LEEGOO BUILDER
Applications

Real-world examples and system overview
of the LEEGOO BUILDER proposal system
in the mechanical and plant engineering industry

Diethard Struck   1st Edition

EAS
sales configuration solutions

LEEGOO BUILDER

Proposal preparation
Plant project engineering
Product configuration

Variant configurator

Customer requirements

Product knowledge

Customer view

Product building block sets

Product standards

Calculation system

Modularisation

Proposal calculation

Project calculation

Profit calculation

Document generation
Sales information

Analyses Reports
CRM integration

ERP integration

Order data transfer

SAP® interface

Support for task types

assemble to order (ATO)

engineering to order (ETO)

make to order (MTO)

pick to order (PTO)

Content

» And now we even standardise our special machines… «

A visionary from mechanical and plant engineering

LEEGO

» If at first, the idea is not absurd, then there is no hope for it «

Albert Einstein

Preface

This book attempts to provide an insight, comprehensible from the user and company perspective, into today's possibilities to improve the proposal process. The focus is therefore on concrete case examples of proposal solutions employed by companies in the investment goods industry. The book is to be understood as an account of practical experiences.

These experiences are based on the work and projects related to the conception, development, extension and introduction of proposal preparation solutions on the basis of the LEEGOO BUILDER proposal system.

The applications documented in this book refer to proposal solutions that I, together with the EAS team, conceived, designed and implemented in cooperation with the relevant customers from 2000 to 2008.

EAS has been working on the development and introduction of the LEEGOO BUILDER proposal system as a standard software product from its inception in 1998.

I hope that interested readers will find case studies in this book with which they can identify with regard to their own problems and challenges. This is particularly important to me because the many expert discussions over the last ten years showed, time and time again, that people interested in the topic often have little or no information on existing possibilities for improving the proposal process.

The many, and in parts very differently designed, proposal preparation applications that nonetheless are all based on LEEGOO BUILDER as standard software demonstrate the large bandwidth of requirements and working methods occurring and to be suitably solved in the areas of mechanical, special machine and plant engineering. The case studies are focussed on, but not limited to, the areas of mechanical and plant engineering.

The book is structured in such a way that each page can be read, or quickly scanned, individually. It primarily describes WHAT was built and applied in each application but not HOW the solution was implemented in a functional sense. This would have gone beyond the scope of this book. If required, details can be requested from EAS and I warmly invite you to do so. We are also happy to take on board information concerning errors and criticisms in order to further develop this representation.

When writing a book, probably everybody will realise that thanks are due to many people, because system development, customer projects and the creation of this book, too, are always a team effort.

Ten years ago, everything reported here was just an idea and a vision. A special thank you is therefore extended to the first pilot customers for their trust, their patience and their many constructive ideas. The comprehensive requirements, too, helped us and the LEEGOO BUILDER product to progress.

Gebr. Schmid GmbH + Co. in Freudenstadt, Germany, is the first LEEGOO BUILDER customer. Here, I would like to thank Mr Christian Schmid and Mr Lang for their cooperation.
At Bühler AG, I would like to thank Mr Straub and Mr Hofer for the opportunity to contribute to such a comprehensive proposal preparation solution.
At Polysius AG, I would like to express my thanks to Mr Haverkamp and Mr Empting.
At Schindler Elevator Ltd., I would like to thank Mr Greter, Mr Schmid and Mr Schaub – also for some evenings spent together in the beautiful Luzern.

I would also like to extend my great gratitude to all the customers and project partners that are not mentioned here.

The members of the EAS team always have been, and still are, standing full square behind the development of our product. I owe them my gratitude and high regard. We all had, and still have, much to learn – a painful process at times – to create and enhance a universally deployable solution for the diverse range of practical requirements.

Many thanks also to all those that contributed to the creation of this book.

I would like to mention my parents with gratitude. I have to thank my wife and EAS co-partner, Martina Struck, for having been able to work on the realisation of the idea of LEEGOO BUILDER for many years with such a high intensity. She has never doubted this idea. Our children, Pascal and Marcel, too, often had to get by without me and the question, "When will you be back again?" was asked many a time.

A heartfelt thank you to all of you.

Diethard Struck

1. Introduction

Proposal solutions for the investment goods industry

The following observations are intended to provide an introductory representation of the proposal solutions resulting from my experience in mechanical and plant engineering as well as a number of additional areas to date.

The following criteria illustrating the diverse nature of proposal solutions within the investment goods industry do not constitute a claim to completeness. They are typified by different working methods, e.g., the use of product configurators or the selection from price lists or a mix of both, as well as the customisation of the proposal system. Experience and sample solutions provide the best foundation for the efficient and optimised alignment of this solution design approach.

The delineation of application types in the next chapter provides a more detailed grouping of the application-technology scenarios.

» Proposal system

I would describe a proposal system as a computer program that holistically and consistently supports all the tasks that are typically required for the preparation of proposals. This book exclusively refers to the LEEGOO BUILDER proposal system which is tailored to the requirements of the investment goods industry. When LEEGOO BUILDER is applied to the proposal preparation, the products concerned often are "engineered products" as exemplified by the applications below.

However, there are also application examples from other areas such as building equipment providers (emergency lighting systems) or utility companies such as municipal departments of work offering their customers, for example, a connection to the power grid, including transformer and earth works.

A proposal system can be used with or without product configurators. Consequently, the proposal system is far more than just a "configurator" because it must support all relevant activities that are part of the proposal preparation, including, for example, the proposal calculation, the generation of results documents and much more. The proposal calculation can dominate the proposal process to varying degrees – from the simple summation of list prices for machine tools based on a building block set right through to the complex calculation of a turnkey project as well as any thinkable mix thereof.

» Project engineering and calculation system

Under certain conditions, a proposal system is also referred to as a project engineering or calculation system. Particularly in plant and large-scale plant engineering, where proposals are processed as part of customer projects, the users refer to themselves as project or calculation engineers. What is being built and calculated are bills of quantity. The bill of quantity defines the technical solution of a potentially large scope of supply and services.

It is the input to the pre-calculation which, mostly in many columns based on a variety of different types of costs and hours, leads from the bill of quantity to the proposal calculation. Weights often play an important part. Generated spreadsheets represent the calculation in a commercially printable format right through to the contribution margin.

The applications in this environment range from machines with a plant character such as industrial mills to turnkey projects such as cement plants, power plants and many more. In cases where all or nearly all calculation master data such as costs, hours, weights, etc. are freely entered for the proposal items, the proposal system has the character of a calculation system. In these situations, the building block concept does not lend itself as a basis for proposal processing. In most of these cases, product configurators and product logics are not feasible. Here, I would like to draw the reader's attention to the application of Hitachi Power Europe GmbH where the proposal process is designed in such a way.

» Product configurators

A proposal system can, but need not, comprise "product configurators" to assemble customer-specific product variants based on the product logics defined in them. Large-scale plant engineering, too, allows the comprehensive use of configurators as the applications of Bühler AG, Schindler Elevator Ltd., Polysius AG, GROB-WERKE GmbH & Co. KG and others prove. For the applications described in this book, many examples of configurators are represented pictorially to illustrate the wide field of applications. Often, more is achievable than the experts in their various fields think possible at the outset.

When the proposal preparation process is to be largely configurator-based, some users prefer to have all manual-interactive functions necessary for defining special features hidden. In this case, the user is working in a strictly logics-based fashion. Example: Bruker AXS GmbH, configuration of diffractometers.

This type of task is called ATO (assemble to order), i.e., the target are assembly variants.

» Catalogues and price lists

In the case of the proposal process involving special customer requirements, special solutions, alterations and overhauls as well as in the case of new developments, etc., it is understandable that the proposal items cannot be derived from the product configurator logic. This logic either does not exist at all or does not exist yet. The proposal system must therefore allow the manual-interactive creation of proposal items and their subsequent textual and calculative modification. In this scenario, building blocks, e.g., sales assemblies, can be selected and included manually from the catalogues and/or price lists stored in the proposal system.

» Sample solutions and reuse

The search for similar solutions, combined with copying from and editing existing Excel sheets, is an initial condition that EAS encounters in many companies. This principle of similarity can also constitute an important working method for a proposal system. The comprehensive support of the similarity principle is a must for using the system with an emphasis on project engineering.

» Free proposal items

In addition to predetermined "building blocks", so-called "free items" can be created for a proposal when a predetermined building block does not exist. Conceptually, this will always be the case for the conventional working method without a dedicated proposal system when a row in an Excel spreadsheet is executed, i.e., when working without reference to project- and proposal-neutral sales and calculation master data – the so-called "LEEGOO building blocks". With few exceptions in the investment goods industry, free items are required in almost all applications for the definition of special features.

» Proposal process

The proposal system must provide consistent and efficient support for the entire proposal process via a central database. To this end, one or more working methods that both fulfil the practical requirements and are justifiable in terms of the maintenance effort need to be set up as part of the system implementation. This process is greatly aided by the use of sample solutions in the form of applications that are already implemented. The working methods are implemented by "customizing". This alignment in terms of the application technology is essential for the practical success and the effective use of the system. The application technology can differ depending on configurable products, different business areas and the implementation phase of a proposal system, e.g., little logic to begin with and gradually more and more product configurators with embedded logic.

EAS experience tells us that one should not aim for an "over-automation" in conjunction with the system implementation as otherwise there will be a danger of not being able to reach the ambitious goals fast enough.

Occasionally it is preferable to begin with application techniques that are easier to achieve, e.g., on the basis of price lists, possibly even starting from product structures and data that have previously been built up with considerable effort. The proposal solution can then gradually be supplemented with configurators.

» Types of use

A proposal system must be functional via the network and often also equally so in its mobile use on PCs and notebooks. A so-called remote operation is supported for the worldwide use of the system. In remote operation, the proposal system runs on a terminal server (see Citrix®).

» Central database and replication in mobile use

From an EAS perspective, the proposal system must be based on a central database. Mobile users work with a "local" database which they synchronise with the central database via replication mechanisms.

» Delineation from ERP systems

The proposal system represents a front-end solution for the sales force, project engineering, pre-calculation and, with analyses, also for controlling, i.e., a pre-stage of order processing with ERP systems.

» Variant configuration in ERP

The configuration of variants in a proposal system follows a user-, function- or process-oriented approach that results in the build-up of a proposal bill of material. In contrast, variant configurators in ERP systems are used to generate variant bills of material as part of order processing. This should not be confused with a proposal system in the aforementioned sense.

» Interface to the ERP system

There may be interfaces between the proposal and the ERP system, e.g., for adopting cost data from ERP in the proposal system or for adopting order data from the proposal in the ERP system. These interfaces can be very important for certain companies and irrelevant for others.

» Delineation from CRM systems

A proposal system is not a CRM system, it merely has points of contact with it. In the experience of EAS it has been shown that it is generally not sensible to introduce a proposal system at the same time as a CRM system because the sales department and other involved parties may over-extend themselves. The corresponding decision is driven by the benefits side. Experience shows that, in the area of "engineered products", a proposal system is given priority over a CRM system in terms of necessity.

» Interface to the CRM system

The proposal system can be fully integrated with a CRM system or just loosely linked. Fully integrated means that the proposal system is called from inside the leading CRM system for a customer and a project in order to perform the proposal processing there. In most cases, loosely linked only means that company address data and, if applicable, corresponding contact details are exported from CRM, mostly as a file, and cyclically imported into the proposal system.

» Consistence

The entire proposal process should be consistently supported and organised on a company-wide basis in a proposal system with a central database. This is organised data processing. It must be born in mind that data and logic maintenance by administrators must be performed simultaneously with the operative application. Especially in the case of world wide applications, this is of elementary importance because of time differences.

» Organised data maintenance

The set-up and maintenance of master data for the proposal process such as building blocks (sales assemblies) with proposal texts in the required languages, cost and price data, building block sets (maximum structures) as well as product configurators with their product logics should be a centralised process. This is to be understood in the sense of an organised product and variant management by product administrators employed for this purpose. This structured, systematic and holistic processing of the product data, and possibly the product logics, unites the views of the specialist departments involved, such as sales (what does the market want?; sales texts), calculation (costs, prices, calculation process) and technology (product structures, product logic) under the proposal system. Different plant sections in plant engineering are also brought together. Experience shows that this approach results in a higher degree of product modularisation and standardisation and a lesser degree of product complexity. Order simplifies matters. The result is an improved communication and understanding of the parties involved, e.g., from sales to customers and from sales to order processing and design office. In addition, the maintenance effort becomes measurable. The proposal system makes the administrative work on the product data and logics easier to plan and more transparent. In a company with several sites, e.g., in the case of a plant engineering business, data maintenance may need to be organised in two stages. The core team at headquarters has overall control. In addition, there may be administrators and key users in individual business areas and/or at individual sites. This may be due to, for example, varying degrees of product expertise (configurator setup) or local circumstances, e.g., regarding proposal representation.

» Proposal preparation should be more efficient and faster

Users should use the proposal system for the efficient preparation of proposals and calculations and NOT to perform master data maintenance. They should be suppored by the system to ensure that proposals are delivered fast, error-free and with great customer benefit in order to achieve the best possible order prospects. After all, the aim is to increase the company's turnover and EBIT.

» Delineation from Word/Excel

An initial condition often found prior to the introduction of a proposal system is the personalised use of Word and Excel in the sense of "private data processing". Employees frequently create and maintain their own data sheets. Who actually calculates with which figures und uses which texts is often not very clear. In most cases, two people will prepare rather different proposals for the same inquiry. The proposal creators spend too much time preparing their "tools and associated data". This time is lost for the actual proposal processing and tracking. Using the available time to clarify customer requirements seems to be a more promising prospect than formatting documents in Word.

» The proposal system as a tool

That is why the sharpened tool "proposal system" should be made available for the use of the well-trained proposal creators.

Objectives, requirements and benefits

The previous section highlighted important basic requirements, based on the experience of EAS and its customers, that a powerful proposal system must meet for its use in the investment goods industry.
The cooperation of EAS with its customers further resulted in the identification of the following typical objectives without a claim of completeness. Readers can compare these requirements with those relevant to their own organisation.

» Motivation
- Replacement of legacy systems, mostly developed in-house; replacement of Word/Excel methodology; replacement of mainframe solutions
- Performance improvement in sales, project engineering, calculation
- Increased turnover and EBIT

» Efficiency and quality
- Faster proposal preparation and preparation of more proposals with the same team
- Higher quality of proposals
- Clarifying and capturing customer requirements earlier and more accurately
- Reliable and error-free proposals
- Ensuring the feasibility of solutions
- More consistent proposal preparation in terms of methodology, technology, calculation and documentation
- Very fast and easy implementation of proposal changes

» Knowledge management, product complexity & variance
- Enabling experts to set-up their own product configurators without any programming skills
- An organised product and variant management appertaining to a planned product variance, adjusted to market requirements, reduces product complexity and avoids an unnecessary "internal" variance inside the company
- Worldwide provision of easily applicable product/technology knowledge in configurators for the sales force; preserve and secure for the company
- Introduction of new employees at new company sites, particularly in expanding companies; easier built-up and relocation of production facilities; improved on-site competence

- Introduction or expansion of a decentralised proposal generation to free experts at headquarters for important tasks

- Creation of simple budget proposals, e.g., for individual machines - possibly configurator-based in the sales office to free experts for other tasks

» System implementation
- Enabling the fast implementation using existing data; application without product logic possible

- A comprehensive spectrum of sample solutions for subtasks accelerates the implementation

» Sales master data maintenance
- Organisation of sales texts and translation process

» Configuration / tree structure
- Configurators for use on different levels of the product structure such as machine, plant section, complete plant

- Learning how to build configurators in a few days; the product specialists build configurators themselves and without any programming skills

- Enabling the comprehensive and simple representation of product logics

- Enabling the simple and fast generation of intuitive user interfaces for configurators

- Online tutorial through context-related, expert-level help

- Enabling flexible, free project engineering for special requirements and solutions

» Proposal calculation
- Transparent costs and prices

- Ensuring the availability/use of always current and currently valid calculation master data for all users

- Comprehensive support of cost and price calculation right through to profit and loss calculation

- Freely definable calculation sheet as printable output

- Providing a better calculation basis

» Turnkey projects, teamwork
- Support of large proposals with, e.g., 10,000 items or more

- Several users should be able to work on one proposal at the same time – possibly at different sites

» Change management
- Support through change management from release; WHO changed WHAT, WHEN, HOW?, e.g., proposal items, quantities, costs, hours, weights, prices, texts, configuration attributes and many more

- Management of responsibilities

- Documented change history to ensure requests of customers and internal processes can always be answered

- Proposal versions with revision numbers; WHAT has changed?

» Document generation
- High-performance document generator for the creation of any type of results documentation

- Ensuring that proposals do not contain any text gaps; detection of non-current texts in a proposal to support a targeted retranslation

- Proposal documents must be able to be generated in a uniform yet flexible and modular fashion

- Support of price definition for structured inquiries (tenders, invitations to tender)

» Consistence
- The proposal process must follow a consistent and clearly structured procedure, particularly in the case of a global operation, possibly across different business areas

- Creation of a better basis for the execution of orders (amendments)

- If required, the integration of existing design programs must be possible

- CRM integration: The proposal program must be callable from a CRM system

- ERP integration: Adoption of sales items, including costs and prices, from ERP by the proposal system. Possible creation of a customer order in ERP via interface on placement of order

- SAP® interfaces are often relevant. The competence of the proposal

system's provider is therefore a prerequisite

» Worldwide use supported by a central database
- Data maintenance on a central database is of elementary importance

- The so-called remote operation via Citrix® Metaframe or the remote operation with Windows Server® Terminal Services® must be supported (Thin Client technology) as this ensures the scalability for many users

» Mobile use on business trips
- Mobile use on notebooks with data replication to the master database at headquarters

» Sales alignment
- Offering solutions with a high customer benefit instead of selling products

- Alignment of the proposal preparation with customer requirements from a function-oriented customer view. The customer does not think in terms of bills of materials but in terms of functions and processes

» Analyses and reports
- The analysable proposal data enable worldwide forecasting and transparency for controlling and sales coordination

- Identify and push back drivers for specialised solutions

- Direct generation of paper-based lists (e.g. PDF) from the system's master data

» Evaluation of standardisation
- Delineation of standard, adaptive and special design; ability to specify a proposal's degree of standardisation with regard to technology and price proportions

» Internationalisation
- User interface languages

- Language of results documents, also in Unicode, e.g., Chinese; bilingual documents are a must in the Asiatic region, e.g., side-by-side presentation of English and Chinese in the proposal text

» Performance – a must!
- The run-time behaviour is a production factor for the users

Company vision and company history

After passing his A-levels, a car mechanic apprenticeship, the author, Diethard Struck, born in 1955, studied mechanical engineering with the special subject production technology at the RWTH Aachen and received his diploma in 1982.

In the following years he developed several company-specific project engineering solutions for a large German plant engineering firm in the iron and steel technology sector as assistant to the Chair of Machine Tools of the machine tool laboratory, WZL, at the RWTH Aachen.
During this time he developed the deep relation to software solutions for the area of plant project engineering with configuration and calculation as well as technical calculations. Large bills of quantity for plants were still written with pencil on paper in those days.

From 1987 to 1988 the author developed the foundations of a system that made it possible to map and execute product logic in terms of product configurators without having to write the extensive and rigid control structures of traditional computer programs.

These ideas and concepts form the core of the LEEGOO BUILDER configurator that was developed later.

In 1988 followed the dissertation in the field of knowledge-based systems for mechanical and plant engineering.
The second phase of industry experience was the period from 1988 to 1992 as a co-worker in the aircraft construction industry at the former MBB in Augsburg, Germany, today, EADS Deutschland GmbH. Initially, he headed various projects in the area of the Airbus A340 prototypes and later he took over as head of the Industrial Engineering department.

The author's enthusiasm for plant project engineering software solutions with configuration and proposal calculation continued unabated through the early 90ies. The jump into independence in 1992 was therefore the logical consequence with the foundation of the EAS Engineering office Dr.-Ing. Diethard Struck. From 1992 to 1998 the author, together with the first members of staff, developed several knowledge-based applications with an extremely comprehensive product logic under contract of industrial firms. The products were manufacturing schedule generators. These knowledge bases represent computer programs whose primary purpose is not the administration but the generation of data. The manufacturing schedules, generated with comparatively few inputs with manufacturing logics mapped in the specific applications, comprise the complete manufacturing information for all work steps, work step data and lead times.

Examples are the manufacturing schedule generation for aircraft sheet metal components, for grinding disc production, for cold-rolling and finishing of cold-rolled strip as well as a manufacturing schedule generator for multi-layer circuit boards.
The author developed the first product configurator for the proposal preparation in mechanical and plant engineering under contract and in cooperation with Gebr. Schmid GmbH + Co. in Freudenstadt, Germany, in 1995. The modular machines built from a large building block set are used for the production of circuit boards.

The idea to develop universally useable standard software for the proposal preparation – particularly for use in mechanical, special machine and plant engineering – instead of company-specific solutions quickly took shape.

The corresponding conception and software development began in 1997 – the baby was named LEEGOO BUILDER – as a symbol for building block sets.

The founding of EAS Engineering Automation Systems GmbH for the development, marketing and implementation of LEEGOO BUILDER took place in 1999. EAS succeeded in winning the first major customers as early as 2000 – amongst them Bühler AG, Polysius AG, Schindler Elevator Ltd. and others.

By 2009, the author, together with the EAS team, had continually developed the LEEGOO BUILDER system in close cooperation with the EAS customers and implemented it in more than 47 companies, most of which are machine and plant manufacturers.

This book is an account of these experiences.
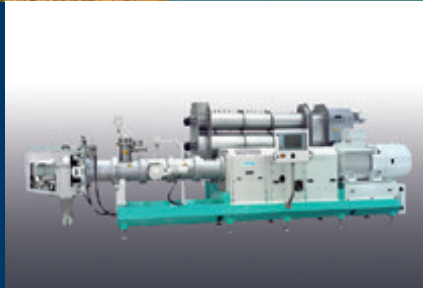
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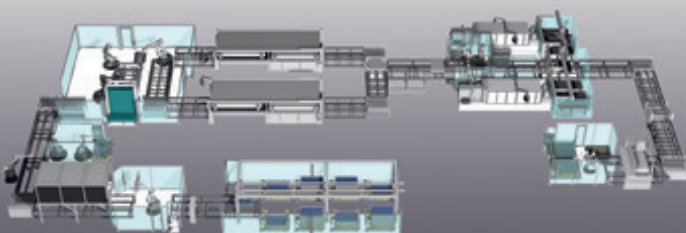
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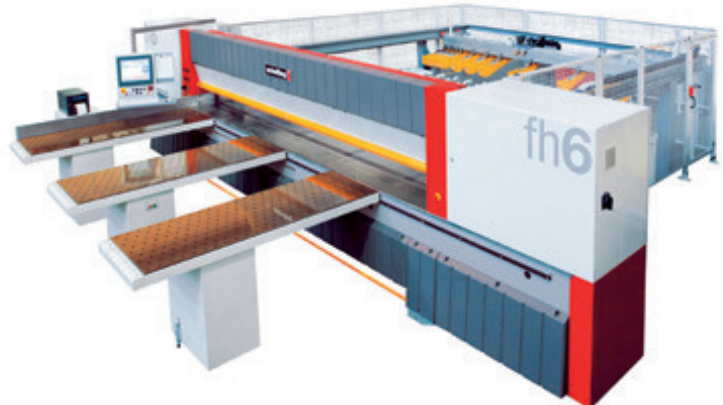
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- The run-time behaviour is a production factor for the users

Individual machines

Proposal preparation for machine tools

Proposal preparation for cut-to-size saws

Individual machines, in terms of the application types used in the preparation of proposals differentiated in this book, typically form the basis of a machine manufacturer's product range. The machines are grouped in more or less well-standardised types, series, designs and sizes.
The proportion of customer-related special features varies from comparatively small (Bruker AXS GmbH) to large (free design of special machines). The desire to define a planned, allowed product variance for matching the customer requirements at least in the shape of sales building block systems is clearly recognisable in most cases but developed to varying degrees. The new proposal system often is expected to support this process of modularisation and standardisation. The individual machines may often be integrated into production lines.

