schedule Management**
- **Information Management**

Construction Management is inconceivable today without computers. But in comparison to the pre-computer era, there has been little change in work procedures. Software programmes are used in all phases of project delivery, but these are classic examples of isolated solutions: although all areas have to work as closely as possible together in any project, the CAD, cost and scheduling applications used today do not do this.

The computer has made our work easier but it has not changed it.

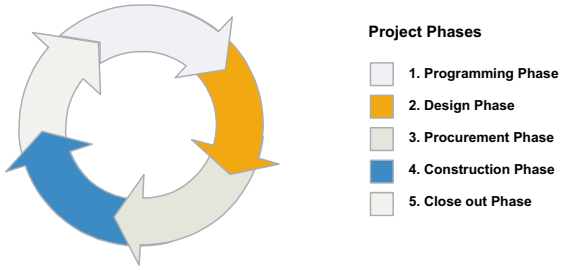
Today: Uneconomic Planning and Management



Conventional Project Delivery

Much time is spent preparing all the data and information required in Construction Management in such a way that precise cost reports and construction and work schedules may be produced. Usually, it is necessary to input the same data a number of times with the corresponding demand on time and man hours and an increased risk of error.

Tomorrow: Integrated Construction Management Software with Major Economic Benefits



Project Delivery with Planworks^{5D}

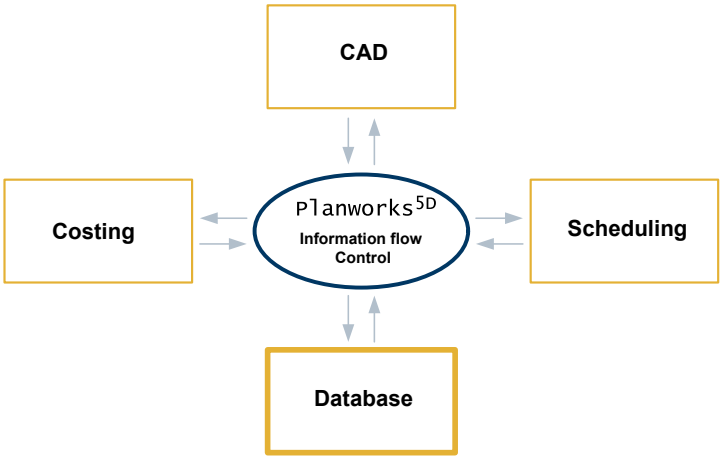
Whoever succeeds first in seamlessly integrating all the tasks involved in and data required for Construction Management into one system will benefit from an enormous potential for rationalization. In other words: Fewer employees will be able to deal with more planning, management, and controlling tasks in less time than before.

Planworks^{5D}: a research project at an advanced stage of realization

Planworks5D is a knowledge-based 3D-CAD driven programme for cost and scheduling planning. It was developed at the Institute of Construction Management at the University of Stuttgart. Planworks5D will make it possible to automatically link up cost and schedule management throughout all the phases of a building project using technology to provide an integrated, thorough and efficient software solution. Planworks5D will become the standard tool of integrated planning. Right from the initial idea to the operation of the building.

The knowledge-based approach of Planworks5D will drastically reduce design and project times with a resulting improvement in quality.

All in all, the programme provides the advantages of an automated takeoff of quantities with detailed costings and automatically generated cost-loaded construction schedules for cash flow analysis directly from the CAD at the press of a button (5D: The integration of 3D geometry, costs and time).