» Application examples

Bühler AG	Roller mills, sifters, conveyor screws
BEUMER Maschinenfabrik GmbH & Co. KG	Palletisers, packaging machines
Gebr. Schmid GmbH + Co.	Process machines for PCB manufacturing
Handtmann A-Punkt Automation GmbH	5-plane HSC processing centres
ALD Vacuum Technologies GmbH	Vacuum furnaces for heat treatment
Rhein-Nadel Automation GmbH	Material charging systems
FELSS GmbH	Rotary swaging and axial forming machines
Schelling Anlagenbau GmbH	Cut-to-size saws (figure right)
MAG Boehringer	Machine tools
GROB-WERKE GmbH & Co. KG	Machine tools (figure left)
Rosendahl Maschinen GmbH	Machines for cable production
Bruker AXS GmbH	X-ray diffractometers
Hager + Elsässer GmbH	Process and waste water treatment plants
HOSOKAWA ALPINE Aktiengesellschaft	Powder processing and classifying systems
Rekers GmbH	Machines for concrete block production
IMA Klessmann GmbH	Wood working machinery

Some characteristics of a proposal system for simple to highly complex individual machines

Well-developed product building block sets do either exist or are definable

Product logic can be formulated with little or intermediate effort and is well-mapped in configurators

Often broad product spectrum, comprising many machine types, series, designs and sizes

Application to be performed by the sales staff itself in order to speed up the preparation of proposals

Provision of sales staff, possibly worldwide, with intuitively applicable product knowledge; safeguard product knowledge

Fulfilment of special requirements to a limited extent; however, they should be kept within reasonable limits

Achieving a consistent calculation based on centrally organised calculation data; consistent proposal documents

Customer-oriented formulation of sales texts: up-to-date, consistent, multilingual; well-organised translation processes

Production lines consisting of individual machines
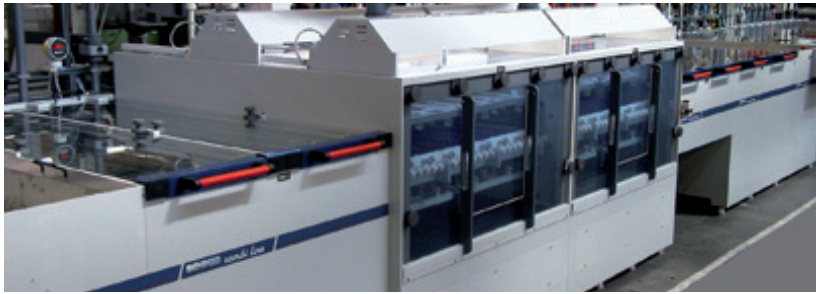
*Machine for the desmear process
in a production line for circuit boards*
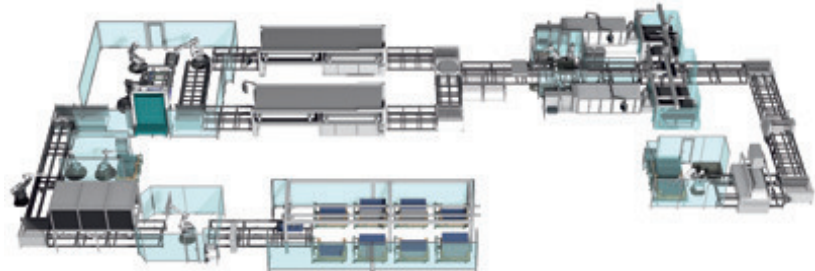
Module line in the photovoltaic area

Production lines are automated systems comprising individual machines that may be linked to realise specific processing and assembly processes. Often, there are individual core machines that realise a major process inside this system. At Schelling Anlagenbau GmbH the saw shown on the left is the core machine in a cut-to-size plant. In addition, the plant realises the material transport, the loading and unloading of the processing machines and the storage of raw and finished material. The individual machines represented first are therefore components of a line. Typically, the scope of supply, in addition to proprietary machines and equipment, comprises a more or less large proportion of buy-in during proposal preparation. Production lines usually mean project business. Before the actual proposal preparation, a plant concept taking into account the layout needs to be formulated.

» **Application examples**

Bühler AG	Silo, grinding plant areas
Schindler Elevator Ltd.	Elevator systems for high-rise buildings
BEUMER Maschinenfabrik GmbH & Co. KG	Conveyor systems for packets
Gebr. Schmid GmbH + Co.	Module lines for the photovoltaic area
ALD Vacuum Technologies GmbH	Vacuum furnace plants
Schelling Anlagenbau GmbH	Cut-to-size plants with saw
GROB-WERKE GmbH & Co. KG	Machining and assembly systems
Rosendahl Maschinen GmbH	Plants for cable production
Brückner Trockentechnik GmbH	Textile dry finishing plants
Hans Lingl Anlagenbau GmbH	Plants for heavy clay products
Ammann Group Holding AG	Asphalt and concrete mixing plants
IMA Klessmann GmbH	Lines for edge processing
Rekers GmbH	Lines for concrete block production

Some characteristics of a proposal system for production lines (project business)

Proposal preparation starts with a fundamental plant specification: Process and material flow, layout

Solutions for production technology, conveyor technology, environmental technology, etc. are project engineered and offered

Solutions comprising linked systems, e.g., individual machines; specific machines realise the major processes

Alternative to linked individual machines there are also station sequences, e.g., in assembly and processing lines

Configurators can be used for individual "proprietary" machines, buy-in is also typical (external input)

For production lines the individual machines business is also relevant; therefore, must also be offered individually

Users in the specialist departments sales, project engineering and calculation; turnkey projects for large lines possible

Calculation is more complex than for individual machines; calculation with costs, hours; complex proposal documents

Machines with a plant character
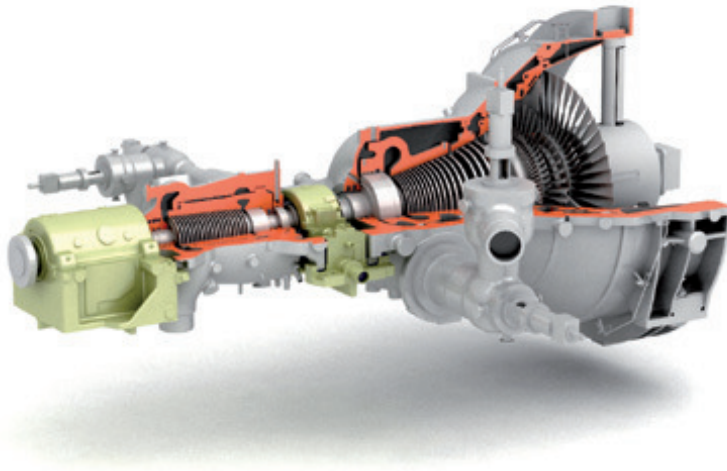
Proposal preparation for steam turbines

Proposal preparation for industrial mills

For machines with a plant character it is quite typical that, given the basic customer requirements such as power (kW) or output (t/h) and other general preconditions, a suitable machine type is selected first. The design using specific and frequently complex calculation programs, e.g., the thermodynamic design of steam turbines (see figure), may have taken place in advance. The proposal system therefore must be capable of seamlessly integrating existing calculation programs. However, integration is not always necessary. Processing with the proposal system begins with the results of this "basic engineering" step. In the case of LEEGOO BUILDER applications of this type, product configurators are used because such products comprise complex logics. There may be large tree structures with up to 5,000 proposal items across 4 - 6 hierarchic levels. Calculation is often driven by

costs, hours and weights. Enterprise-internal transfer prices must be determined if "equipment" is to be incorporated in an overall project of the own group of companies (cf. page right "Large-scale plant engineering and turnkey projects"). The steam turbine is incorporated as a component of a turbo set. The turbo set can be incorporated in a scope of supply as a component of a power station. LEEGOO BUILDER is successfully represented in all component plants, as the applications demonstrate.

The free project engineering in the LEEGOO BUILDER "Configuration Editor" is used for implementing special requirements that are considered a normal in project business. Machines with plant character are often large systems comprising long-lead items that are critical for delivery times such as large gearboxes (mills), large cast components (steam turbines), etc. The early and precise clarification of requirements is a major factor for success.

» Application examples

Siemens AG, Energy Sector	Steam turbines (figure above left)
Loesche GmbH	Industrial mills (figure above right)
Polysius AG	Industrial mills for cement production
FELSS GmbH	Rotary swaging transfer lines
Hans Lingl Anlagenbau GmbH	Kilns for heavy clay products
Doppelmayr Seilbahnen GmbH/Garaventa AG	Circulating ropeways, special ropeways

Some characteristics of a proposal system for machines with a plant character

Proposal processing typically begins with a design specification calculation (mechanics, thermodynamics and others)

Comprehensive design on placement of order; configurators are an important component of a new proposal solution

Mid-size scopes of supply and services of up to 5,000 items; typically in-house production of core machine; buy-in is important

Long-lead items (large gearboxes, cast and forged components) are often critical for procurement

Integration of existing design programs may be necessary; alternatively a reimplementation can make sense

In addition to the use of configurators, free project engineering is important for proposal processing

Initial condition: Frequently characterised by Excel calculation sheets; texts are composed by copying in Word

Application not only important in-house but also on the move; considering changes and alternatives on business trips

Large-scale plant engineering and turnkey projects

Proposals for milling plants for food production

Proposal preparation for cement factories

The use of LEEGOO BUILDER in large-scale plant engineering and for turnkey projects constitutes the application type which places the most demanding requirements on the proposal system. As in the case of production lines and machines with plant character, the first step is "basic engineering". Here, process design is to the fore (process diagram). The technical project engineering of the scopes of supply, also called bills of quantity, then takes place in the proposal system. The applications at Bühler AG, Polysius AG and Siemens AG, Energy Sector, are also proof of the benefits of a comprehensive use of configurators in large-scale plant engineering. Very large tree structures make it necessary for the project engineering of one proposal to be carried out by several people simultaneously. The proposal system must be capable of handling bulk data, be internationalised and efficient. Change management becomes a must for the support of the organisation.

Proposal preparation for power plants

» Application examples

Bühler AG	Mill plants (figure above left)
Polysius AG	Cement factories (figure above right)
Hitachi Power Europe GmbH	Fossil-fuelled large-scale power plants (figure)
Siemens AG, Energy Sector	Steam turbines for power plants
Gebr. Schmid GmbH + Co.	Photovoltaic and other production plants

Some characteristics of a project engineering and calculation system in large-scale plant engineering

Project engineering, calculation and provision of complex solutions as plant sections, complete plants or turnkey projects

"Basic engineering" as first step with process and material flow diagrams, layouts (not in LEEGOO BUILDER)

Large scopes of supply > 5,000 items; worldwide procurement; consortial partners; there are project managers

Project engineering and calculation in teams; usually, several project engineers need to edit a proposal simultaneously

Similarity principle and sample solutions are often important working techniques; comprehensive configurator use is possible

Complex proposal calculation; costs and prices in different currencies; internal transfer prices are often important

High proposal/order values; high degree of responsibility in technology and costs/prices; release process

Change management is elementary; many and comprehensive changes; long project time periods

Applications in other areas
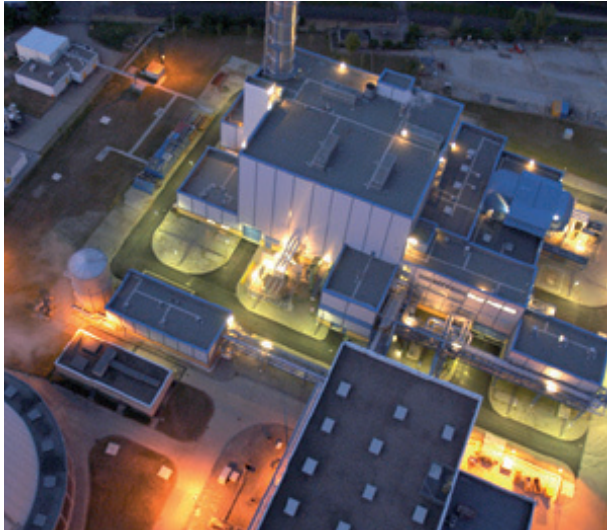
Proposal preparation for energy utility

Gate valve in water management

The depictions in this book are focused on the areas of mechanical and special machine engineering, on plant-related mechanical engineering and on large-scale plant engineering, including turnkey projects.

However, the LEEGOO BUILDER proposal system is not limited to these areas and is capable of configuring and calculating any scopes of supply and services. The applications can therefore be successfully implemented in further areas as illustrated by the examples at VAG-Armaturen GmbH and RheinEnergie AG.
In addition to the logic-based configuration, the manual-interactive selection of items (pick to order – PTO) for the creation of proposal items is also important (see RheinEnergie AG).

In this case, the proposal items are drawn from predefined building blocks that are defined in LEEGOO BUILDER "price lists" and/or "catalogues".

The proposal calculation typically is based on item list prices and working times, plus additional costs for travel, freight and many more factors. Customer- and enterprise-related terms and conditions that were negotiated in contracts may need be taken into account during the proposal calculation.

In some cases, as for example for VAG-Armaturen GmbH, tender inquiries are a frequent occurrence.
It is also possible for several inquiries from different engineering offices to arrive for one project.
The proposal system then should support the recognition of this fact and the consistent handling of all inquiries.

» Application examples

VAG-Armaturen GmbH	Valves for water management
RheinEnergie AG	Energy utility

Some characteristics of a proposal system outside mechanical and plant engineering

Proposal processing frequently takes place on the basis of catalogues and price lists by manual item selection

Configurators in the sense of product logic may be used (see VAG-Armaturen GmbH)

The proposal items on the priced level frequently represent materials with ERP material numbers

In most cases, the integration with ERP systems is important for the acquisition of sales items; order created from proposal

Among others, the new proposal system offers the advantage of the central, up-to-date database for all users

The support of handling and navigation in the item space enables a faster proposal preparation

Consistent proposal calculation based on the current and valid costs and prices; no data distribution necessary

Quickly generated multilingual proposal documents with illustrative item images; realisation of corporate design
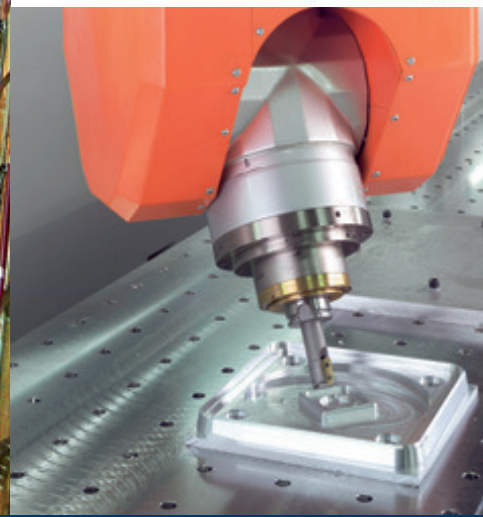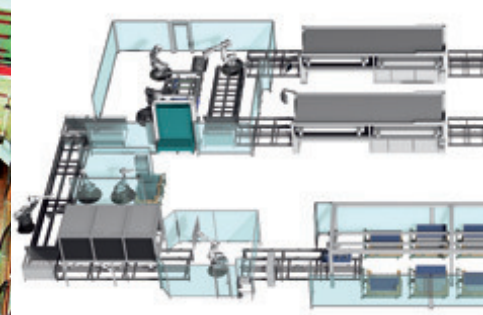
3. Building proposal solutions

Preparation with planning and knowledge engineering

» Preparations

The approach adopted by EAS for a company interested in the LEEGOO BUILDER proposal system usually is to begin with a test installation and a trial phase.

The aim of this chapter is to simplify and summarise this approach under the heading of "Getting started". However, some cases necessitate more in-depth clarifications that cannot be represented in a meaningful manner here.

The collection of materials begins with creating a project folder for bundling the collected documents and details.

» Breakdown of the product-spectrum

The question about the configurable products on all levels of the product breakdown initiates the preparations. It should be noted that configurable products may be encountered on the assembly, machine and plant level and, therefore on all levels of the tree structure.

» Defining a pilot product

We, together with the customer, select a pilot product on the machine level and, if applicable, also a plant type in order to build the first associated configurators which also provides some practical experience.

» Case studies as test case

Sample proposals for the pilot products, price lists, text modules and other sales documents are compiled in the project folder.

» Defining the proposal structure

The tree structure is being planned. In this exercise, the sale of individual machines and the sale of the complete plant must be differentiated because, in most cases, an option to offer plant components is desirable. It is defined, which building blocks are to have a configurator in which level of the tree structure.

» Defining the building block world

If possible, sales building blocks, e.g., from Excel sheets with costs and prices, will be imported to LEEGOO BUILDER. Texts are added to.

» Defining the product building block set

A product building block set, that is, a maximum structure of the relevant sales building blocks, is built in a desired hierarchic structure. In addition to mandatory components, the building block set also contains optional components. Both mandatory and optional components can have alternative variants inside the building block set, e.g., a drive consisting of motor-1 with 12 kW and, alternatively, motor-2 with 15 kW.

» Creating a configurator

Next, the selection rules for the items in the building block set need to be devised. Excel provides a good tool for performing this task in a system-neutral and preparatory manner. The selection rules result in a demand for attributes such as performance, table length, etc. The necessary attributes for mapping the requirements and functions are defined in the configurator.

This then makes it possible to implement the selection rules. The final step in formulating a configurator is the formulation of the rules for the caption of requirements. These are interdependencies between the attributes. Subsequently, an extensive test involving product specialists is performed until a release is possible.

The individual steps are explained in more detail below.

Defining building blocks and building block sets

Building block sets are the basis for each product configurator in LEEGOO BUILDER. The figure page right shows such a maximum structure for a demo lathe. The hierarchic structuring is recognisable as a tree in the maximum structure. The design features of the basic machine in the upper area is always included in a proposal. Additional equipment and options complement the basic specification. A real-world maximum structure will contain many alternative variants, e.g., due to different machine types, series, designs and sizes (see three-jaw power chuck). However, the building block set only maps the maximum structure for the configurable product.

The selection logic is not visible here. That is part of a configurator explained on the next page.

Maximum structures may contain 20 items but also 3,000 or more items. EAS experience shows that many building blocks and items in a building block set provide quantity but not necessarily complexity. It is advantageous to differentiate all building blocks in a well-structured manner and to render them as tangible and concrete as possible. When a sales building block represents, e.g., a standard component or a standard assembly, it may even carry the ERP material number. The items in the building block set preferably should be matched with the materials used for processing in the ERP system. However, depending on industry and products, this may not always be achievable.
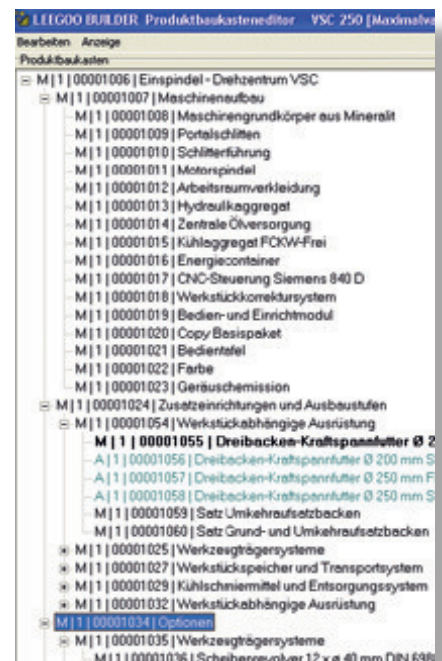
Building block set of demo example represented in the LEEGOO BUILDER building block set editor.

Defining product configurators

Baukasten Positionen	Konfigurator-Merkmale	Werte	Bemerkung / GUI
Vakuum-Ofen Bauart VUTK	Allgemein		GroupBox
Ausführung 10 bar; HV	NENNDRUCK	10 bar	
Ausführung 10 bar; FV		6 bar	
Ausführung 6 bar, HV		2 bar	
Ausführung 6 bar; FV	VAKUUMART	FV	
Ausführung 2 bar; HV		HV	
Ausführung 2 bar; FV	VAKUUMTYP	AvaC	
Ausführung AvaC		AvaC (N)	
Ausführung AvaC (N)		ohne Zusatzausstattung	
Ausführung Sonderausstattung		Sonderausstattung	
	NETZSPANNUNG	230 V	
		380 V	
	BETZFREQUENZ	50 Hz	
		60 Hz	
	Gehäusezusammenstellung		GroupBox
Gehäuse 10 bar	GEHAEUSE	10 bar	
Gehäuse 2 bar		2 bar	
Anschluss Pumpsystem FV: DN 500 mit DN 150	ANSCHLPUMSYS	FV: DN 500 mit DN 150	
Anschluss Pumpsystem HV: DN 500		HV: DN 500	
Anschluss Pumpsystem HV: DN 600		HV: DN 600	
Stutzenvorbereitungen ohne Zusatzstutzen	STUZENVORBE	ohne Zusatzstutzen	
Stutzenvorbereitung mit Zusatzstutzen		mit Zusatzstutzen	
Zusatzstutzen AvaC-Vorbereitung	ZUSATZSTUTZEN	AvaC-Vorbereitung	nur bei "mit Zusatzstutzen"
Zusatzstutzen Seitenkühlung-Vorbereitung		Seitenkühlung-Vorbereitung	
3 Thermoelement-Stutzen	SONDERSTUTZEN	ohne	
Tür / Deckel Ausf. 10 / 6 bar		3 Thermoelement-Stutzen	
Tür / Deckel Ausf. 2 bar	TUERDECKEO	10 / 6 bar	
Eckventil DN 500		2 bar	
Eckventil DN 600	ECKVENTIL	ohne	
Anschweissteile Gehäuse		DN 500	
		DN 600	

Classic example of the field-specific elaboration of a maximum structure (building block set) with associated attributes and values   Source: ALD Vacuum Technologies GmbH

» Knowledge engineering

Before creating, building and refining the actual configurator, the associated building blocks of all hierarchic levels of the tree structure and the maximum structure of the configurable product are formulated and implemented. Further additions and modifications are always possible. However, it has been shown that the structured product definition in terms of the product building block set should have stabilised before the formulating and mapping the associated product logic. It is plausible that the "WHAT needs to be configured?" must be clarified before the "HOW does the logic work?" can be formulated because the logic refers to the building block set in terms of the so-called selection rules. The figure above shows an extract from a tabularised elaboration as a sample. The rows represent items of the building block set in the left-hand columns. Attributes associated with the items are defined by name to the right of them. Attribute values that, in part, have a 1:1 relation to building blocks, are shown next to them. Other attributes are not associated with building blocks and represent customer requirements such as performance, output, etc.

» Building configurators

Components of configurators are:

- Building blocks and associated data such as name, costs, prices, sales texts and, if applicable, images embedded in the texts

- Building block sets (maximum structures)

- Product logics: Selection logic and attribute logic

- Graphic or tabular user interface

» Configurator attributes

Configurator attributes are the "variables" of the product logic.

They are labelled with language-neutral attribute names (see figure left). The attribute names and attribute values are represented in multiple languages.

» Selection rules

Selection rules are logical constructs that utilise attributes and their associated values to enable the formulation of selection conditions for items in the building block set. Therefore, a selection rule specifies under which conditions a building block will be included in the relevant configuration, in which quantity, etc. or whether it is not to be included.

» Attribute rules

Attribute rules map the inter-dependencies of the attributes. They are used for the logic-based acquisition of customer requirements. Typical dependency types are "What is possible or not possible if …". "What is standard if ..." and also "What is relevant if ...". In most cases, the attribute logic is significantly more difficult to define than the selection rules.

» Graphical user interface

This book shows many examples of configurator interfaces.
The figure of the configurator, below, belongs to the elaboration described above (knowledge engineering).
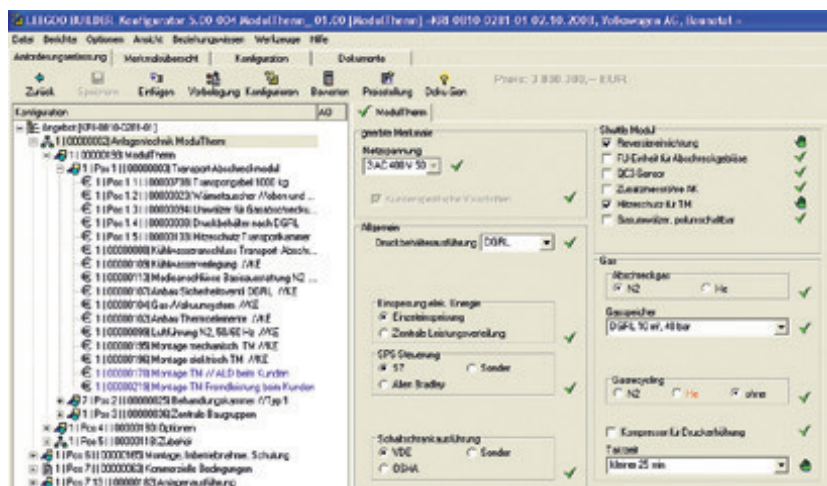
Example of a configurator based on the knowledge engineering detailed above
Source: ALD Vacuum Technologies GmbH

Clarifying, implementing, applying the proposal calculation

Herstell-kosten	Allgemeinkosten							Selbst-kosten		Provision		Gewinn Brutto	Listenpreis Brutto	
	TB		AT		KM		V&V		Summe	Einzel	Summe		Einzel	Summe
[€?]	% - [€?]	[€?]	% - [€?]	[€?]	% - [€?]	[€?]	[€?]	[€?]	[€]	[€]	[€]	[€?]	[€?]	[€]
0 €	0,00 €	0,00 €	624,00 €	0,00 €	0,00 €	0,00 €	0,00 €	0,00 €	624,00 €	624,00 €	31,20 €	31,20 €	124,80 €	780,00 €	780,00 €
0 €	1.000,00 €	57,00 €	0,00 €	1,00 €	0,00 €	8,00 €	0,00 €	180,00 €	1.246,00 €	1.246,00 €	62,30 €	62,30 €	249,20 €	1.557,50 €	1.557,50 €

Classic example as a section from an expert specification for a company-specific calculation scheme
Note: The representation in Excel is only for documentation NOT for application!

» Knowledge engineering

The formulation of a proposal system best starts with specialists in the relevant field clarifying WHAT is to be calculated HOW. The figure above shows a section from such a clarification. It is helpful to use Excel for this to be able to run at least a simplified version of the test data together with the calculation process along with some lines. The more complicated access to factors, hourly rates, etc. can be inserted into the calculation process as constants in the cells of the calculation sheet. This representation is only used to document the calculation scheme!

» Building the calculation scheme

- Calculation master data with building block integration are, e.g., list prices, costs and hours of different types as well as, in some cases, weights. The representation of the calculation master data in LEEGOO BUILDER is achieved via freely definable database tables that are to be seen as part of the customer-specific tables.

- Calculation master data for factors, e.g., material overheads factor, country factors, hourly rate may vary from site to site; possibly also in different currencies.

GUEVON	GUEBIS	PASSIV	KALKJAHR	FAK_MGK	FAK_MAT_MECHA	FAK_MAT_ELEK	BEMERKUNG
(Filter)	(Filter)	(Filter)					(Filter)
20040101	20041231	0	2001	1,05	1,028	1,093	Testfaktoren
00000101	20011231	0	2001	1,05	1	1	Testfaktoren
20050101	99991231	0	2001	1,05	1,028	1,093	Testfaktoren
20030101	20031231	0	2001	1,05	1,018	1,071	Testfaktoren
20020101	20021231	0	2001	1,05	1,006	1,04	Testfaktoren
20050101	99991231	0	2002	1,05	1,022	1,051	Testfaktoren

Example of a factor table in the LEEGOO BUILDER database (fictitious data)

» User view

- The LEEGOO BUILDER "Configuration Editor" contains columns in tabular representation for inputting the item-related calculation master data (figure below). Inputs of this kind are made for, e.g., modified assemblies as adaptive or special design as well as for so-called "free items". Free items represent, e.g., purchased parts, assemblies or entire machines that are being inquired and that can be represented as an item in the proposal without any further subdivision.

» Processing/calculation

- The calculation master data are accessed during processing via SQL instructions.

- Processing is highly efficient and uses a freely configurable algorithm of the proposal calculation in accordance with the expert concept (figure above).

» Maintainability/changes

- Maintainability through the administrator of the organisation is an important requirement due to the need for independence and fast internal responsiveness for the verification and, if applicable, the adjustment of a calculation scheme.

- The calculation results are output in columns of the calculation view (figure below). These results can also be represented in the proposal documents.

- The output in Excel calculation sheets as a so-called value added or contribution margin calculation frequently is an important, internal calculation result.

	Position / Benennung	1 AO	2 Menge Stk	3 Menge Total	4 Mat. Mech. [EUR]	5 Mat. Fluid [EUR]	6 Mat. Elekt. [EUR]	7 Mont. Mech. [Std]	8 Mont. Fluid [Std]	9 Mont. Elekt. [Std]	10 Inbetr. Mech. [Std]	11 Inbetr. Elekt. [Std]	12 Angebot Preis [EUR]	13 Kosten HK [EUR]	14 Rabatt Ef. %	15 Rabatt Abs. [EUR]
	(Filter)	(Fi...	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)	(Filter)
	Angebot (Maschine)		1	1									1.127.703,32	825.653,34	2,44	28.211,35
1	Einspindel - Drehzentrum VSC		1	1									750.000,00	555.217,56	3,51	27.304,58
1.1	Maschinenaufbau		1	1									536.777,43	397.371,01	3,51	19.541,97
1.1.1	Maschinengrundkörper aus Mineralit		1	1	12.340	1.640	3.440	2	20	33	7	13	30.937,08	22.902,42	3,51	1.126,30
1.1.2	Portalschlitten		1	1	8.320	1.760	4.118	1	18	32	6	12	25.855,08	19.140,26	3,51	941,28
1.1.3	Schlittenführung		1	1	12.470	1.890	5.234	3	24	24	6	15	34.107,51	25.249,45	3,51	1.241,72
1.1.4	Motorspindel		1	1	15.520	1.620	4.378	4	20	35	7	14	37.345,16	27.646,25	3,51	1.359,59
1.1.5	Arbeitsraumverkleidung		1	1	18.210	1.530	3.928	1	16	32	6	11	39.329,29	29.115,08	3,51	1.431,83

Example as a section from a LEEGOO BUILDER calculation scheme from the user's point of view (simplified demo example)

Results output with proposal and spreadsheet

Example of a generated proposal document (Source: ALD Vacuum Technologies GmbH)

» Conception and planning

Conception and planning in the context of "document generation" begins with the specification of the relevant proposal chapters. Based on these chapters, flexible layouts can be compiled as templates for specific proposal layouts in the "Document Generator" module of LEEGOO BUILDER. The figure to the right shows two alternative proposal layouts. One layout for proposals and another one for orders (meaning order confirmation).

The experience of EAS in mechanical and plant engineering regarding the standardisation of proposal documents led to the concept presented here.

On the one hand, the aim is to standardise the visual appearance of the documents and, on the other hand, there must be sufficient flexibility for the proposal presentation. Therefore, the approach is to capture the relevant chapters and to implement them using the proposal templates. Relevant chapters include the following: Letter, cover sheet, table of contents, advantages of the solution, pricing, scope of supply specification, etc. through to the chapter covering commercial terms and conditions. However, the composition and sequence of the chapters is freely
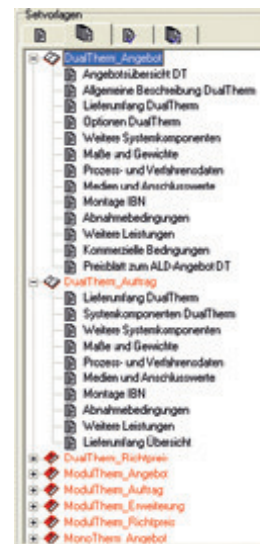
selectable so that the proposal layout remains adaptable to the customer requirements. For example, "exotic" chapters can be realised and, if required, applied to a specific country, without departing from the systematic approach.

» Document templates

The document templates are created by the administrator. The users are not allowed to change them but can apply the chapters defined that way to documents (figure right).

» Multilingual capabilities

The figure below shows a proposal document generated in two languages. This is a vital requirement for Asiatic languages.

Modular results documents from standardised chapters

Section of a generated bilingual proposal document (Source: BEUMER Maschinenfabrik GmbH & Co. KG)

The journey of attributes

The image to the right shows an artistic representation of the journey of attributes, together with their values, from customer requirements via the proposal and order data during order processing right through to specifications in an assembly drawing for the construction site. Many thanks to Mr Toni Greter, Director Process & Tool Management at Schindler Elevator Ltd. for the image and the lovingly rendered details.

Our small "Attributes" travelling band consists of three participants. GQ – the "Rated Load", HQ – the "Travel Height" and VKN – the "Rated Speed". Of course, there are many more participants on route on the real-world journey – often hundreds. Together, they form the specification for the project journey and they evolve in the various project phases, both in the proposal stage and during order processing, right through to their assembly. Later, they can also be relevant for service and maintenance.

The optimum organisation of the large attributes travelling group of a real, complex project such as the elevator systems of a tower building and the frequently changing project and product requirements demand consistency in the system and a thought-through representation of the data.

The journey depicted in the figure begins at the top left with the customer requirements stated in the "Tender Specification" of the customer enquiry. This can also be submitted by a planning office instead of the end customer.
In our case, the three travellers are very dominant quantities, because load, travel height and travel speed influence almost everything else in an elevator system. Here, one needs to visualise several elevators forming an elevator group. A tower has many elevator groups, each starting from specific floors and terminating on specific floors. The traffic analysis is shown at the top of the image as a "Building Traffic" diagram. This determines the number of elevators required. Connected to this is the

entrance principal layout (image top right). We call this initial step "Basic Engineering".
Now we continue our journey with the proposal system. A project and a first proposal are created. There will be others for alternative solutions, and one thing is absolutely certain – there will be changes. The paths in the image therefore form a cycle that, we hope, will end in an "Order".

The main project data such as mains frequency, building type, etc. are now input in LEEGOO BUILDER. The project phase is specified for controlling and sales coordination (see figure in the second row from the top). "Identification" is the first phase, during which no proposal is created yet. Only when the "Tender" project phase has been reached and the criteria for proposal processing are met the decision is made whether to make a proposal. This approach is also known as "Strategic Selling".

Only now, things are beginning to become serious in terms of proposal processing. A member of the sales force, or project engineer, creates the main items in the proposal system. These represent elevator groups and, from a sales perspective, consist of a number of identical elevators. This will change later during processing because there is a specific "Commission" in SAP® for each individual elevator. However, this is only mentioned here to provide an outlook. Next, the individual main items, each with a configurator of the selected product line, are configured. First, the configurator for a main position is opened. This status is illustrated by the left-hand image in the third row. Here, the values for the product attributes are entered and our three travellers assume a concrete shape: GQ = 1,600 kg, HQ = 156 m and VKN = 5 m/s.
Understandably, only a few lead requirements will be known in an early project phase and they, too, will probably change. Other attributes are set by the so-called configurator acquisition logic in terms of "What is standard, if …". However, all attributes will
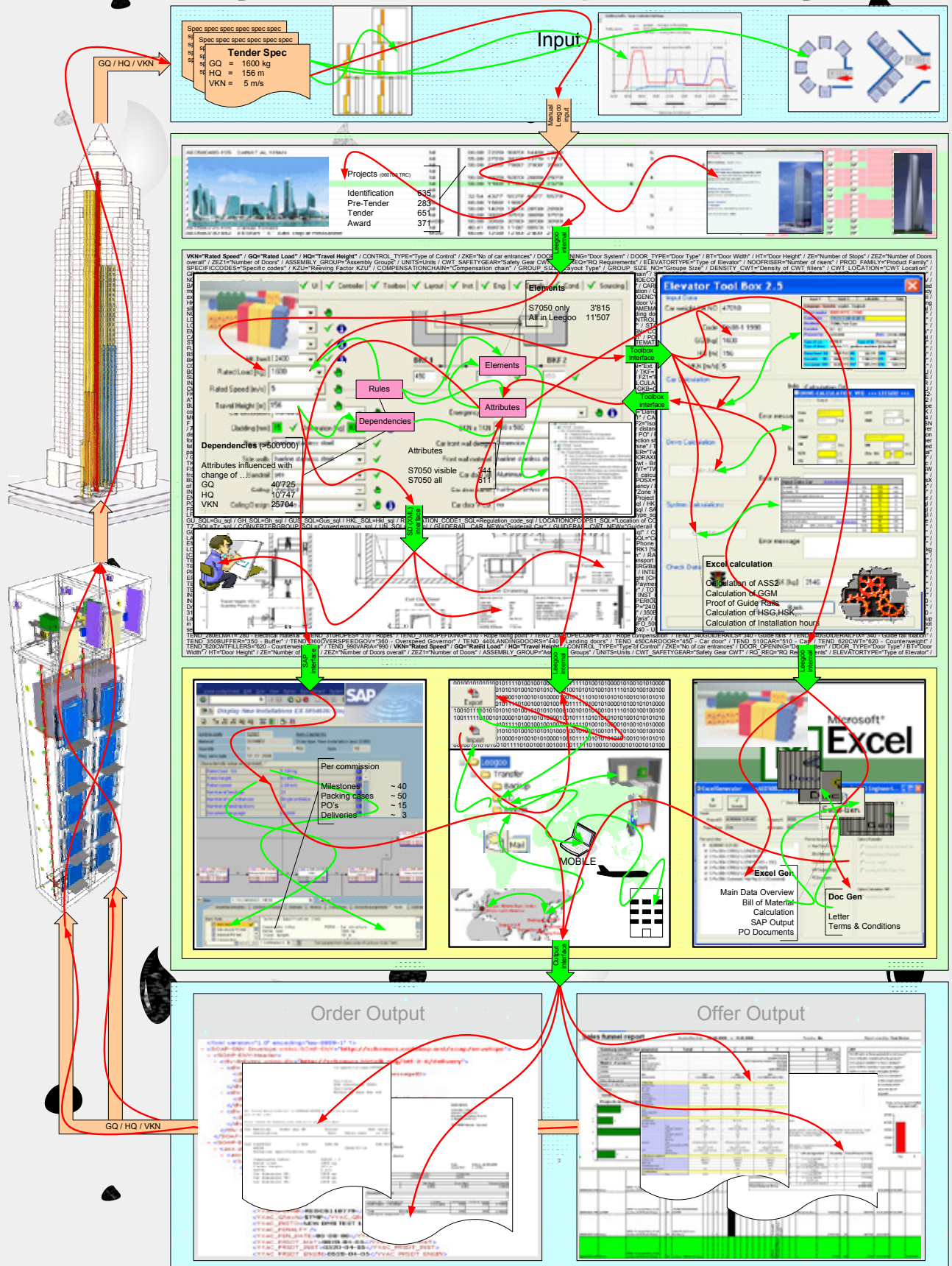
always have to have a valid value in order to make configuration possible. This makes it possible to accurately specify for the recipient of the proposal on which clarified requirements, but also on which assumptions the proposal and the associated proposal calculation is based. The clarification of the actual requirement progresses in the course of the proposal cycles and becomes increasingly accurate. An existing calculation program was integrated into the proposal solution for the elevator system's design specification (see image right "Toolbox").
The execution of the configurator for the current attribute values generates the tree structure shown in the image to the right.
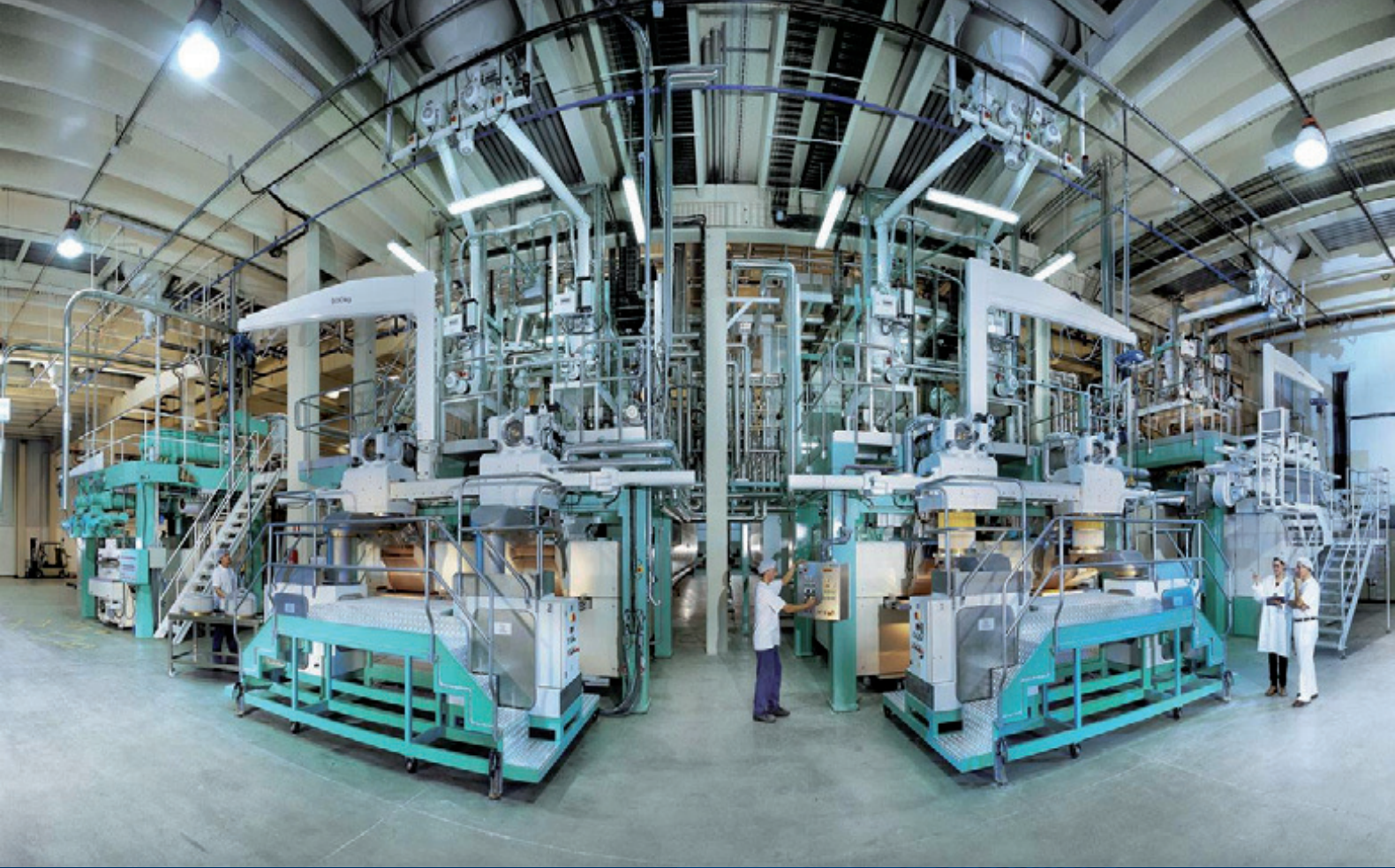
Frequently, this requires manual-interactive post-processing in the sense of free project engineering, for example, for the implementation of special requirements. This is done with the "Configuration Editor" module of LEEGOO BUILDER. In project business this module is as important as logic-based configurators and occasionally even more so. Due to space constraints, this essential range of topics cannot be treated further in this context.
In the fourth row of the image we reach the level dealing with generating results documents, e.g., "Main Data Overview", "Bill of Material", "Calculation Sheet", "SAP® Output File" for the handover of order data and the so-called "Purchase Order (PO) Document". The proposal document is created at this point in the process.
The left side of the image shows a view from the SAP SD® module. The items and attributes for each commission (one lift) have arrived there from the proposal system. This also allows for any changes required. The image shows views of the documents for "Offer" and "Order" shown for one cycle. There still is always a need for "paper". At the bottom left, another cycle can then start and a new proposal variant can be created. Here, the LEEGOO BUILDER "Change Management" is a handy safety anchor.
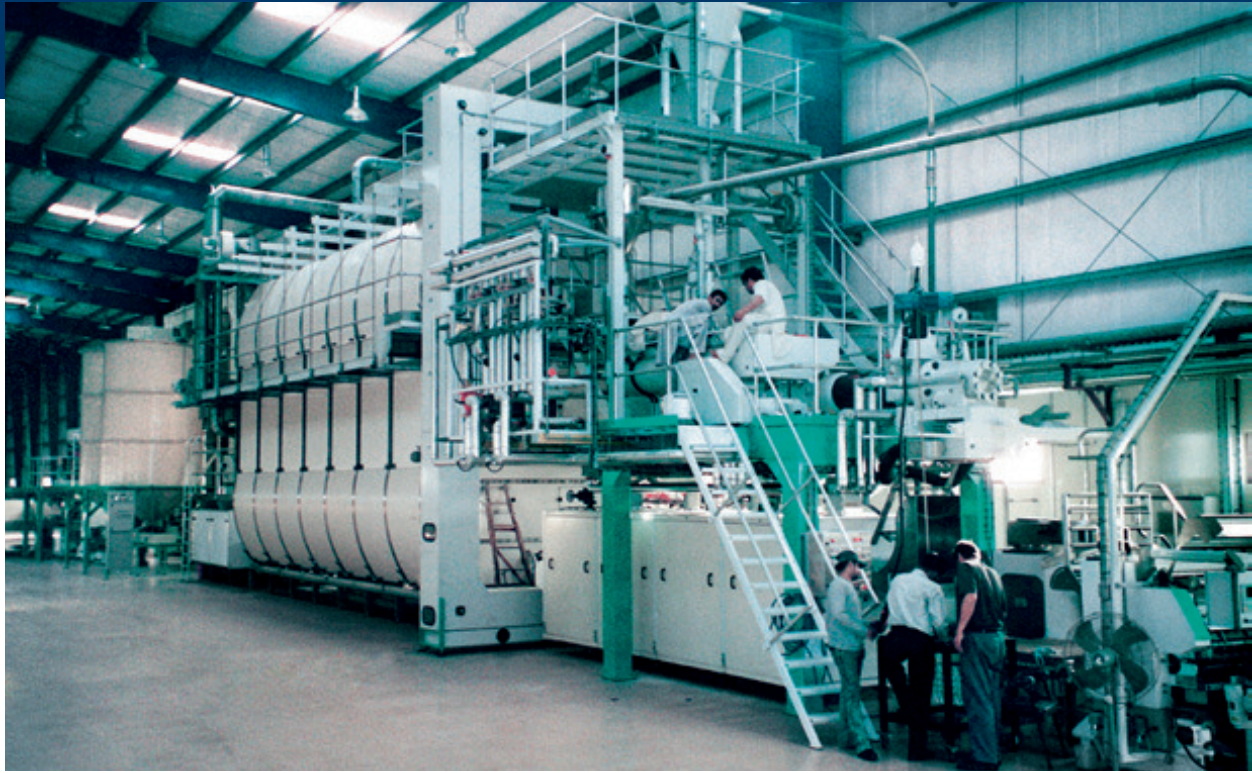
Source: Schindler Elevator Ltd., Ebikon/Switzerland

BÜHLER

Schindler

BEUMER
technology in motion

SCHMID

handtmann
Ideen mit Zukunft.