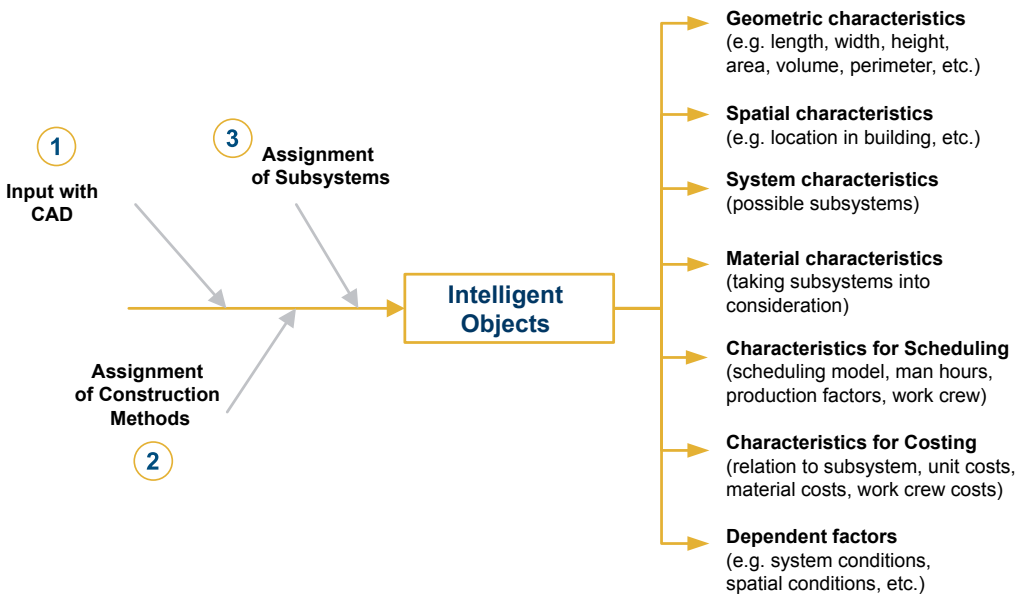
Planworks5D is innovative in that the programme can comprehensively read quantities from a CAD programme and connect them with detailed cost indices and scheduling models in a database. At the press of a button the planner is provided with detailed cost reports and project schedules directly from a CAD. The time-consuming manual calculation and coordination of costs and schedules becomes unnecessary.

The knowledge is present; it simply needs to be efficiently organized.

Intelligent Objects: Geometric data is assigned detailed information.

What is new here is that the planner has direct access to a wide range of information about a component (geometry, cost, man hours, spatial dependencies, buildability) on his computer screen. Geometric bodies in a CAD programme become intelligent objects with directly linked characteristics through the assignation of construction methods (What am I? How am I constructed?)

With this detailed information about each individual component, the planner, on the basis of already existing costing and scheduling models, is in a position to make detailed statements about how costs and schedules develop – factors which are crucial for the success of a building project. Changes and additions can be entered without difficulty and serve to update and increase the precision of the results.



Planworks5D is devised in such a way that, in contrast to traditional practice, the development, planning, management, and documentation of building projects are understood and displayed as a continuous work flow. Planworks5D takes an integrated, not a disparate, approach. This means that all data and information that has been input is linked and dynamically related to each other and is automatically accessible during all the relevant phases of the project.

Planworks*5D* successfully integrates all areas of Construction Management.

The Planworks*5D* - Database: Time and Cost Savings through Integration and Automatization

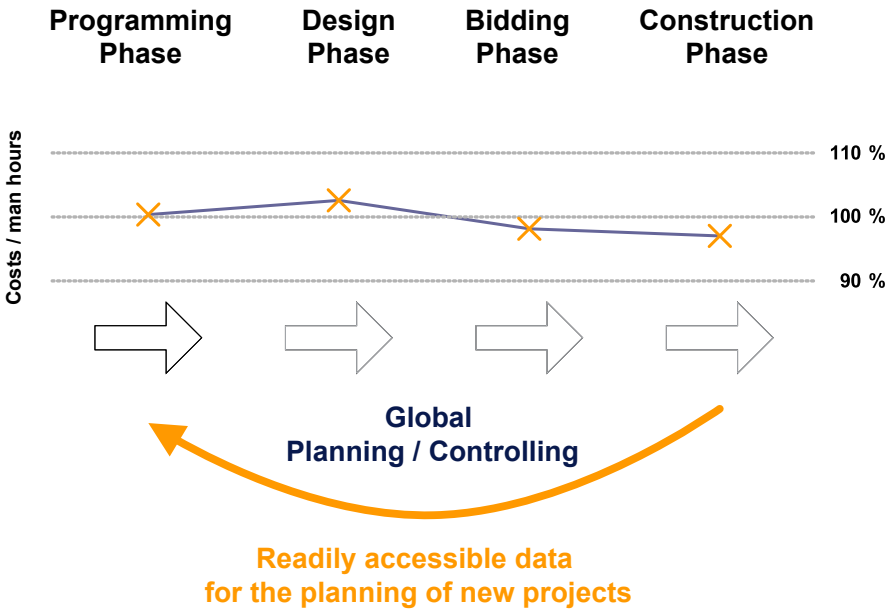
The greatest advantage of Planworks5D is the huge time saving; Planworks5D automatically reads the dimensions of the building in all their complexity from a CAD programme and links them to integrated cost and schedule indices.