The Solution
ald

RNA

FELSS

VAG

schelling

ROSENDAHL
AUSTRIA

Polysius
ThyssenKrupp

BRÜCKNER
be first in finishing

MAG BOEHRINGER

RheinEnergie

LOESCHE

LINGL

SwissTex
Filament Yarn Technologies

GROB

IMA

BRUKER

REKERS
Maschinen- u. Anlagenbau

SIEMENS

HITACHI
Inspire the Next

HAGER+ELSÄSSER

Glatt

Doppelmayr

GARAVENTA

AMMANN

HOSOKAWA MICRON
HOSOKAWA ALPINE

4. Applications

BÜHLER

Production line for pasta products

Bühler AG headquartered in Uzwil, Switzerland, is an international mechanical and plant engineering company. Bühler regard themselves as a global technology partner specialising in food production, chemical process technology and die casting.

For Bühler AG, the worldwide introduction of LEEGOO BUILDER resulted in operative and strategic advantages:

- Reduction of the preparation time for new proposals from 4-5 days to ½ day with LEEGOO BUILDER instead of Excel price sheets
- Reduction of the processing time by 10 % for new proposals, for changes by 50 %, in comparison with the previous system
- Technical know-how is represented in configurators
- Reduced product complexity
- The alignment of the proposal preparation with the customer requirements with configurators supports customer orientation in sales force
- Globally consistent calculation instead of "insular Excel solutions"
- Increased EBIT

Martin Zeindler,
Head of Sales and Information Management Systems

Grain mills

» Objectives

The replacement of the existing proposal system and the introduction of a comprehensive logic-based product configuration from plant to machine level in order to make the product and process knowledge available to the global sales force. The aim is to facilitate the decentralised global preparation of proposals (faster, better, centralised and decentralised). Further goals are a worldwide consistent price calculation with a transparent cost and price basis, structuring of the product range into 'definition' and 'sourcing' (division of supply) in the international project business, and the fast generation of consistent, multilingual finished documents (proposal document, profit calculation, etc.).

Proposal preparation, including project engineering with configuration and calculation is planned for a total of 10 business divisions. Deployment of the system for plants in the areas wheat mills, feed mills, distribution depots, rice processing and brewery/malting. The production plants for pasta products, chocolate, extrusion products and dyes are also included.

The proposal preparation in the international project business applies to individual machines, complete and partial plants.

» Project

The LEEGOO BUILDER project, internally known as Navigator, was started in 2001 following a comprehensive system selection process and was then organised into three phases:

Phase 1
Conception and set-up of the new proposal system with emphasis on logic-based product configuration, price calculation and document generation in a leading business segment (MU mill plants) at the headquarters in Uzwil.

Phase 2
Set-up of the solution in additional business units at the headquarters.

Phase 3
Worldwide rollout at 23 sites in 20 countries (see map above).

» Application

Worldwide use for complete plants and individual machines with an extremely large and diverse product portfolio. 500 LEEGOO BUILDER users create more than 15,000 proposals per year. At times the central database at Uzwil is simultaneously accessed by up to 150 international users (Citrix® Server). The rollout phase was completed in 2008.

» Configuration

As live operation takes place on a global basis, the system has a built-in international bias in respect of the preparation of proposals for complete plants, plant segments and individual machines.
For example, there are over 800 product configurators on the machine level alone! The process technology design of plant sections is supported by more than 100 configurators. All these configurators are built and maintained by the experts themselves – without any need of programming skills.

» Calculation

The globally consistent price calculation is based on a complex calculation scheme with more than 100 columns. In addition to many other factors, currencies/exchange rates play an important role in relation to purchase costs and sales prices. Over the course of the project this new calculation scheme was developed and deployed as a globally consistent system foundation.

» Documentation

Proposal documentation can fill whole folders and can be generated in 8, including Asian, languages. The document generator needs to satisfy the most demanding requirements.

» System environment

Citrix® Metaframe is used for remote operations alongside LEEGOO BUILDER for proposal preparation and project engineering. On placement of order, the relevant data is transferred to an in-house system and SAP R/3®.

The introduction of LEEGOO BUILDER means the following for Bühler AG:

- Investigation of the sales processes
- 60,000 building blocks for 10 business areas
- 320,000 text modules in 9 languages
- Set-up of app. 800 product configurators
- App. 100 configurators for process technology
- Use in 20 countries and at 23 sites around the world
- 500 LEEGOO BUILDER users
- Up to 150 users work concurrently
- Preparation of over 15,000 proposals per year

Schindler Elevator Ltd. Top Range Division, TRD, is a company of the Schindler Group. TRD supplies elevator systems for high-rise buildings around the world, East Asia being one of the key markets. With 40,000 employees Schindler Group is the world's largest supplier of escalators and the second largest manufacturer of elevator systems. Schindler moves 900 million people per day.

The advantages for Schindler Elevator Ltd. are:

- Replacement of a legacy configurator system
- Consistent support of the proposal process from project data capture via product configuration, price calculation right through to the generation of multilingual documents
- The proposal process needed to become consistent, faster and more transparent for all company sites
- Use of the system at the headquarters in Ebikon (Switzerland) and four sites in China as well as Hong Kong, Seoul, Dubai and Morristown (USA)

Toni Greter, Director Process & Tool Management

» Project

The Schindler Corporation uses SAP® throughout all its businesses. Based on the company's own experience, SAP® was considered unsuitable for the high-end elevator systems business of TRD.

Following an 8-months selection process involving intensive benchmark tests and competitive comparisons as well as a thorough practical trial of LEEGOO BUILDER, EAS was awarded the contract for the proposal system early in 2004.

Schindler Elevator Ltd. appraised the progress of the project very positively. Despite a very broad product spectrum, live operation could be achieved after only 10 months' data collection and preparation across the entire product range and on schedule. The budget, too, stayed exactly inside the planned limits. Worldwide implementation followed suit.
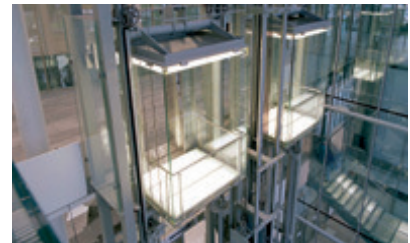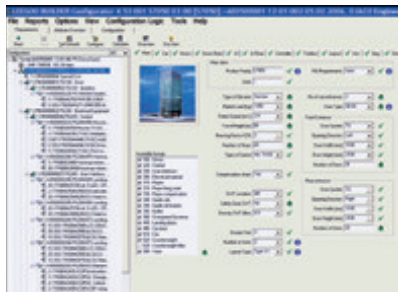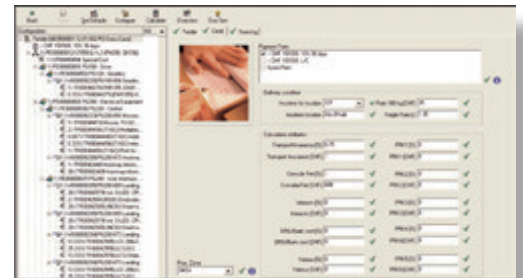

The project team

» Rollout phases

Start of solution development from April 2004. Live operation from April 2005 in Ebikon with 120 users and from June 2005 in China (Shanghai, Suzhou, Beijing and Guangzhou) with 35 users. Operation from mid 2008 in South Korea, Hong Kong and Dubai with 50 users. Operations in Morristown, USA, and Sydney, Australia with 10 users.

*Configurator for the S7050 elevator family
with request and tree view*

This enables a member of the sales team to perform the entire proposal process, including design and configuration, price calculation, creation of proposal documents right through to generating 2D/3D graphics in a consistent and efficient manner. This not only accelerates the proposal process and makes the calculation transparent and consistent but also significantly improves the reliability of the proposal process so that errors are avoided.

*Entry of calculation parameters as a view within the
main project data capture*

» Configuration

The system is used live around the world and is therefore designed for global operation. The first step was the modularisation of the product structure. The building blocks of a set comprising 16,000 elements for all types of high-rise elevators were already present within the organisation and could be imported into LEEGOO BUILDER. The direct and ready access to the existing master data proved to be a great advantage during the implementation of the proposal solution as its maintenance had already been established within the organisation.

The comprehensive set-up of product configurators for app. 6 elevator families of very different designs was achieved by TRD's own product managers, who possessed the requisite product expertise, even without any external support. The same is true for the continued maintenance which has proved an essential requirement of the day to day business. Due to their complexity and mandatory use in the proposal system, comprehensive design programs were integrated into the configurators.

» Calculation

The globally consistent price calculation is based on a complex calculation scheme comprising 87 columns. In addition to various other factors, currencies/exchange rates play an important role in relation to purchase costs and sales prices. Over the course of the project this new calculation was developed and deployed as a globally consistent system foundation. The calculation process was optimised in 2008.

» Graphics

TRD uses LEEGOO BUILDER in conjunction with the integrated Lift-Designer graphics application to generate scaled 2D and 3D representations for inclusion in the proposal (figure below).
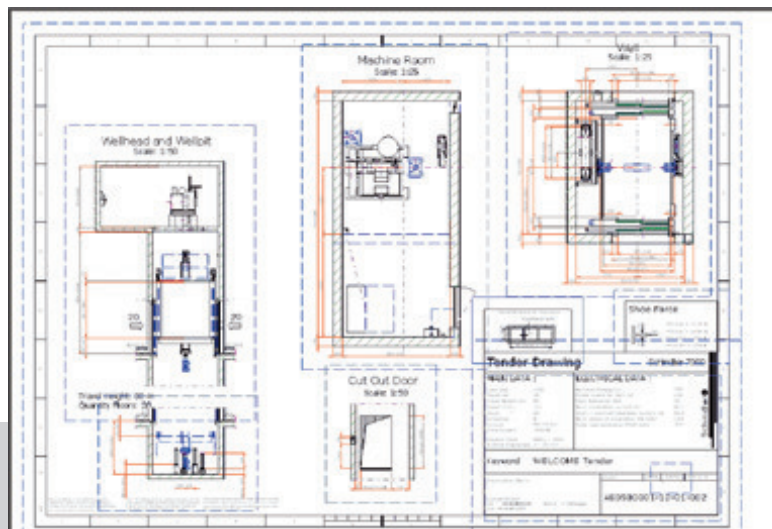
» Documentation

The proposal documentation is generated in German, English and Chinese.

» System environment

Existing design programs for calculating the carriage weight and specifying the drive units were also integrated into the LEEGOO BUILDER proposal system.

The Integration with LiftDesigner allows the consistent creation of 2D and 3D representations. On placement of order, an iDoc-based data transfer to SAP R/3® for the creation of customer orders via an interface realised by EAS takes place.

*Drawing generated by the LiftDesigner system
with data from LEEGOO BUILDER*

BEUMER
technology in motion

Machines and plants for conveyor, loading, palletizing and packaging technology as well as sortation and distribution systems

BEUMER
E Tray sorter

> *Advantages for BEUMER gained with LEEGOO BUILDER:*
>
> - BEUMER, as an expanding enterprise, can achieve a wider and easier applicability of product knowledge, e.g., in China, through the use of configurators
> - Quality improvements for proposals and, at the same time, faster creation
> - Price changes can be put into effect immediately on the day they occur on a worldwide basis
> - Complex technical designs are fully integrated in the product configurators instead of insular solutions
> - The efficient proposal system ensures error avoidance directly at the proposal stage during the design, configuration and calculation of the systems
>
> **Christian Niehaus, Deputy Design Manager**

The BEUMER Group is a globally leading producer of intralogistics solutions for conveyor, loading, palletizing, packaging, sortation and distribution technologies. With around 900 employees and a turnover of about 180 million Euros BEUMER supplies multiple markets through its affiliated companies and offices around the world.

The sheer diversity of tasks makes tailored solutions indispensable: From initial project concept to after sales service. BEUMER not only offers standard solutions but also plans, builds and installs plant systems matched to the specific customer requirements down to the finest detail. The product range includes machines and plants with a proven track record on many continents. They offer the user high availability and efficient operation.

BEUMER Belt Tray Sorter

BEUMER Belt Tray Sorter

» Objectives

A new proposal system for intra-logistics machines and plants. The initial situation was characterised by various insular solutions and a Word/Excel-based proposal solution. The new proposal system was to be created as a globally usable, consistent and comprehensive solution for the entire proposal process. The provision of know-how with the help of relatively complex product configurators to an internationally expanding organisation is a vital part of this exercise.

The palletizing and packaging technology area has been operative since early 2008. The bulk goods technology area has been expanded further.

» Solution

Following a comprehensive competitive comparison and a practical trial of LEEGOO BUILDER the system was chosen in 2004. An essential criterion was that LEEGOO BUILDER is geared towards the requirements of the mechanical and plant engineering industry. It was intended that product data and logic should be able to be built without any programming by the general business functions.

» Operation

Live operation since Q3 2004. Roll-out at the Chinese affiliate company is complete. Implementation under LEEGOO BUILDER, including initial comprehensive product configurators, was completed within just a few months. As the proposals are issued in 8 languages, including Russian and Chinese, a new LEEGOO BUILDER option, Translation Manager, was

developed in cooperation with EAS. Benchmark tests verified a fast proposal preparation.

Live operation of the LEEGOO BUILDER configuration and proposal system at BEUMER Maschinenfabrik in Beckum, Germany with the affiliated companies using Citrix®:

| BEUMER Machinery, China |
| --- |
| BEUMER India, India |
| BEUMER Latinoamericana, Brazil |
| BEUMER SARL, France |
| BEUMER Corporation, USA |
| OOO BEUMER, Russia |
| BEUMER Australia, Australia |

» System environment

Following the implementation of the LEEGOO BUILDER proposal system, the SuperOffice® CRM system was introduced throughout the organisation. The adherence to a strategy of openness towards CRM systems has enabled EAS to bring the integration of SuperOffice® and LEEGOO BUILDER to an early completion. The transfer function of order data to the ERP system developed in-house has been completed in 2008.
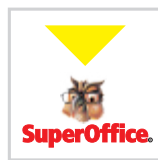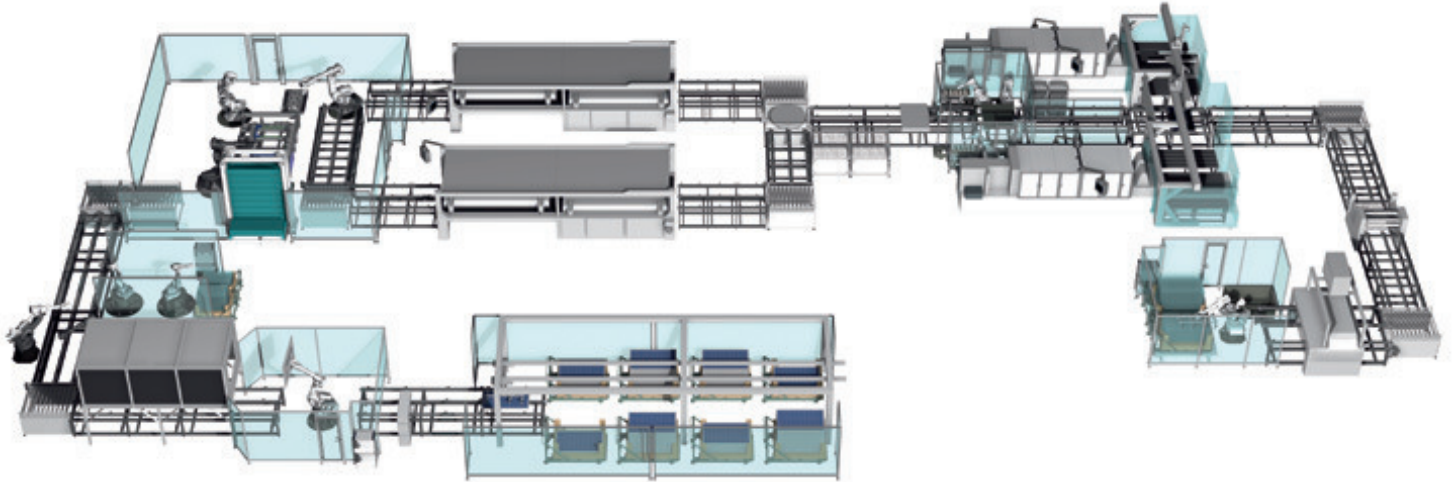

Bucket elevator at the pre-heating tower

Curve-capable belt conveyors

BEUMER robotpac® palletising robot

*Packaging machine BEUMER stretch hood®*

Module line in the photovoltaic sector

Developing, etching, stripping, laminating, brushing, grinding, regenerating, cleaning, resin stripping, chemical copper plating, direct metalising, plating, loading and unloading, transporting, buffering, laser treatment, measuring, testing ...

The target markets of the Schmid Group are technologically demanding:

- Printed circuit board manufacturing plants
- Flat panel display production plants
- Modular systems
- Photovoltaic production plants and complete factories as turnkey projects
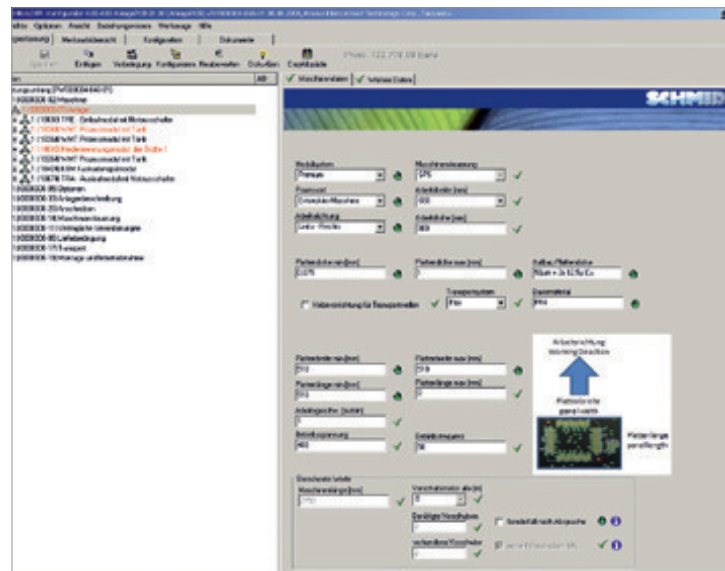
Configurator for printed circuit manufacturing plants

Significant advantages in a rapidly growing enterprise with high-tech products:

- More proposals, faster and in better quality
- The ability to evaluate and track proposals around the globe through analyses, especially in new subsidiary companies
- LEEGOO BUILDER database as a source for different back-end systems (SAP®, SharePoint®, ClickView®, MS Projekt®)
- Analyses of more than 60,000 existing proposals provide deep insights into the behaviour of subsidiaries, representations and customers
- The use of LEEGOO BUILDER ensures a secure flow of information and more local competence

Christian Schmid, Executive Partner

» Expansion course

The organisation's continual growth is maintained by the formation of partnerships and the foundation of new companies. In 2009, the worldwide number of employees was approximately 1,800. The worldwide use of the LEEGOO BUILDER proposal system supports this approach by providing a consistent and comprehensive platform for product configuration, price calculation and project engineering right through to results documents. A further advantage is the improved efficiency of the transfer of know-how to new employees joining the staff at remote locations.

The increasing importance of Schmid Group's large-scale projects (turnkey business) necessitates the further development of the internal organisation and information systems. The LEEGOO BUILDER database provides a data source for the worldwide organisation of the project management on the basis of, e.g., SharePoint in combination with MS Project. The ClickView system makes it possible to analyse the data experience embedded in more than 60,000 LEEGOO BUILDER proposals.

» Application

Gebr. Schmid GmbH + Co. is the first LEEGOO BUILDER customer. The proposal system has been operational since 1997 and has been expanded worldwide. Currently, more than 75 employees use LEEGOO BUILDER for proposal preparation and calculation at the following locations:

Germany	Freudenstadt Niedereschach
Canada	Sutton
USA	Oakdale
Taiwan	Chung Li
Hong Kong	Hong Kong
China	Shenzhen Shanghai Guangdong Zhuhai

» Configuration

Product configurators are a perfect fit for the modular/building block concept that the company adopted as the foundation of the success of its PCB production plant business division as early as 1997. The reuse of components and assemblies as order-neutral elements of a building block system in the highly individual plant configurations of the process technology solutions is a core concept with a sweeping effect.

The configuration takes place in two stages. During the first stage the process technology design, e.g., of a PCB production plant, is accomplished using plant configurators from a sequence of process modules such as etching, stripping, cleaning, etc. During the second stage the individual modules are configured to the level of detail relevant to the proposal preparation.

» Calculation

A globally consistent price calculation is one of the significant advantages of the database-supported proposal system.

» Documentation

Proposal documentation can fill whole folders and can be generated in 11, including Asian, languages. The document generator therefore needs to satisfy the most demanding requirements.

» Change management

Gebr. Schmid use a special methodology implemented in LEEGOO BUILDER that allows all changes made to a configuration to be retraced at a later stage.
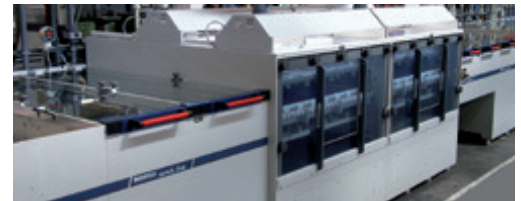
Schmid Resist technology for printed circuit boards DES (development-etching-stripping line)
Example of a printed circuit board production system in the Combi-Line modular system

DES system in the Premium-Line modular system

Assembly of printed circuit board production systems

» System environment

Citrix® Metaframe is used for worldwide operation via the Intranet alongside LEEGOO BUILDER for proposal preparation and project engineering. On placement of order the required data is transferred to SAP R/3®. The output of configuration data to MEGA-CAD for the generation of plant views that are attached to the proposal was implemented in 2008.

![handtmann logo – Ideen mit Zukunft.]

High Speed Cutting, 5-axis Machining Centers,
e.g., for the aerospace industry

Assembly gantry TS

Handtmann A-Punkt Auto-mation GmbH, a company of the internationally operating Handtmann Group in Biberach, Germany, manufactures 5-axis HSC centers focusing on high-precision cutting processes. The company offers a compre-hensive range of machining cent-ers for processing a multitude of materials in the aerospace, automotive, mould tool-making industry as well as the curtain wall and general metal machin-ing industry.
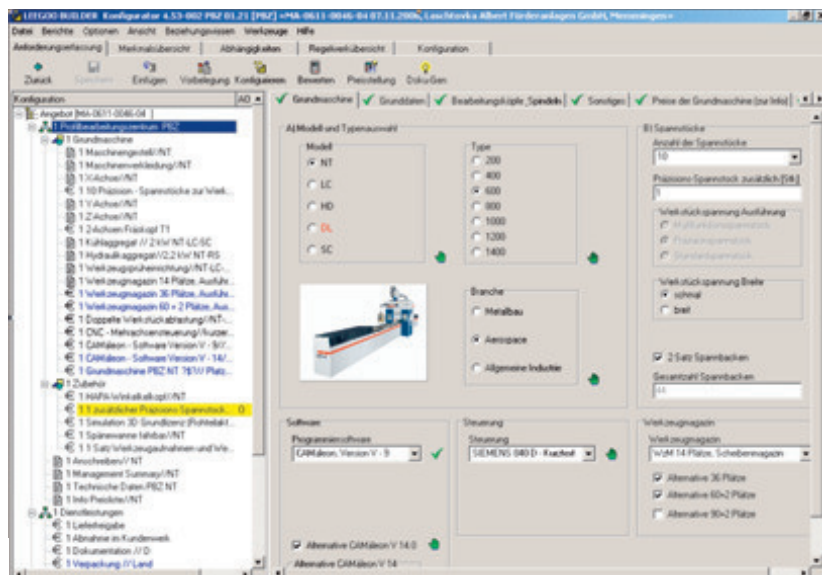

Illustration gantry TS

Configurator for profile centres in the "Customer View".

Extract from the technical specifica-tions section of a generated quotation

DONNÉES TECHNIQUES

Type de machine:	PBZ NT 600
Dimensions des pièces à usiner:	
Section max (l.xH.):	400 x 300 mm
Longueur max.:	6.500 mm
Courses:	
Axe-X env.:	7.230 mm
Axe-Y env.:	1.100 mm
Axe-Z env.:	850 mm
Axe-C env.:	+/- 200°
Axe-A env.:	+/- 120°

» Objectives

LEEGOO BUILDER is to realize a faster and more efficient generation of quotations within the Handtmann sales team, integrated individual product logics of a continually growing product range to different machining center product lines. The quotation system is executed via product configurators, price calculation and multilingual document generation. The global sales team must be provided with up-to-date and user-friendly access to all this data.

» Project

Following an extensive competitive comparison, LEEGOO BUILDER was chosen in August 2005.
The solution was realised in the sales division by a product administrator.
Since LEEGOO BUILDER is used as standard software without any special modifications or expansions, external support by EAS was limited to just a few days of on-the-job training.
The concept of standard software has had a very positive effect on the implementation costs and timescales.

» Configuration

The building block world is structured according to the individual basic models of the different machine types and their series as well as accessories, product options and service provision.
The envisaged improvement of the quotation system is achieved by the well-configurated mapping and application of the product logic defined in the configurators.

» Calculation

Price calculation is based on standard list prices and is quite clearly laid out. Market price, price rounding or discount/surcharge are realised with the so-called "pricing dialogue".

» Documentation

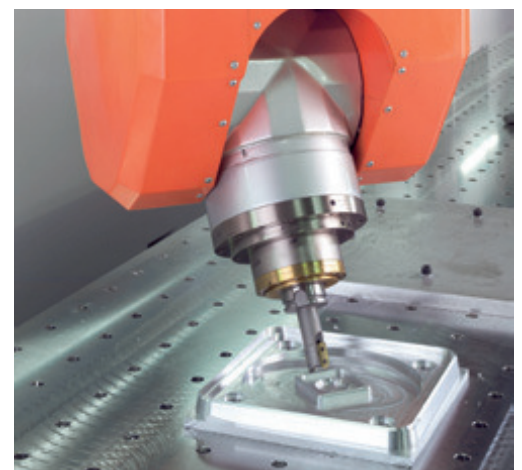Quotations are generated in four languages.

» Operation

The software is used via the in-house network by both the sales area managers in charge and the other members of the sales team, who quickly and reliably generate budget quotations.
For Handtmann a quick generation of quotations, e.g., budget quotations for individual standard machines, means that LEEGOO BUILDER stands for quotations that will be ready for dispatch within minutes.

» System environment

Company address and contact details are provided by an existing CRM system and replicated into the LEEGOO BUILDER database twice a day.
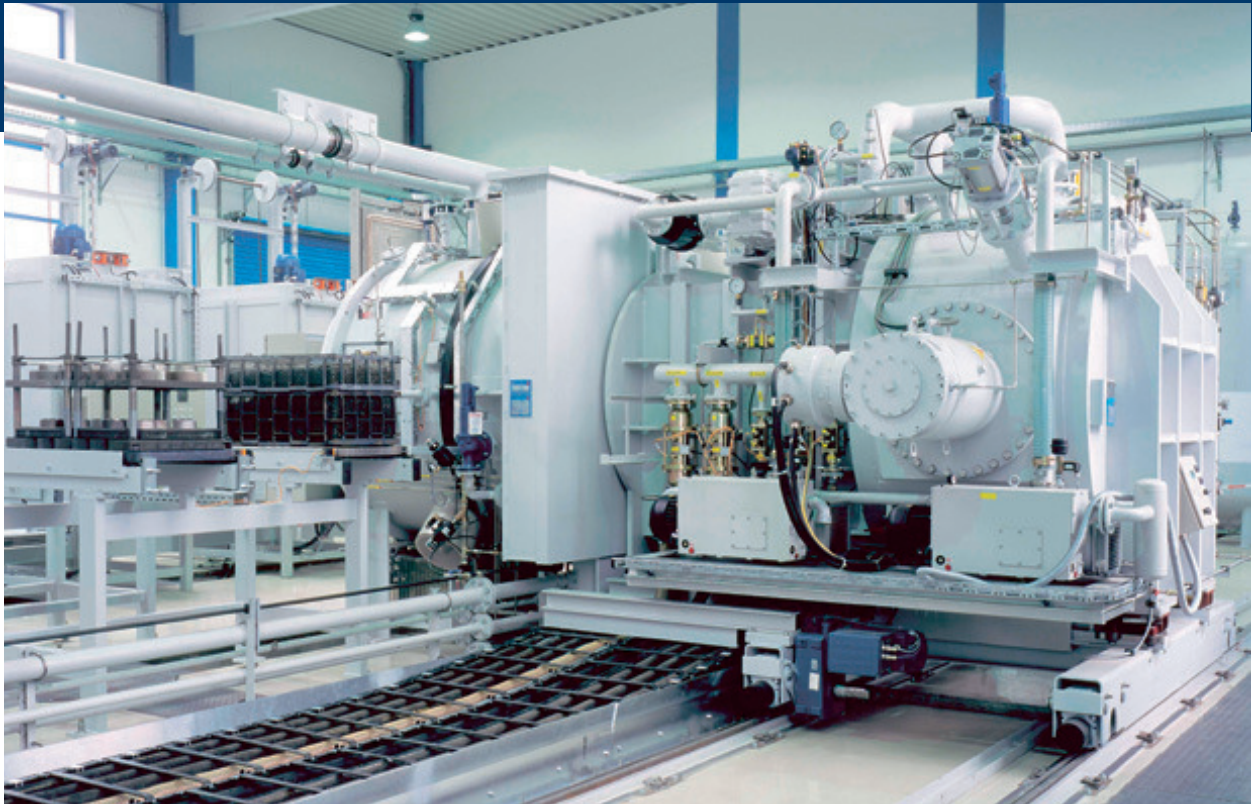
5-axis machining of aerospace components on a Gantry machine center

Extracts of a generated quotation

ALD

Plants for vacuum metallurgy and the heat treatment of steel components

Quenching chamber of the ModulTherm® plant

ALD Vacuum Technologies GmbH is the global market and technology leader in the provision of plants for vacuum metallurgy and the heat treatment of steel components.

"

Advantages of using LEEGOO BUILDER:

- One database for text modules and calculation for all employees
- Optional adjustment of all text modules in the project (specialisation) without changing the master data
- Consistent appearance of the proposals for all configurable plants
- Fast, user-friendly proposal preparation
- Central maintenance of the building blocks for text and costs
- Reduced number of errors during proposal preparation

Karl Ritter, Product Manager Heat Treatment

"

Daisy-chained multi-chamber vacuum plant

» Objectives

A database- and product configurator-based proposal system is to be used for the efficient, technically and arithmetically consistent preparation of multilingual proposal and order confirmation documents.
Major objectives are ease of use and maintainability by a member of the sales team.

» Project

LEEGOO BUILDER was chosen in July 2005 following a thorough trial.

» Configuration

The building block world for vacuum furnace systems was built in a modular fashion.
The figures to the right illustrate the multi-stage building process involved in the plant configuration.

» Calculation

The calculation is based on cost elements for material and different hourly rates charged for construction, commissioning, assembly, travel expenses, patent fees and many other parameters.
Based on these cost elements, which are defined as master data of the building blocks, and taking into account a variety of factors such as material overheads and corresponding hourly rates, a price proposal in the customer's target currency is arrived at by applying a calculation scheme comprising

more than 100 columns.
These calculated proposal prices can subsequently be trimmed by rounding, discount/surcharge or target market price until the sales price strategy on the one hand and the required margins on the other have been balanced.

» Documentation

Proposal documents and order confirmations can be generated in five languages.

» Operation

The system is used both in-house and on business trips by members of the sales team.
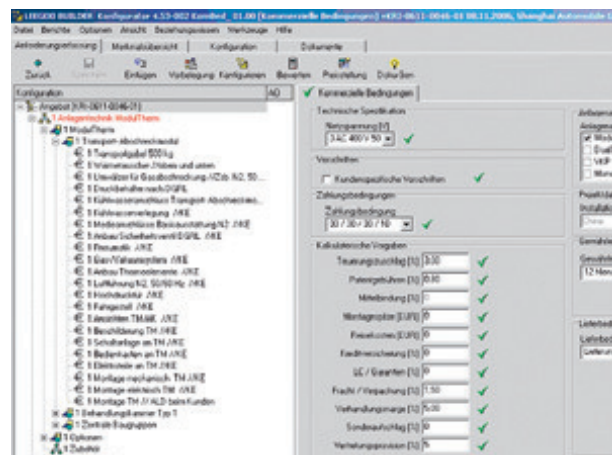
Proposal-level configurator for capturing the requirements in relation to commercial conditions which partially flow into the price calculation process
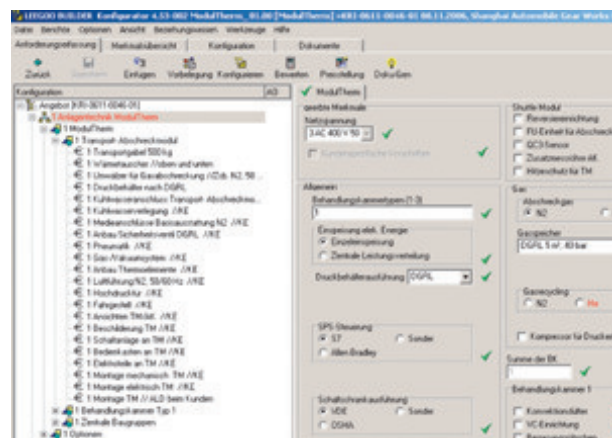
Plant-level configurator for the "ModulTherm" product line
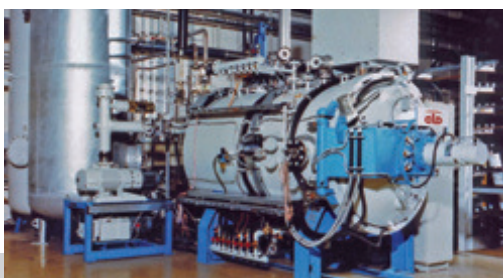
Flexible vacuum chamber furnace, type "MonoTherm"
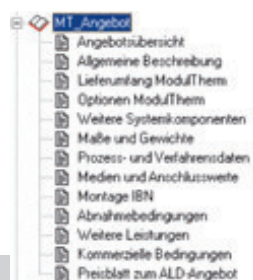
A plant engineering proposal document can consist of different chapters and is built in a modular fashion.
The documents are generated by the LEEGOO BUILDER "Document Generator" module.

Feeder system for the pharmaceutical industry

Rhein-Nadel Automation GmbH are specialists in the supply of parts handling and orientation equipment. Rhein-Nadel Automation GmbH has the technical knowledge and experience to handle the most demanding and challenging projects from concept to a fully commissioned automated system. With an extensive portfolio of standard equipment to draw upon, Rhein-Nadel Automation will manufacture a bespoke system to suit customers' requirements and needs.

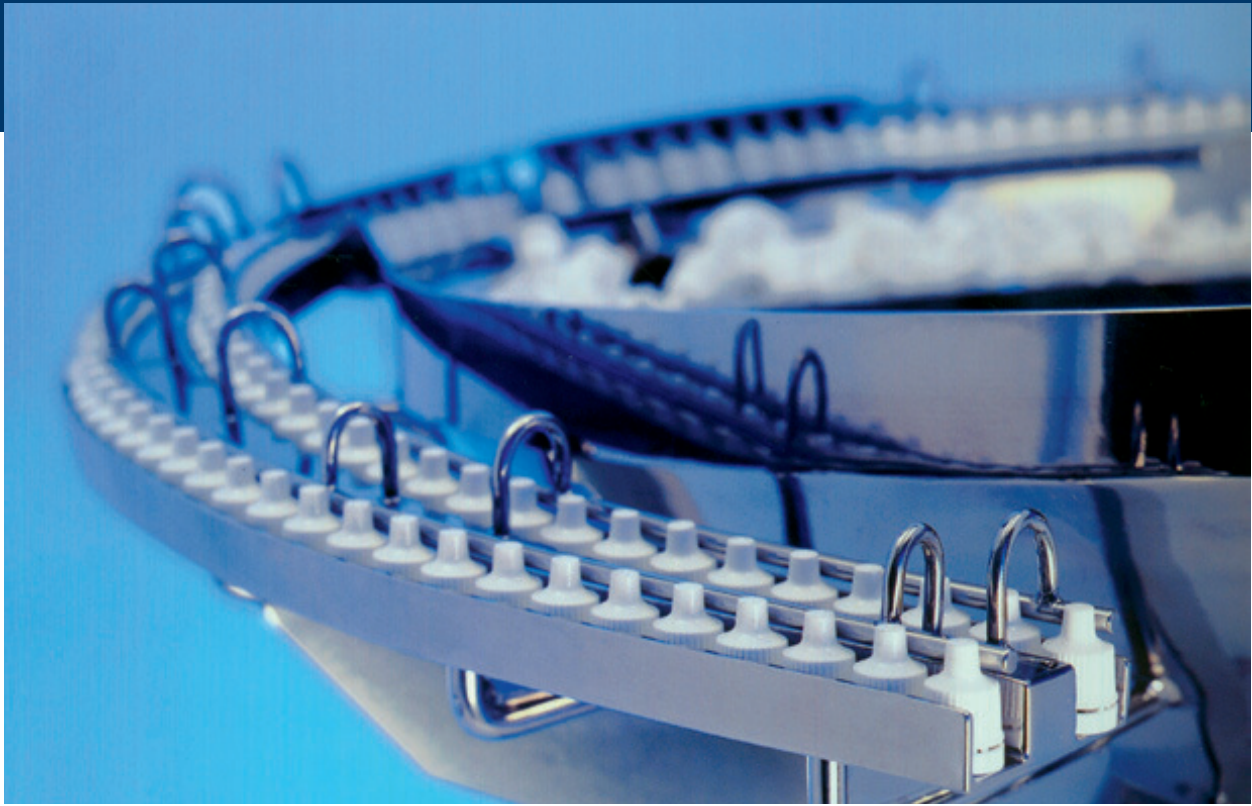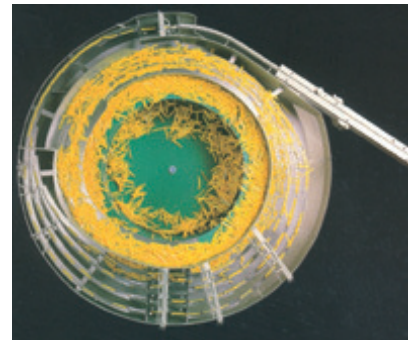*Sorting pot of a feeder system*

The main advantages using LEEGOO BUILDER for RNA:
- A structured and clearly defined technical proposal for the end customer, price calculation and common documentation for all operators of the quoting system
- Project engineering and configuration of solutions instead of the "summation" of items as previously in an ERP system
- Consistent and reliable proposal process combined with transparency and a comprehensive technical calculation solution for the back-end specialist areas
- Much reduced processing and lead times

Oliver Kirch, Administration LEEGOO BUILDER

Linear feeder system

» Products

Special purpose handling and orienting systems for industrial automation.
Within the scope of components required to supply the assembly process, RNA's experienced and highly qualified engineers develop and plan the correct solutions based on the latest feeding technology. High feeding capacities, operational reliability and a high-quality design are the main characteristics of our installations. RNA offer a full range of component feeders including bowl feeders, linear feeders, centrifugal feeders, step feeders and carpet feeders.

» Objectives

Project management and proposal calculation of feeder and system solutions alongside standard component sales are based on a central database solution to support the previous system of project planning and calculation as a single coherent process.

» Solution

Solutions for feeder systems are highly dependent on the components to be transported so that configurations are of rather limited use in this context.

Therefore, the company's components defined in price lists are made easily accessible to project engineers when preparing a proposal and an order. This forms part of the overall project engineering and ensures a more efficient customer-specific, structured end result for the solution and concept.
RNA uses LEEGOO BUILDER as a manual, interactive solution giving a consistent project engineering and calculation process ensuring efficient production of proposal documents.

» Project

LEEGOO BUILDER was chosen in June 2005 following a full and intensive trial by RNA.

» Operation

The software is used in-house for project and quotation management. It also produces print-ready quotation documents. The mobile use of the system is planned as well.

» System environment

Customer information is regularly updated from an ERP system to LEEGOO BUILDER.
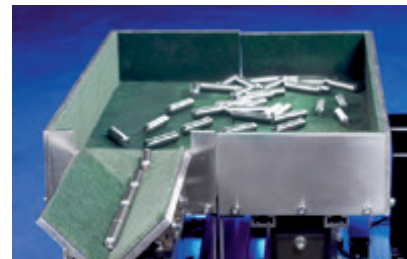
Slide bed conveyor

Feeder system for the pharmaceutical industry

Standardised band hoppers

Feeder system in an assembly plant

Feeder system with quick-change mechanism

FELSS

Machine and transfer lines for the chipless production of net-shape components by rotary swaging and axial forming
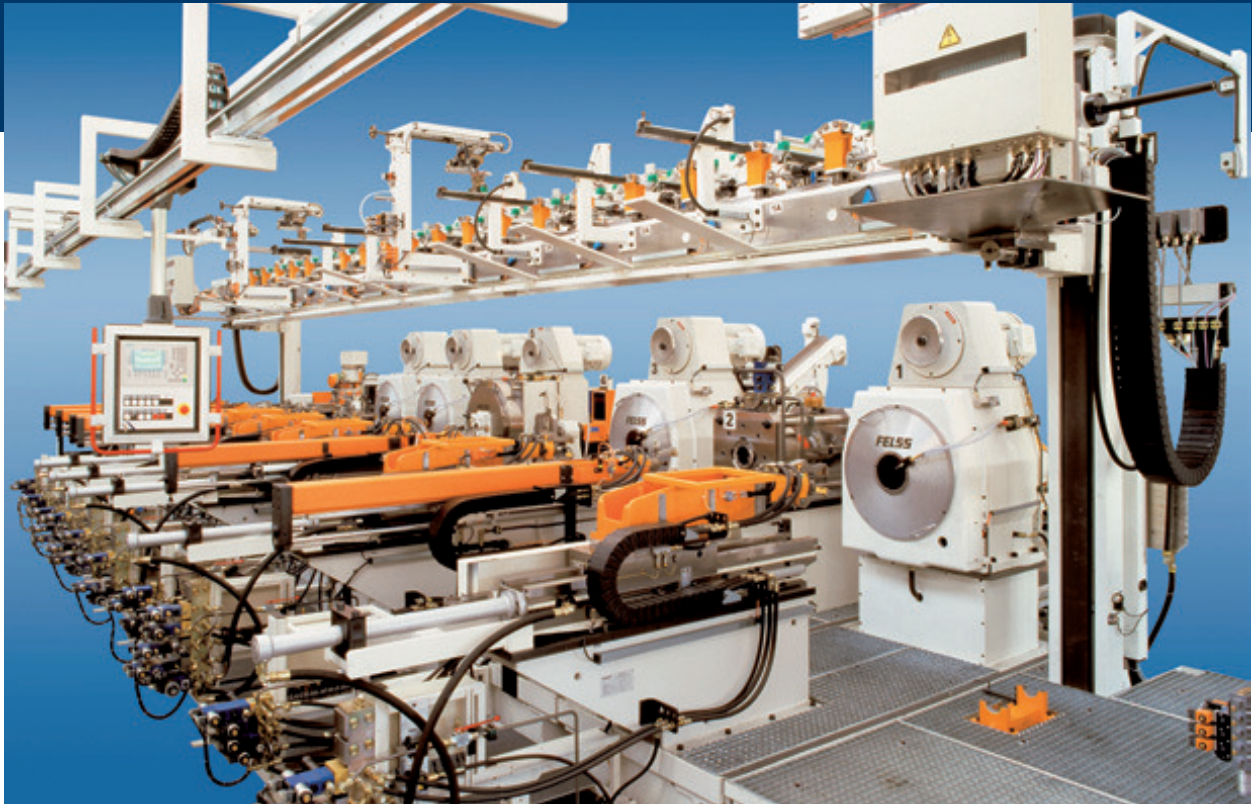
View of a 10-station, fully automatic rotary swaging transfer line, type HA 40-10 VUE

FELSS GmbH represents the machine building division within FELSS Group. FELSS GmbH specialises in machines and transfer lines for chipless production of net-shape components by rotary swaging technology and axial forming. Processing in general takes place on single-station machines or on transfer lines consisting of several processing stations.
A possible solution of the technologically demanding rotary swaging process requires an accurate analysis of the components to be produced on the machine.
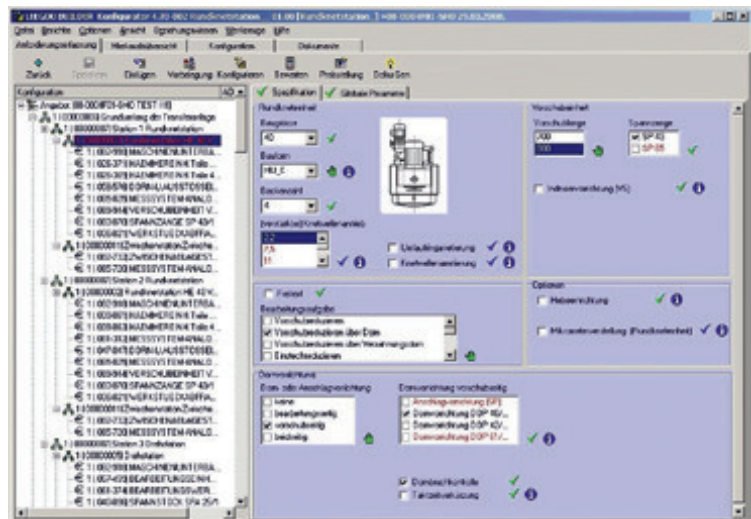
Configurator for rotary swaging stations of a rotary swaging transfer line

Work pieces manufactured by rotary swaging technology

» Objectives

LEEGOO BUILDER is to bring about a faster and more efficient proposal preparation process, including the representation of product configuration logics as well as their readily applicable presentation to the sales force. Furthermore, the departmental development of a transparent and consistent calculation scheme as well as the implementation of this scheme in the LEEGOO BUILDER proposal system are of the greatest importance to the company and in future also to its affiliate companies.