Once the data has been read, it is stored in a central database, ready for further use (e.g. cost & schedule reporting, alternative studies, project comparisons etc.).

Continuous Support: with its reference to construction phases it has a dynamic learning ability and provides the basis for Information Management

A further innovative approach of Planworks5D is its construction phase relevance: The system accompanies the building process and, at the same time, "learns" for the planning and controlling of new projects. The huge amount of current information is compared with data already present in the database – an effective controlling instrument.

At the same time, the Planworks5D database provides the basis for company-internal information management: the more often projects are realized with Planworks5D the greater the amount of accessible and directly relevant information for the company (automated database actualization).



The automated linking of all the relevant data enables more exact cost reports and schedules to be drawn up in a shorter time. More time remains for the more important management tasks.

It is time to revolutionize our working practices.

The integrated structure results in the following advantages for the user:

- Time and cost savings through automated quantity takeoff and integrated costing and scheduling
- Continuous flow of information from CAD, cost and schedule planning
- Transparent relationship between quality of implementation and construction costs and schedules (alternative studies) and thus minimization of planning errors
- Effective control and evaluation e.g. through the automated generation of resource outflow (cost, time, material and labor allocation reports)
- Planning and task oriented as a prerequisite for work across all phases of the project
- Continuous real time control of the construction work through a link with a Tablet PC solution for on-site controlling tasks
- Simple and cost-saving application through the use of standard programmes (MS Excel, MS Project, Adobe PDF)

Cooperation and Added Value

Planworks5D is a project sponsored by the Federal Ministry of Education and Research and is at an advanced stage of development. It was developed by Dipl.-Ing. Jochen Reichert at the Institute of Construction Management at the University of Stuttgart. The programme is functional so that a convincing and detailed display of the principles behind it is possible.

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Planworks*5D* will become the standard tool of integrated planning for Construction Project Management.

Efficient, cost-conscious construction management is only possible on the basis of valid data. Planworks5D is a CAD-based programme for integrated cost and scheduling planning that provides the project manager with the required information at the required level of detail at any time.

What is convincing in theory calls for confirmation in practice.

Planworks 5D offers key advantages that will lead to a lasting improvement in the efficiency of work practices:

- The basis of the data used in the reports is an intelligent, digital 3D building model
- Cost planning and controlling directly from CAD (DIN 276, task and project phase oriented)
- Schedule planning and controlling directly from CAD (Project phase oriented)

- Automated cash flow and liquidity–analysis
- Target-performance comparison
- Calculation of overall return on investment (manually or automated on the basis of CAD data)

- Data-based construction schedule simulation at the press of a button
- Automated generation of factors and rates for the validation of results
- Predefined Project Programmes, Specifications and Documentation of Standards

- Integrated spatial layout models for automated evaluations (DIN 277, II BV, GIF)
- Economic efficiency check of spatial layout and design at the press of a button
- Evaluations for strategic facility management tasks at the press of a button

- Predefined project reports for project documentation, knowledge management, Intranet
- Interface with Microsoft Office (Excel & Word) and Microsoft Project
- Automated PDF conversion of all database reports

Planworks 5D adapts itself to the work flow in the company and not vice versa.

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