The appropriate coordination of the pre- and post-calculation is an essential aspect in relation to the groups controlling function.

» Project

LEEGOO BUILDER was chosen in August 2005 following a thorough competitive comparison.

The solution is being developed by a product administrator inside the sales division in cooperation with another member of the sales team.

Since LEEGOO BUILDER is used as standard software without any special modifications or expansions, external support by EAS was limited to about 10 days of on-the-job training. The concept of turnkey standard software proved successful once again.

» Configuration

The building block world is structured according to the individual basic models of the different machine types and their models as well as accessories,

product options and service provisions. The implemented product configurators and the new calculation procedure, which is consistently applicable throughout the proposal system, have brought about the required improvement of the proposal process in terms of speed, consistency, transparency and appearance.

» Calculation

The price calculation is based on approximately 15 cost elements such as manufacturing costs, hours for mechanical, electrical design and assembly, etc. as well as hours for commissioning and assembly at customer`s plant. In addition to this calculation master data, the project engineering data can also be entered and priced individually for the corresponding order item and according to the project engineering requirements for new, modified or requested assemblies. Thus, the flexibility required in the plant engineering business is also carried through to the project engineering of customer-specific solutions in comparison with more highly standardised individual machines.

» Documentation

Proposal documents are generated in three languages.

» Operation

The system is used in-house in the sales department. LEEGOO BUILDER is also intended for the mobile use on business trips by members of the sales team who exchange proposals with the main office.

» System environment

Company address and contact details as well as the building block data are maintained by the PsiPenta® ERP system. The data is replicated cyclically in LEEGOO BUILDER. Conversely, on placement of order the proposal bill of material held in the proposal system can be transferred back to the ERP system where it can be used as order BOM.

» Outlook

The next stage planned is to adopt the single-station machines and the Aximus machine type into the LEEGOO BUILDER configuration and proposal system.
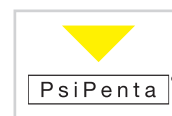
Single-station, fully automatic rotary swaging machine, type FlexCell

Single-station, fully automatic rotary swaging machine, type HA 40-1 VUEH-NC

Chipless shaping and finishing by rotary swaging technology

VAG

Product configuration and price calculation with SAP® integration for standard and large-scale fixtures

Dam fixtures

We move water.

As a solution provider for water and wastewater technology VAG has defined a new standard.

VAG-Armaturen has a long tradition as a provider of innovative and reliable valves. In addition to serial products such as control valves and dampers, VAG is increasingly active as solution provider for water and wastewater technology. The extensive product portfolio spans small-gauge gate valves, hydrants and many more to gate valves for dams with diamete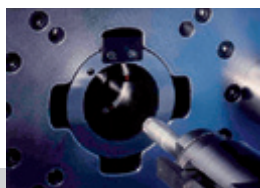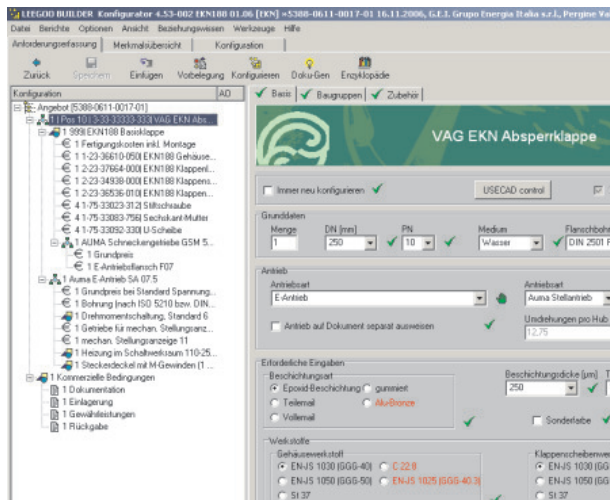rs of several meters. These products then become a part of the project business as solutions for the water and wastewater economy.

Configurator for the EKN gate valve with tree structure and request view
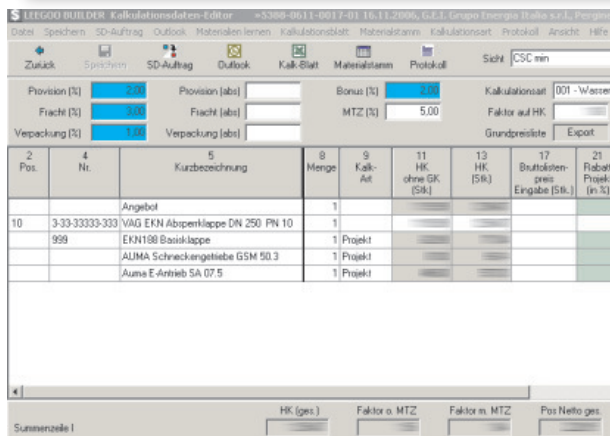
Extract from the VAG-specific dialog for the order calculation based on series and project items; the calculation of series items is SAP® conform

> *LEEGOO BUILDER experiences at VAG:*
> - Creating more proposals faster and with shorter cycle times improves the order prospects
> - Consistent and SAP®-compliant price calculation
> - One consistent calculation database for all users
> - Worldwide access to the proposal system through a solution with application in the Intranet (Citrix®) from 13 sites around the globe
> - Consistent solution with SAP® integration
>
> ***Volker Radlhamer, Project Engineer***

» Before
Prior to the introduction of LEEGOO BUILDER in 2005 the proposal preparation followed an insular approach based partly on Word/Excel and partly on standard production items in SAP R/3®.

» After
The aim of the new proposal system with product configurators and customised price calculation was a drastically improved efficiency, speed, consistency and transparency of the price calculation process as part of

the proposal preparation process inside the customer service function to keep abreast of the growth of the organisation.

» Proposals
About 75 users in different countries required consistent product data and configuration logics for the preparation of proposals.

» Orders
On placement of order, an SAP SD® sales document (order), including all items, proposal prices and texts, is automatically created via LEEGOO BUILDER. An XML-based SAP® interface was developed and implemented in cooperation with EAS for this purpose.

» Reuse
A particular highlight of the proposal solution is its "learning" capability. This means that once a product variant, for example an EKN gate valve with approximately 100 specific attribute values, has been converted into an order it will be saved in the proposal system together with these characteristics and the corresponding SAP® material numbers. During each configuration a check is made whether the entered product requirements such as pressure rating, nominal width, etc. match the specifications of a finished gate valve, i.e., whether there is an existing SAP® material number. If yes, the proposal system will transfer this material number to SAP® together with the order. This saves having to create new material with the ancillary work schedule, bill of material, etc. and results in significantly reduced effort not only on the proposal side but also on the order handling side.

» Project
LEEGOO BUILDER was chosen in March 2005 following an extensive market analysis, various visits of reference sites and an exhaustive trial of LEEGOO BUILDER.

» Configuration
VAG product administrators developed comprehensive configurators for project items such as EKN gate valves of all designs and sizes as well as other configurable products. Some of the configurable valves have a very high number of characteristics such as pressure rating, nominal width, etc. so that more than 100 criteria are required to uniquely identify one of these gate valve variants.

» Modularity
The configuration must be carried out in stages, as a gate valve may comprise other configurable component assemblies such as gear and drive units with their own configurators (see figure above left).

» Calculation
Clarifying and implementing the calculation process for all business cases in the area of series production and project calculation was a considerable challenge in terms of expert knowledge. Following a detailed analysis in preparation of a holistic definition of the new calculation scheme, EAS implemented a customised calculation view for VAG.

» Documentation
Proposal documents and order confirmations are generated in 5 languages.

» Operation
The system is used both in-house and on business trips by members of the sales team.
As of 2008 LEEGOO BUILDER has been in use at a total of 13 sites in addition to the VAG headquarters at Mannheim, Germany. The sites include:

Czech Republic	Hodonin
China	Taicang
Austria	Salzburg
UAE	Dubai
Chile	Santiago
Italy	Milan
India	Secunderabad

» System environment
Material data for series items is cyclically machine-transferred from SAP® to LEEGOO BUILDER. SAP SD® orders are automatically created in SAP® via a LEEGOO BUILDER dialog and data transfer.
The proposal system recognises whether a configured product variant already exists as material in SAP® so that if it does, a considerable amount of time and effort is saved during order processing. Previously, there were only limited capabilities reliant on the employees' memory.

In 2008, VAG introduced a CRM system that cyclically transfers customers' and enquirers' company addresses and contact details to LEEGOO BUILDER for import.

schelling ®

Sharp cuts for every requirement
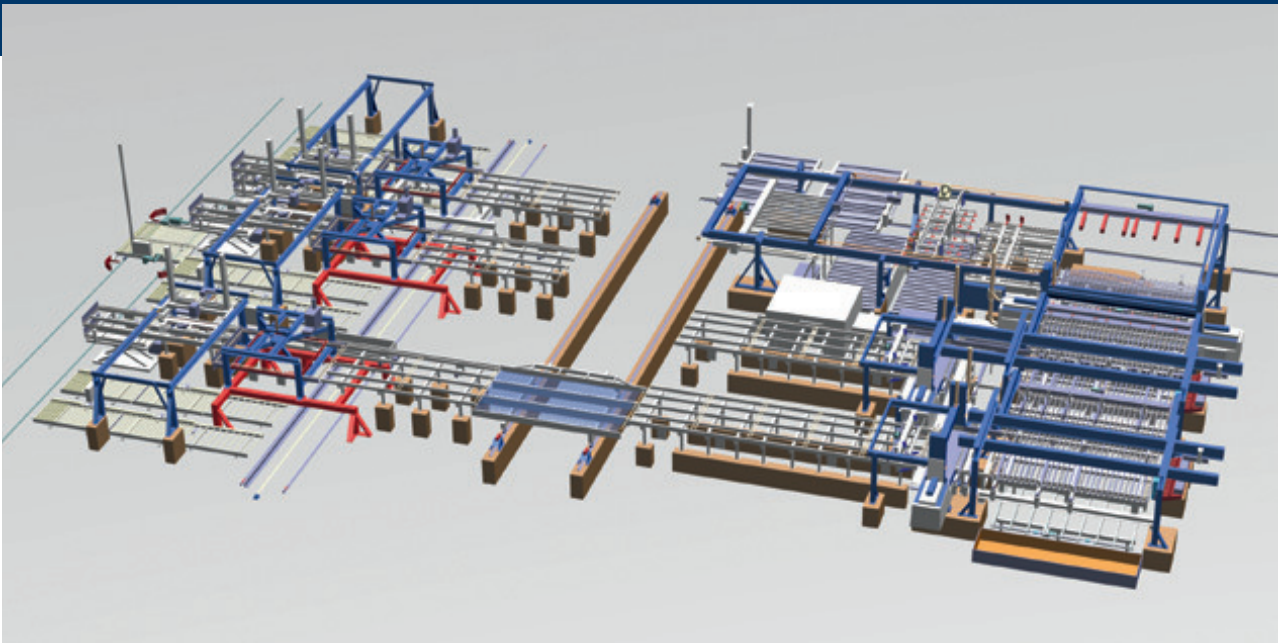
Fully automatic cut-to-size plant with sorting and stacking plant

With more than 80 years' experience Schelling Anlagenbau GmbH is one of the oldest and most reputable saw manufacturers around. Schelling products are built according to a building block system. Simple adaptations allow them to **be customized according to the many and varied customer requirements. The personal advice provided by Schelling specialists forms the basis of an optimal customized solution - during all stages of the individual projects - worldwide.**

Advantages of introducing LEEGOO BUILDER:

- The use of product configurators for individual machines and plants results in a faster and more reliable proposal process
- Error reduction due to the more accurate capture of requirements
- Consistent visual appearance of the proposals
- Up-to-date calculation data base and consistent calculation for all users
- "Paper price lists" generated directly from LEEGOO BUILDER master data

Gerhard Stofleth, Head of Marketing

fh 6 cut-to-size saw – core machine of a cut-to-size plant

» Products

Cut-to-size saws and cut-to-size plants for sawing material made of wood, plastic, non-ferrous metals and steel.

» Objective

Proposal and order preparation via a DOS program developed in-house proved insufficient for meeting today's and future requirements. Proposals needed to be created faster, more accurately and consistently. The modular products and their building block systems, including the corresponding product logics and configurators, needed to be supported, in particular for the market introduction of new machine types. The calculation process needed to allow for a flexible market adaptation and in the case of discounting the remaining margins needed to be immediately visible. Proposal documents, including various foreign languages, needed to be generated within seconds.

» Introduction

In 2004 Schelling recognised the need for high-performance proposal software. Following a market evaluation and a thorough trial, the LEEGOO BUILDER standard software package was acquired in April 2004. The deciding factors for the speedy selection of the system were the extensive references from the mechanical engineering and plant engineering market, the system's design bias towards these markets and its proven functionality. Due to a lack of internal resources system development started to falter in 2004. The expected progress was made after the company management charged one person with the main task of setting up the system.

There is a lesson to be learned here – the preparation, structuring and matching of product data and configuration logics down to the level of prices and proposal texts often accounts for 70% of the overall time required, whereas the implementation with LEEGOO BUILDER only accounts for the remaining 30%. In this sense, structuring the product range often proves to be a professional challenge despite the fact that in some cases machines have been successfully built for the past 100 years.

This is why the project support provided by EAS during the early stages of the system set-up in the form of on-the-job training proves highly useful and necessary. It usually results in the completion of the required proposal system, including basic customisation, within 5 to 10 working days. Further system development is carried out by the internal product administrator(s) in their specialist department(s) – usually sales department.

» Application

Proposal preparation with 15 users for cut-to-size plants of various designs and types.
The saws are the core machine of a board segmentation plant (see figures). The process is configurator-based using product logic.

» Configuration

The corresponding product configurators inside LEEGOO BUILDER are built as modules spanning multiple stages corresponding to the product structure levels, i.e., there are machine component configurators which are used by several different machine configurators. This way, assembly logics need to be defined only once.

» Calculation

Calculation is based on a model comprising approximately 60 columns. Manufacturing costs are derived from costs and hours and then compared with the sales list prices, allowing an immediate evaluation of the feasibility of discounts in view of any remaining profit margins.

» Documentation

Proposal documents are generated in German and English.
Further languages are being added gradually.
The LEEGOO BUILDER "Translation Manager" is a very useful tool in this context, in particular when a proposal needs to be published in a new, i.e. incompletely translated, language as this entails the need to assess and meet the translation requirements of this particular proposal.

» System environment

The LEEGOO BUILDER proposal system was integrated with Microsoft® CRM 3.0 in 2007. The manufacturing costs are provided by the Baan® ERP system.

Microsoft Dynamics® CRM

Polysius

Project planning in the cement factory market – from individual machines to turnkey projects


Pre-heating tower with rotary kiln of a cement factory

Today, Polysius AG is one of the world's foremost engineering companies for the supply of equipment to the cement and minerals market. Polysius builds complete production lines, supplies individual machines and carries out plant reconfigurations:
From project elaboration, construction, delivery, assembly to commissioning and after-sales service.

"

Advantages of introducing LEEGOO BUILDER:

- Reduced IT costs through the replacement of the IBM mainframe system
- Comprehensible, consistent data through the use of configurators with data inheritance
- Additional worldwide use in subsidiary companies resulting in consistent and comparable project structures and data
- System support for the predetermination of the division of supply and corresponding pricing

Heinz Empting, Project Manager Project Engineering/Proposal Preparation

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The most important prerequisite for a successful implementation is the ability to formulate user-specific tasks and their implementation within an agreed quality, cost and time framework – irrespective of the project spanning an entire plant, the refurbishment of a production line or individual segments. In each case the result is a concept with optimally selected machines, carefully matched process stages and their concatenation into an efficient whole.
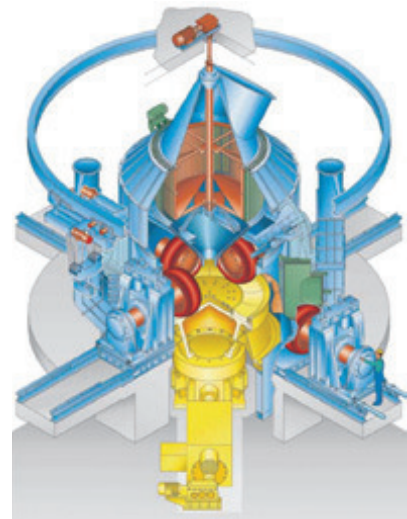
Polysius has a worldwide presence with 20 overseas companies and therefore can provide competent on-site advisors, all adhering to the same principles, offering identical yet customer-specific, future-oriented and professional project and deployment support based on common research and development.

Quadropol roller mill

» Objectives

A Polysius proposal can represent an order value of several hundred million Euros, with project engineering and calculation handled by teams at various locations (concurrent engineering). A company-specific and cost-intensive mainframe project engineering

Materials for cement production

application is to be replaced by a new solution for the more efficient support of the complex proposal process for machines and installations through to complete plants.

For entire plants bills of quantity comprising up to 30,000 items are created which, in the sense of a pre-calculation, require complete calculation as a whole, right through to the proposal price.

Fast presentation, from calculation results to order calculation, is to be achieved with LEEGOO BUILDER as a consistent project engineering solution.

» Project

LEEGOO BUILDER was chosen in 2000 following a trial phase. Live operation since 2002. SAP R/3® is used as the processing system throughout. Before the selection of LEEGOO BUILDER, it was envisaged to use of SAP® for plant project engineering but this failed to reach a positive conclusion …

» Application

With more than 500 configurators for machine and plant areas the system provides more than 130 project engineers at various locations around the world with easy-to-apply product knowledge.

During the introduction of LEEGOO BUILDER the great advantage of using configurators for the planning of machine and plant area projects became evident.

This realisation, based on practical experience, exceeded the expectations held at the outset of the introduction into Polysius's field of expertise.

In the "engineering-to-order" business such as Polysius's, so-called

Configuration with flow sheet for a raw mill plant. Polysius places great emphasis on an informative process representation in the configurator.

Bill of quantity for part of a plant, including details on delivery distribution for worldwide sourcing

bills of quantity play a pivotal role. In addition to parameters such as quantities, weights, hours and other factors, it is important to represent the division of supply. Of course, this bills of quantity data is relevant to the calculation process. The bill of quantity therefore represents the result of the technical project engineering and provides the master data for the pre-calculation.

In addition to the bills of quantity, various representations of the calculation results are generated on the results side. Additionally, a so-called order calculation is created for each project. The order calculation is a condensed representation of the pre-calculation results for the internal economical project evaluation. Following the review of the order calculation results, changes to the

overall configuration, and possibly the division of supply, are quite normal so that the system needs to allow a quick reiteration of this project engineering loop.

» System environment

Citrix® Metaframe is used for remote operations alongside LEEGOO BUILDER for proposal preparation and project engineering.

On placement of order, data describing the order structure is transferred to the SAP R/3® module PM via a special interface developed by Polysius.

BRÜCKNER POWER-FRAME tension machine with patented "split-flow" ventilation system.

"Be First in Finishing" – this is the motto BRÜCKNER has been committed to since 1949. Today, the companies of the BRÜCKNER Group are global leaders in the provision of systems and plants for the textile dry-finishing and related markets.

Advantages of introducing LEEGOO BUILDER:
- Consistent system for product configuration right through to calculation and proposal preparation with the resultant error reduction
- Logic-based selection options offered by configurators ensure the production feasibility
- Provision of a basis for the transparent comparison of pre- and post-calculation
- Significantly faster realisation of technical changes in proposals

Andreas Grausdies, Order Control Director

BRÜCKNER production lines are used for finishing woven and knitted textiles, high-tech textiles, floor linings, glass-fibre fabrics, fleece fabrics, etc. The resulting finished products are textiles, carpets and PVC flooring, light-protection louvers, glass-fibre reinforced plastics, artificial leather, wallpaper reinforcement materials for the construction industry and many more.

During the development of the modular production lines the BRÜCKNER technologists give economy, flexibility and technological progress the same importance as ease of use and maintenance. A team of qualified specia-lists guide the customer through all project phases – from planning and consultation right through to commissioning.

» Situation
The proposal processes used by BRÜCKNER until the introduction of

LEEGOO BUILDER was technologically obsolete and unfit for the future. The initial state was characterised by a variety of insular project layout solutions based on Word and Excel. The manual process of linking the data and prices stored inthem was prone to errors which were difficult to spot and track. The relationship with technology and design (maximum bills of materials ERP), especially pertaining to the continued development of machines and plants was not recognisable.

» Objective
The primary objective was the creation of a coherent and consistent proposal process with a transparent calculation function, including the ability to generate additional documents. From this the following subordinate objective was derived: Creation of a building block world co-ordinated with design and technology. Based on this a transparent pre-

calculation process, consisting of calculation master data and proposal price calculation, which was readily comparable with the post-calculation had to be built. Configurators on the plant and plant component level were the third major objective for a broad and consistent provision of the sales force with configuration knowledge. The maximum structures (building block set) used by the sales force were to be derived from the maximum bills of materials used by the ERP world so that price relevancy could be achieved without being overly detailed. The consistent configuration and price calculation as seen by the users was then to result in the practical advantages during proposal preparation brought about by the preparatory work described above. The relatively high error risk of the manual text configuration and price definition of the old method was to be drastically reduced.

A better foundation for additional internal documents, for example, a technical specification sheet, was to be created.

» Modularity

In accordance with the objectives described above, the building block world initially needed to be defined from the ERP maximum bills of materials (design) for the sales force. This step was time-consuming and it took about 9 months of preparatory work until clean foundations, based on expert knowledge, were laid for building the configurators with LEEGOO BUILDER. Experience once again showed that the effort involved in "doing the homework" accounted for about 70 % and the implementation in LEEGOO BUILDER for only 30 % of the overall effort.

The completion of a configurator for a component plant, including clarification with systems experts and implementation with test in LEEGOO BUILDER, took an average of about 2 to 4 weeks. The company needs to view this time as a meaningful investment because this clarification results in a simplified, more transparent, consistent and easier to understand business as well as an easier knowledge transfer to new employees.

» Configuration

The building block world used for BRÜCKNER plants comprises approximately 5,000 building blocks which are now matched to the bill of materials used by the design engineers. There is one plant-level configurator. Here, the creator of the proposal enters universally valid plant requirements, according to the customer's specifications, in the form of attribute values such as type of goods, width of goods, production rate, etc. These plant requirements are then "inherited" on the component plant level. There are 10 configurators for component plants.

» Calculation

Traceable calculation master data such as material costs, material overheads, design hours and factors detailing country specificity, financing, commissions as well as various other details is mapped to the building blocks. The pre-calculation, which can now be compared with the post-calculation, consists of a calculation scheme comprising more than 60 columns.

» Documentation

Proposal documents and order confirmations are generated in German, English, French and Spanish.

» Operation

The system is used both in-house and on business trips by members of the sales team.
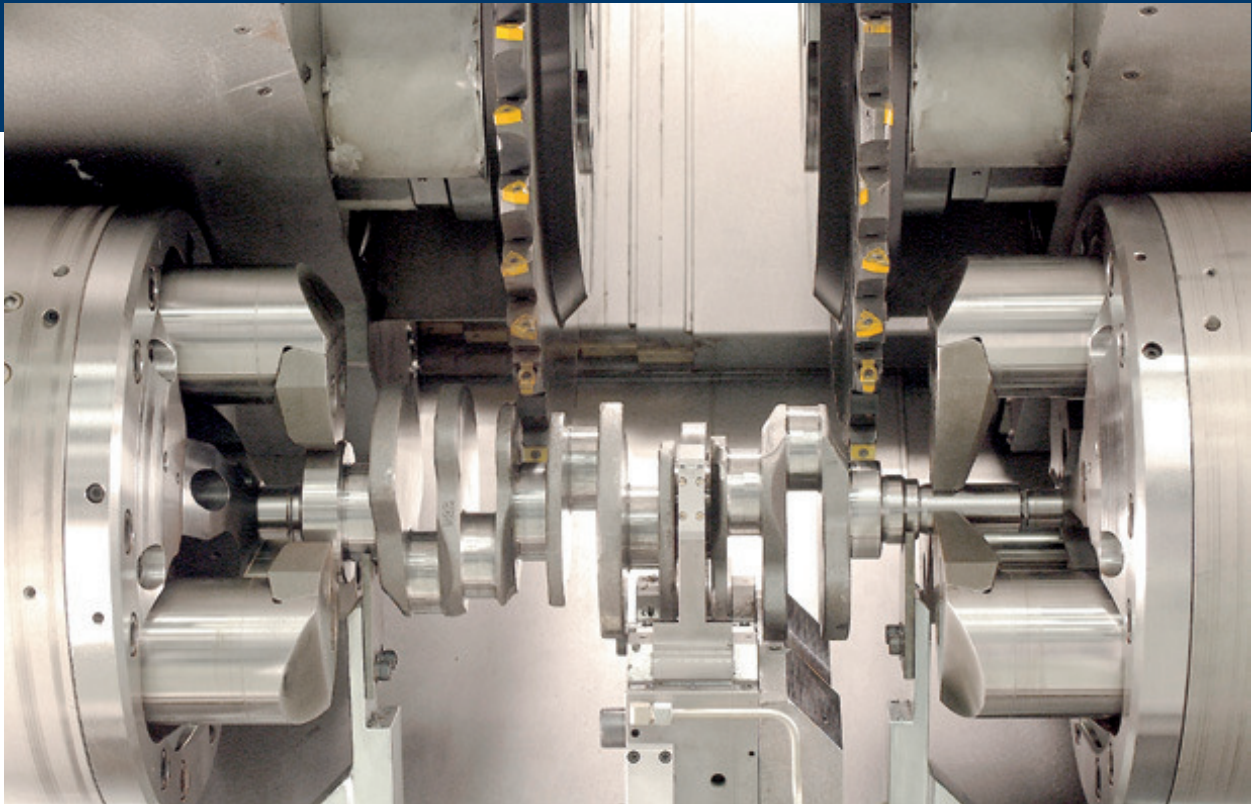
» System environment

Customer address and contact details are imported into the LEEGOO BUILDER database via a transfer mechanism using an export file which is populated from a data repository residing on an AS400.

BRÜCKNER POWER-LINE tension machine: Exit – batch winder with peripheral drive, changeover roller and interim product storage trough

Product entry into the BRÜCKNER POWER-SHRINK compressive sanforization line

MAG BOEHRINGER

Machine tools and processing systems for the automotive and supply industry as well as the machine and power plant industry

Workspace of a crankshaft milling machine

MAG Boehringer is part of MAG Industrial Automation Systems, a dynamically growing group and worldwide leader in the machine tools industry. Market leaders from a variety of areas utilise the MAG Group's enormous innovative power to safeguard their technological advantage and to be prepared for future challenges.

Today, MAG Boehringer doesn't regard itself as a pure supplier of machines but rather as a partner of its customers capable of offering production solutions and competently maintaining the delivered plants.

MAG Boehringer offers its customers the safety of a reliable partner, technologically leading products and the entrepreneurial flexibility to quickly adapt to changing customer requirements.

MAG Boehringer caters for international customers spanning the entire spectrum of the metal-processing industry, with an emphasis on the automotive industry and its suppliers as well as machine and power plant manufacturers.

VDF 320 CM crankshaft processing machine

» Objective

A new configurator-based proposal system is to provide efficient support of proposals – from individual machines to project engineering for the solutions business.
Especially budget proposals for individual machines are to be created faster, more accurately and coherently than previously. They are required within in minutes, leaving more time for the actual "engineering" tasks.

Prior to the introduction of LEEGOO BUILDER, SalesLogix® was used as the CRM system. Therefore, the integration of CRM (SalesLogix®) with LEEGOO BUILDER was a further requirement.

» Project

LEEGOO BUILDER was chosen in December 2005 following a thorough competitive comparison. A product administrator in the sales force is responsible for building and maintaining the solution. External support by EAS, including the SalesLogix® integration, consisted of a total of 6 days on-the-job training.
The system's introduction with so few service provision days by EAS was made possible by the experience of EAS in implementing systems of this type in mechanical and plant engineering environments, by the openness of LEEGOO BUILDER regarding the integration of CRM systems and, last but not least, by the concept of ready-to-use standard software.

CNC lathe, type VDF 250 T, for up to 1850 mm work piece lengths

» Configuration

The building block world for basic machines, options, accessories and service provision with corresponding standard list prices and multilingual proposal texts was built for the various product lines and their types. Product configurators, including the logics for built-in valid variance within the product lines, were built and enabled a fast and coherent proposal preparation, including price calculation.

» Documentation

Proposal documents are generated in four languages.

» Operation

The system is used in-house by the sales force. LEEGOO BUILDER is also intended for the mobile use on business trips by members of the sales team who exchange proposals with the main office.

» System environment

The integration of the SalesLogix® CRM system with the LEEGOO BUILDER proposal system was completed in Q1 2007.

SAGE CRM SALESLOGIX®

Experiences gathered during the introduction of LEEGOO BUILDER at MAG Boehringer:

- A product administrator for developing and maintaining the proposal solution is an essential requirement
  The experience of EAS needs to flow into
- the conception of the introduction
- Implementation should follow a planned and systematic approach
- Proposal preparation with configurators constitutes a major improvement

LOESCHE mill, type LM 60.4, for grinding raw materials

LOESCHE GmbH has supplied the global cement, iron and steel, power plant and minerals industry with grinding and drying mills since 1906. The company's core competence is the development and design of vertical mills (the LOESCHE mill) as well as the planning, project planning, delivery, assembly and commissioning of complete plants with a high content of process technology engineering in which the LOESCHE mills are used. In addition, LOESCHE offers a broad spectrum of services comprising maintenance, repair and spare part acquisition as well as the modernisation of grinding plants. LOESCHE GmbH is an independent, family-owned company with headquarters in Düsseldorf, Germany. With nearly 400 employees, affiliate companies in the USA, Brazil, Spain, Great Britain, South Africa, India and China as well as representative offices in more than 20 countries LOESCHE GmbH has a truly international presence.

"

Benefits of using LEEGOO BUILDER at LOESCHE:

- Consistent use of the proposal and project engineering system for machine design, machine configuration, proposal calculation and document generation
- Mapping of all proposal-relevant sales and calculation master data, e.g., prices, costs, hours and weights
- Central, redundancy-free mapping of assembly-specific proposal texts as basis for the generation of consistent proposal documents

Nina Wittmann, Proposal Engineering

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» Project schedule

09 / 2005	Phase 1: LEEGOO BUILDER trial installation
12 / 2005	Phase 2: Development of data and configurators
12 / 2006	Test and optimisation
08 / 2007	Start of initial live sales projects
08 / 2008	Implementation of the LOESCHE Germany concept
2009 onward	Integration of worldwide subsidiaries

» Objectives

The objectives arise from the general conditions of an expanding and globally active organisation

- Development of a central database for products and components, including weights and prices
- Semi-automatic configuration of LOESCHE machines / projects
- Centrally organised maintenance of component data, including weights and prices
- Consistent LOESCHE code structures from CRM, LEEGOO BUILDER to SAP-PS®
- Multi-lingual, multi-currency, multi-user capabilities for international use
- Consistent configuration and layout of complex products
- Output documents for proprietary and external products
- Organisation of the proposal function for the product range
- Technical spec sheets for proposals, enquiries and project documentation
- Project-related sales calculation with integration of all cost types

» Configuration

A "project configurator" at the top level of the tree structure is used to capture the grinding matter data for, e.g., coal, limestone and many other materials. The component plant types are selected at the milling plant level. Further corresponding configurators on the component plant level, e.g., mill, classifier, etc., specify all relevant details.

» Calculation

The calculation process consists of a scheme comprising approximately 60 columns. In addition to costs, hours and prices it also represents and calculates weights as well as their split in the sense of an international division of supply.

The pre-calculation results from LEEGOO BUILDER are imported to a LOESCHE-specific Excel representation for internal use in a printer-ready format. This then allows the evaluation of the economical aspects of the project calculation in addition to the technological criteria.

» Documentation

The proposal documents are generated in German, English and Chinese. Russian is planned for 2010.

» Operation

The system will initially be used in-house at the Düsseldorf headquarters and on business trips by members of the sales team. The international rollout to all sites is scheduled for 2010 / 2011.

» System environment

LOESCHE uses SAP R/3® throughout its processes. However, the company decided against the use of SAP® for the plant project engineering function, partly on the advice of a large consultancy firm, and LEEGOO BUILDER was selected instead. The SalesLogix® CRM system from the EAS partner Global Concepts, based in Neumarkt, Germany, had already been installed. The integration with LEEGOO BUILDER is completed.

SAGE CRM SALESLOGIX®   SAP®

Interior view of a LOESCHE mill, type LM 60.4, with 4 rollers

Machines and plants for the tile, building ceramics and refractory industry

The company was founded in 1938 and today is one of the world's leading suppliers of advanced know-how and robust, reliable machines and plants for the manufacture of ceramic building materials. Lingl employs about 650 people in its domestic and overseas factories and affiliate production companies. The company is represented by distribution partners around the world.
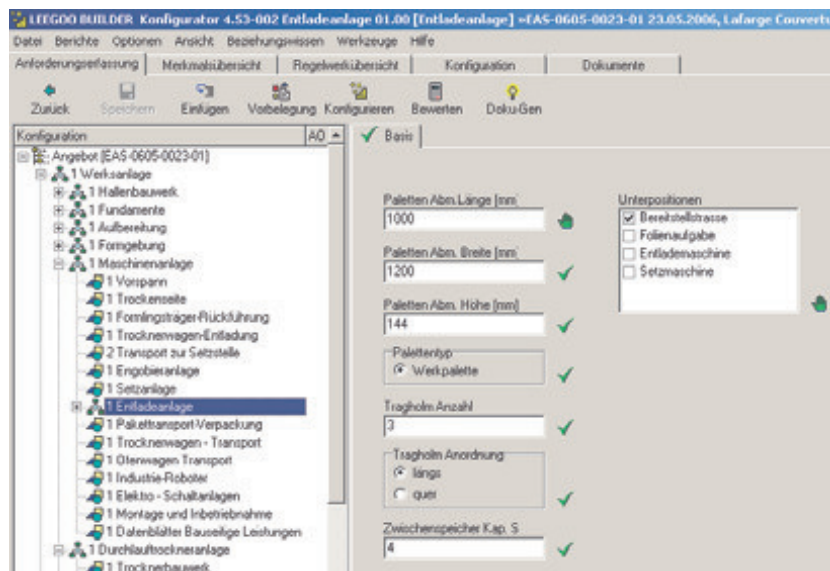
Tree structure according to product organisation and extract from a configurator

» Situation

A Word-based custom solution from 1997 was used for proposal preparation. The proposal calculation was carried out in isolation under Excel which resulted in a very cumbersome and labour-intensive method of working. A project for the development of a customised successor solution, which ran from 2001 to 2005, was discontinued because it could only have been brought to completion with an unjustifiable effort. Late in 2005 it was decided that a standard solution available on the market should be found. Following a comprehensive market analysis and practical trial, EAS and LEEGOO BUILDER were selected in early 2006.
Actually, 40 LEEGOO BUILDER Licences are in use.

» Objectives

Having recognised the possibilities offered by LEEGOO BUILDER following the trial period, the previous objective was extended with the following:

- Logic-based product configurators and defining the sales building block systems
- Complete price calculation implementation with LEEGOO BUILDER (a vast improvement over the previous situation!)
- LEEGOO BUILDER interface with the PsiPenta® ERP system
- Support of tender proposals
- Extended functions on sales information (CRM)
- Integration of affiliate companies (Germany, United Kingdom, Spain, USA)
- Mobile use on business trips by members of the sales team

» Project

Following the purchase of 30 LEEGOO BUILDER licences in April 2006, the system's master data was developed first, as the expert basis for the sales building block sets was yet to be defined. If not already present in the company, this groundwork usually requires a great deal of effort but this is rewarded by many benefits. In the case of LINGL a basic building block world already existed in a large Excel list containing ready-calculated assemblies which was used for answering sales force inquiries. Reworking this list with calculation data and the subsequent automatic-import into the system LEEGOO BUILDER was a major step forward in the set-up of the system.

» Modularity

The first step in structuring the product data was the definition of 14 plant types. Following this exercise, the sales building block set, in the sense of a maximum structure for each of these plant types, was established and implemented in LEEGOO BUILDER to form part of the master data of the proposal system.

» Configuration

On the top, "factory", level there is a simple configurator for selecting one of the 14 different plant types, e.g., an extruded roof tile factory.
There are a total of 81 different "component plants" (work lots) such as such as hall construction, shaping, machine system, continuous drying system, etc. The corresponding configurators are kept simple and allow the selection of the so-called HPOS building blocks (main items) required for each component plant. A selection logic on these higher levels is hardly sensible.
The selected component plants of a configuration consist of a list of the HPOS building blocks (main items) selected in each case, e.g., an unloading system. These HPOS building blocks then own the configurators for defining the content of the main items as well as their attribute specification and attribute values.
A main item consists of a list of plant building blocks (UPOS, German for sub items), e.g., an unloading system can comprise the following UPOS building blocks: Feeder line, wrapping unit, unloading machine, setting machine, etc. Note that actually configurable machines are only arrived

on this fourth hierarchical level. This plant engineering example illustrates the considerable size of the entirety of the sales building block system.

» Calculation

The proposal calculation system was established in the course of the following two main steps:

- Expansion of the current calculation scheme and implementation in LEEGOO BUILDER
- Implementation of the handling of foreign currencies/exchange rates according to LINGL calculation

» Documentation

The proposal documents are required in German, English, Spanish, French, Italian and Russian. Initially, only the proposal texts for German and English are being developed and revised. The texts will be implemented in the remaining languages at a later stage.

» System environment

Customers address data and contact details are extracted from an existing data repository of the PsiPenta® ERP system via a transfer mechanism.

PsiPenta®
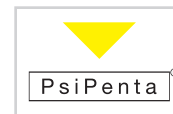
Experience of the LINGL employees: "The users need to be convinced that sharpening the axe is better than trying to chop faster!"

G350 5-axis universal machining centre
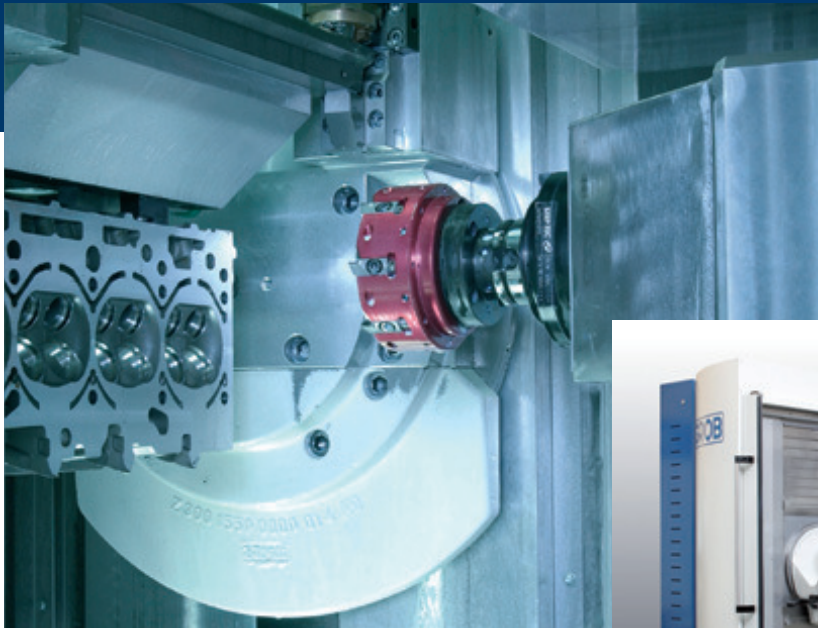
G-Module machining centre for highly dynamic cylinder head dry machining in mass production

Systems – more than the sum of individual components.
The Grob company was founded by Ernst Grob in Munich in 1926. Today, GROB-WERKE is a company with worldwide operations and production facilities at the

headquarters in Mindelheim (Germany) and additional production sites in Bluffton (USA) and São Paulo (Brazil).
The company maintains a worldwide presence through its service and sales offices.

GROB-WERKE is much more than a manufacturer of special machines and machining centres. The product range spans individual machines and complex, flexible systems through assembly and automation lines to complete system solutions. GROB develops individual solutions for each customer – from the raw part to the assembled product.

» Objectives
In order to found the pre-calculation on a more transparent basis than could be achieved with the Excel methodology, GROB began looking for a new "calculation system" in early 2004. At the same time a future-oriented tool for a project calculation with transparent pre-calculation was to be introduced.
In addition, the development of the "G-Module" series was underway with full speed (see figure). The modular design of the machining centres

Advantages brought about by the LEEGOO BUILDER project engineering and calculation system at GROB in plant-related mechanical engineering:

- The introduction of LEEGOO BUILDER has resulted in a faster and more detailed preparation of proposal calculations
- The cost transparency has been improved
- Product knowledge captured in configurators, e.g., for the standardised G-Module is applicable more easily and on a broader basis
- Worldwide use of one central database
- Data and product logics are maintained directly in the specialist department without any need of programming skills
- Large proposals, e.g. comprising 5,000 items, can be split into segments for concurrent processing by the team

Günther Epple, Head of Calculation

Configurator for G-Module machining centres

aims at achieving a higher degree of "standardisation" of the highly individual solutions for transfer lines for the mechanical processing of large-scale production series. To this end, a product configurator for the broad dissemination of product knowledge to the sales staff was required. The main application area for GROB machining and assembly systems is the automotive and supply industry.
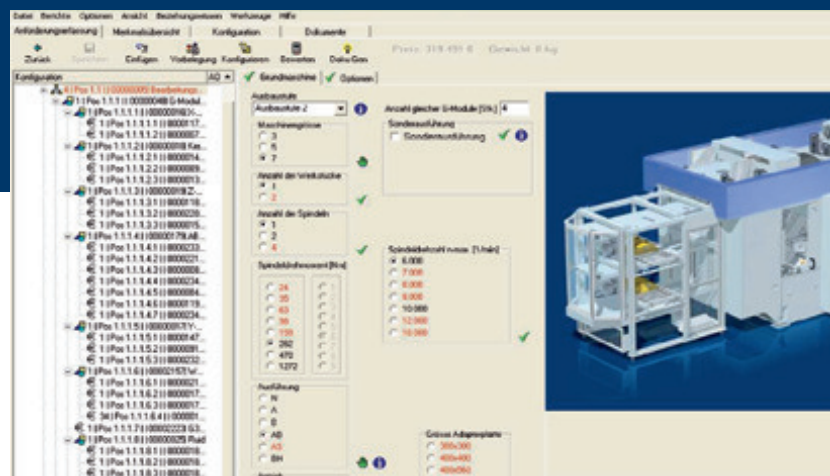
» Project

Following a comprehensive market analysis (dissertation), the GROB machine tools business division started trialling LEEGOO BUILDER in 2004. The analysis did not yield any real alternatives to the LEEGOO BUILDER project engineering system because traditional "configuration systems" cannot cover the project engineering and project calculation requirements of an "engineering-to-order" world such as at GROB.
SAP R/3® was newly introduced in 2004. The SAP® consultancy firm Untersee, Constance, specialists in the use of SAP® in the mechanical and plant engineering arena, also had recommended the use of LEEGOO BUILDER.
GROB acquired the first 10 LEEGOO BUILDER licences in January 2005 and extended these, according to schedule, to a company licence in June 2006.
Employee training in the USA and Brazil; increase of the number of users in Germany to 20.

» Configuration

The first implemented configurator applies to the new "G-Module" series of modular machining centres – a revolution in modularity considering the complexity of transfer line machining stations.
At GROB the scope of supply in the "machining" area usually represents a sequence of individually implemented machining stations for the various processes performed on the workpieces, for example, a cylinder head or an engine block. Such a machining station can be implemented with one or more machining centres (see G-Module) and also with more loosely defined project layouts of machining units. But even these stations consisting of machining units with a more loosely defined project layout are based on previously defined LEEGOO building blocks, although these should be seen as functional rather than standard assemblies in this context. Finally, optimised processing solutions must be implemented. Precise machining and the reliable adherence to the tightest of tolerances are central target para-meters of this process.
In reality the working method used for project planning and pre-calculation therefore is a mix of logic-based configuration, e.g., for G-Modules and other production series with associated configurators and the manual/interactive setup of the structural components of machining stations. The project engineering for assembly machines started in 2007.

» Calculation

The internal project at GROB was named "New calculation system" and the users are members of the pre-calculation department. The name alone emphasises the thrust of the system requirements.
For individual building blocks the calculation can be based on stored standard list prices or, optionally, on cost elements for materials and hours for design, assembly, commissioning, etc.
The calculation scheme comprises about 65 columns. A second calculation scheme with about 120 columns is used for the further processing of the basic calculation for the company management and for controlling purposes.
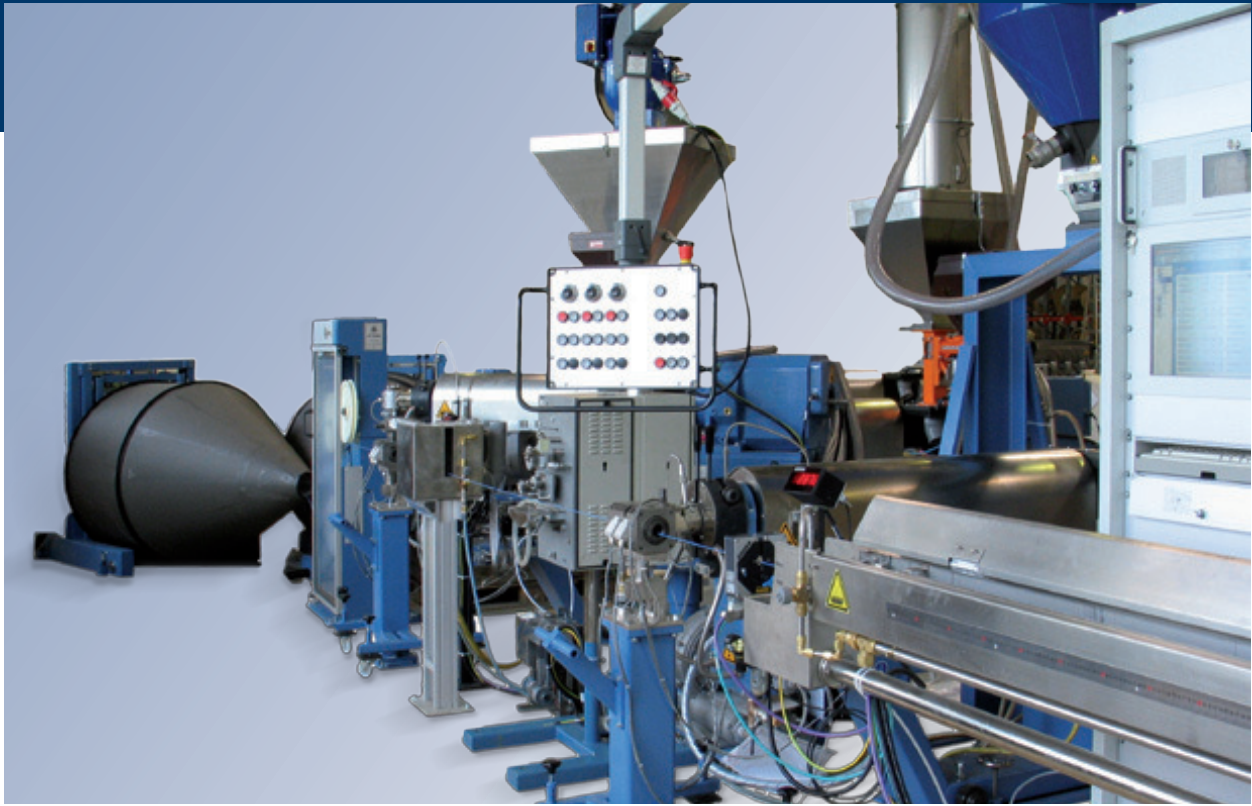
» Documentation

The system generates internal calculation sheets, specifications and bills of quantity. These are made available to the sales force for the proposal preparation.

» System environment

GROB uses SAP® R/3. In future, the transfer of calculation master data from SAP® for proposal calculation is to be increased.

View of a cable production plant

With more than 400 employees, Rosendahl, founded in 1959, is a global supplier of high-end process technology and production plants for the fibre, cable and wire industry.

"

Advantages achieved with LEEGOO BUILDER at Rosendahl in comparison with the previous use of Word/Excel:

- Fulfilment of the requirements for proposal preparation in the project business and in special plant engineering
- More proposals can be created in a shorter time period by the same team
- Product configurators help create proposals faster and more reliably
- Achievement of a consistent proposal calculation on the basis of consistent price data
- Correct contact details and project information for sales support
- The mobile use of the proposal system is an important advantage enabling fast responses of the sales force

Bettina Rossegger, Project Engineering

"

SZ stranding

» The company

The core competence in fibre, extrusion, SZ stranding and continuous metal forming and welding technology in conjunction with proprietary plant control systems make Rosendahl the leading partner for the global fibre, cable and wire industry. Rosendahl is a company of the KNILL Group.

» Objectives

Product configurators are to provide the sales force with the routinely and easy to apply product relationship knowledge of the production plants, which in turn consist of configurable machines, e.g., extruders, since not every member of the sales team knows all machines and technologies equally well and thoroughly.
Particular objectives are the fast and accurate target-oriented preparation of budget proposals with the help of configurators, a consistent price calculation right through to the generation of the proposal documents in the desired language.
Additionally, however, the customer requirements need to be clarified earlier and more accurately during the advanced proposal stages and taken into account during the proposal preparation. This will also improve the transition from proposal to order.

» Project

The acquisition of LEEGOO BUILDER in January 2001 makes Rosendahl one of the very early LEEGOO BUILDER customers. Initially, and as usual, the building block world and the initial machine-level configurators for extruders and other products were defined.
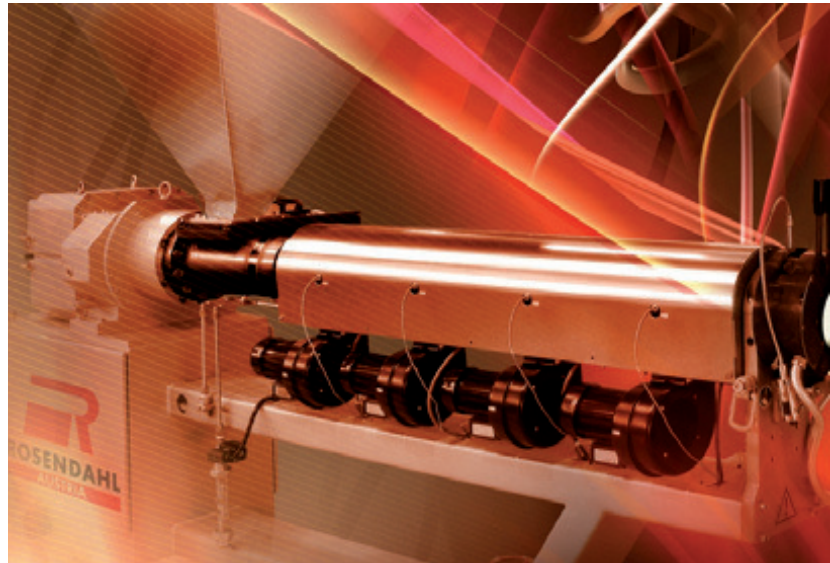
Extruder for a cable production plant

Plant-level configurators allow the machine configurators below this level to "inherit" part of their attributes such as power supply frequency, power supply voltage, ambient temperature, etc.
The relevant attributes defined in the proposal configurators are built from the start for their usability during order processing following the placement of order. Of course, this progress in consistency necessitates the not always simple coordination of the sales and design function.
However, the advantages of this communication and negotiation process are immense. Initially, mainly the "effort" is noted; later on people ask, "why didn't we do this years ago?"

» Configuration

The configuration is carried out in stages, as described above, on the plant and machine level.

» Documentation

Conventions for a consistent textual representation such as font, font size and tabs are defined for the proposal text modules and then implemented in the building block world.
The configurator attributes are embedded in the text modules as variables.
It was found that the LEEGOO BUILDER standard edition offered all the required functions.
The proposal documentation is published in German, English, French, Spanish and Russian.

» System environment

The system is used in-house via the network and on business trips with data exchange with the headquarters.

AMMANN

Asphalt mixing plant, type GLOBAL 160

Ammann is a leading supplier of the construction industry providing machines, systems and services with core capabilities in asphalt and worldwide road construction. The driving force of the family-owned company, founded in 1869, is its entrepreneurial spirit.

» Products
- Asphalt mixing plants
- Concrete mixing plants
- Mineral processing plants
- Compaction machines

» Objectives
The replacement of the more than 10 years old solution named "EASY" with a modern and flexible standard software was a major project objective. The aim is the implementation of a consistent proposal system for the entire plant engineering division. In addition, proven and new methodologies such as a "logic-based configuration", were to be suitably realised in a new and easy to maintain system environment.

The improvements over the precursor tool which LEEGOO BUILDER brought for Ammann include the following:
- *LEEGOO BUILDER can practically be maintained entirely by the administrator, eliminating the expense of chargeable additional programming work*
- *Proposals can be updated via reference data, eliminating the expense of recreation*
- *LEEGOO BUILDER offers a sophisticated access permission control which allows a "ViewOnlyUser"*

Arnold Buhl, Head of Project Engineering

» Project

The table below shows the project sequence for phase 1. The practical successes during the trial phase, in particular those based on the successful integration of data from the "EASY" legacy system, and a practice-oriented and therefore accepted application concept provided the foundations for the content-related (in terms of data) development and implementation.

» Configuration

For phase 1, which comprised the implementation of the system in Langenthal and Alfeld, the configuration is based on machine-imported price lists. The user manually selects the building blocks required for the proposal from these price lists. To support the user in this task, the system uses the higher-level attributes of the plant, e.g., plant type (see figure to the right), to exclude all invalid building blocks from the price lists. The price list logic is therefore based on constraints. In phase 2 (rollout), which started with the SIM-Ammann site in Italy in 2008, the product configurators were defined using rule sets that exceed the scope of the faster to realise price list concept.

This 2-stage approach also proved to be practise-oriented and advantageous in the case of Ammann because the first phase can be completed quicker than having to have all the configurators defined before the start of live operation.

» Calculation

The calculation is based on stored master data (from SAP®) such as material and production costs as well as different types of hours. These costs and hours can also be entered manually for proposal items (adaptive and special design). Factors for, e.g., material overheads as well as hourly rates are stored site-specifically. The calculation process involving about 60 columns results in the proposal price through to the contribution margin. The calculation results are output
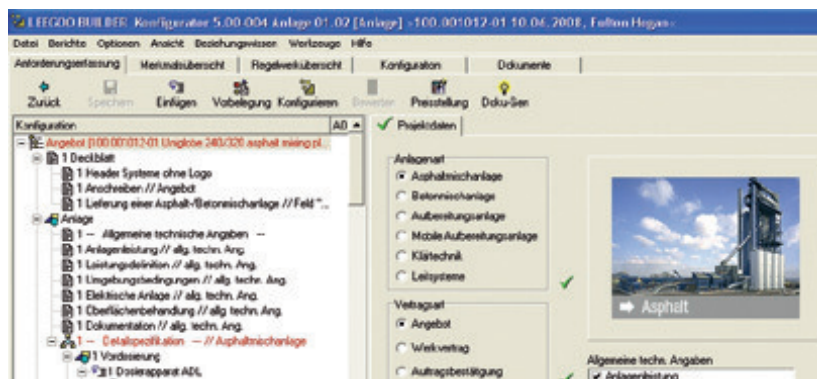
in a clearly structured calculation sheet.

» Documentation

The proposal document can be generated in German, English and French. It can comprise the chapters cover sheet, pricing, commercial terms and conditions, and the actual specification with detailed item descriptions.

» System integration

On placement of order, LEEGOO BUILDER generates an Excel datasheet that is used as input for an SAP SD® sales document. The integration with the CRM system introduced in 2008 is complete.

Configurator for asphalt mixing plants

» Project schedule

06 / 2006	EAS receives a task schedule from Ammann, presentation
08 / 2006	Start of the trial phase. Application concept developed
12 / 2006	Decision for LEEGOO BUILDER
01 / 2007	Start of the implementation phase in the sequence asphalt mixing plants, concrete mixing plants, mineral processing plants
02 / 2007	Planning of methodology, data migration, interfaces, etc.
05 / 2007	Administrators trained, data migrated, application tests
08 / 2007	Start of live production in Alfeld (Germany), Langenthal (Switzerland)
03 / 2008	Start of live production at SIM-Ammann in Italy (Verona)
2009	Rollout to sites in China and the Czech Republic planned

X-ray diffractometer with X-ray source, sample holder with alignment unit, and detector (from left to right)

Bruker AXS manufactures state-of-the-art X-ray systems for element analysis, material research and structural examinations. The particular application areas of these innovative solutions include heavy industry, chemistry, pharmaceuticals, semiconductors, bio sciences and nanotechnology.

» Bruker products are used for
- X-ray spectrometry
- Optical emission spectrometry
- Microanalysis
- X-ray diffractometry
- Biological crystallography
- Chemical crystallography
- Laboratory automation

» The diffractometer
is a high-precision measuring device based on the principles of X-ray diffraction. It is mostly used for analysis of crystalline phases, i.e., substances such as quartz, retained austenite or cement clinker.
An essential physical aspect is that the wavelength of the X-ray beams is on the scale of the inter-atomic distance (0.1 … 0.3 nm).

» Project
Following a comprehensive market analysis and practical trial, LEEGOO BUILDER was selected in December 2006. An elementary requirement in the configuration of diffractometers (figure above) results from the necessary reconfigurability of the devices.

By reconfiguring the measurement geometry is adjusted to the various measuring tasks (applications). Along with alternative compounds, necessary adapting parts need to be configured.

» Configuration
The development of a solution enabling the configuration of reconfigurable devices was essential even in the trial phase. According to the philosophy of an application-driven configurator, starting from default values the user selects all requested components, even the optional ones. In an automatically executed second step an implemented algorithm which is called "consolidation" generates the actual scope of supply, thus yielding

Material samples of crystalline substances for phase analysis with X-ray diffractometry

a branch of priced items which are necesssary for all the desired applications. The "consolidation" process takes fractions of a second.

» Application objectives

Previously, proposals had been created manually using Word/Excel based on so-called price lists. This requires a great deal of expert knowledge, hence only a few people in head offices could create proposals for the members of the sales team.

The new proposal system enables the sales engineers to generate adaquate proposals – even in remote countries.
It ensures adoption of a consistent product logic as well as uniform master data (prices, texts). An additional important feature is the mobile use of the proposal system.

As a result of the application driven concept and its inherent combinatorics, the diffractometer configurators are highly complex, thus demanding a high degree of technical expertise during customizing LEEGOO BUILDER. This also constituted a particular challenge with regard to the configurator concept and its design and performance.

» SAP® integration

As with many other proposal solutions, in the case of Bruker AXS, it was decided to use existing master data supplied as Excel files by SAP®.
In addition, an interface for transferring order data via an XML file (its structure being defined by SAP®) for the generation of SAP SD® sales documents was programmed.

» Order from proposal for SAP®

On placement of order, the purchased configuration (that no longer contains options and alternatives) is created from the former proposal in LEEGOO BUILDER.

In addition to the scope of supply (given in the form of purchase order line items and quantities), the transfer of order data to SAP® also comprises specific attributes and values for configurable materials in SAP® (KMAT).

Therefore, the interface realises the recoding of attribute values for order data transfered into the ERP system. After that the actual bills of material are generated as part of the order execution by using SAP® variant configurators.

The separation of the proposal configuration (customer and functional view) from the generation of the bill of materials (execution view) proved considerably advantageous in the proposal solution for Bruker AXS.

X-ray diffractometer, type D8 ADVANCE

» CRM

SalesLogix® is used as the CRM system. However, Bruker AXS currently does not consider a link to the proposal system.

Configurator view for diffractometer:
Device base requirements capture

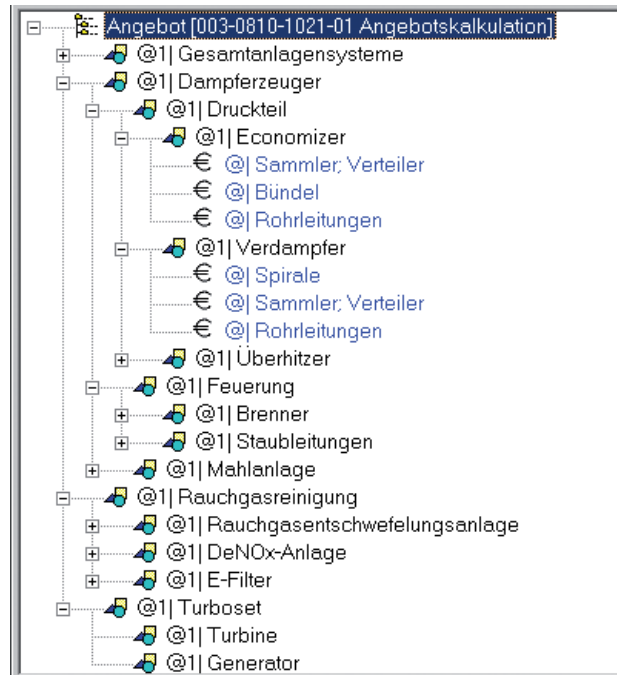*Proposal calculation for power plants and components*
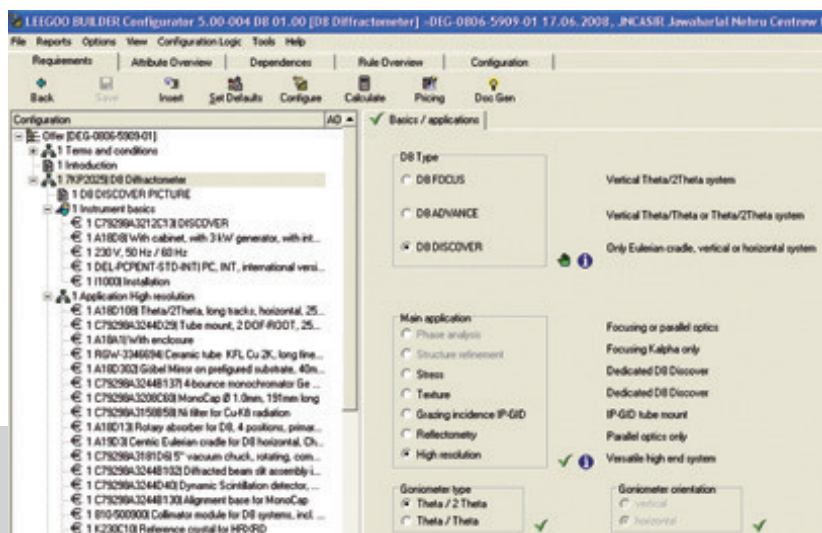
Brown coal power plant Lippendorf/Germany

Hitachi Power Europe GmbH plans and builds fossil-fuelled turnkey power plants. The delivery and service spectrum also comprises large-scale steam generators, turbines environmental technology and milling plants. The company is experiencing rapid growth due to the strong global demand for economic and environmentally friendly power plants. Experience and knowledge from more than one hundred years of power plant construction around the globe and the know-how and commitment of the employees ensure the customers' satisfaction.

Section of a tree structure representing the scope of supply and services of a power plant

"

Hitachi Power Europe expects the new proposal calculation with LEEGOO BUILDER to deliver operative und strategic advantages:

- The new proposal calculation fulfils all current and future requirements of the HPE proposal process
- The efficient administration ensures the fast access to and the reusability of all data
- Everyone involved in a project can work simultaneously on a proposal calculation
- Comprehensive analysis functionality ensures reliability and transparency
- The "Change Management" functionality in LEEGOO BUILDER ensures the retraceability of the calculation process

Proposal Management
Large-scale Steam Generators

"

» Objectives and tasks

The current market situation also presents new challenges for the proposal calculation at Hitachi Power Europe (HPE) GmbH. The price of a large-scale coal power plant currently lies in the range of about one billion Euros. The complete representation of the scope of supply and services is essential as individual proposal items can mean costs in the million Euro range.

The scope of supply and services can be spread across multiple project partners. In addition, long project lead times make it necessary to link the scope of supply and services with the time axis. A project-specific, centralised and dynamic approach makes it possible to adjust the calculation to the current market conditions.

Because of the system's mobile availability on a laptop, recalculations for answering diverse questions can even be carried out during negotiations. LEEGOO BUILDER uses the "Change Management" function for tracking all changes. This ensures the retraceability of all calculation data even in the case of simultaneous processing by multiple users.

» Project

The intensive LEEGOO BUILDER pilot phase started immediately after an initial presentation in May 2007. The aim of the pilot phase was to develop a prototype on the basis of the LEEGOO BUILDER platform that already had to realise the basic requirements specified by HPE. The pilot phase from May to December 2007 comprised the conception, detailed planning and implementation of a functional prototype.

The calculation results could be verified against reference calculations and the feasibility of the basic requirements of HPE could be confirmed in a feasibility study conducted in December 2007.

The contract for the implementation of LEEGOO BUILDER was signed at the end of December 2007.
A detailed task schedule formed the basis for the contract.

Long and intensive teamwork between EAS and HPE finally resulted in a well thought-out and powerful solution for the application at HPE that meets the practical requirements.
The new proposal calculation receives a high degree of acceptance in the specialist departments and from the company management.
The project was completed within budget and on schedule.

» Configuration

The complex scope of supply and services of a power plant calculation is made available via predefined templates.
All costs are represented transparently and can be analysed. The central administration of cross-project data simplifies adjustments to changing project conditions.

» Proposal calculation

The solution is centred around the HPE-specific calculation module which was integrated in LEEGOO BUILDER as an add-on module. This add-on, the so-called HPE Calculation Manager, is typified by a user-interactive main work view and the run-time optimised calculation process.
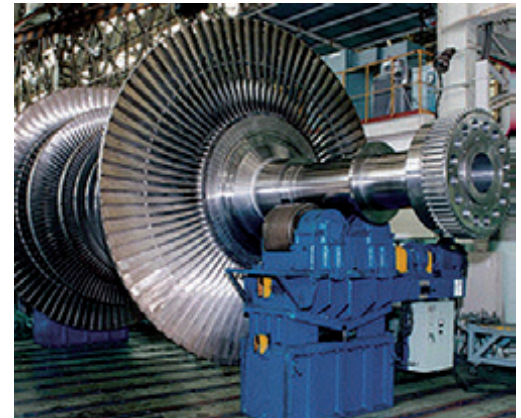

Rotor of a steam turbine

» Results

LEEGOO BUILDER supports the generation of a large variety of calculation-relevant information in defined output formats.
The calculation results data is mostly required in the form of Excel data-sheets from LEEGOO BUILDER because of the portability and print options.
Programmed results documents and the possibility to perform further analyses via data exports are prerequisites for this.

HAGER+ELSÄSSER

*Proposal preparation with product configuration
for water treatment plants*
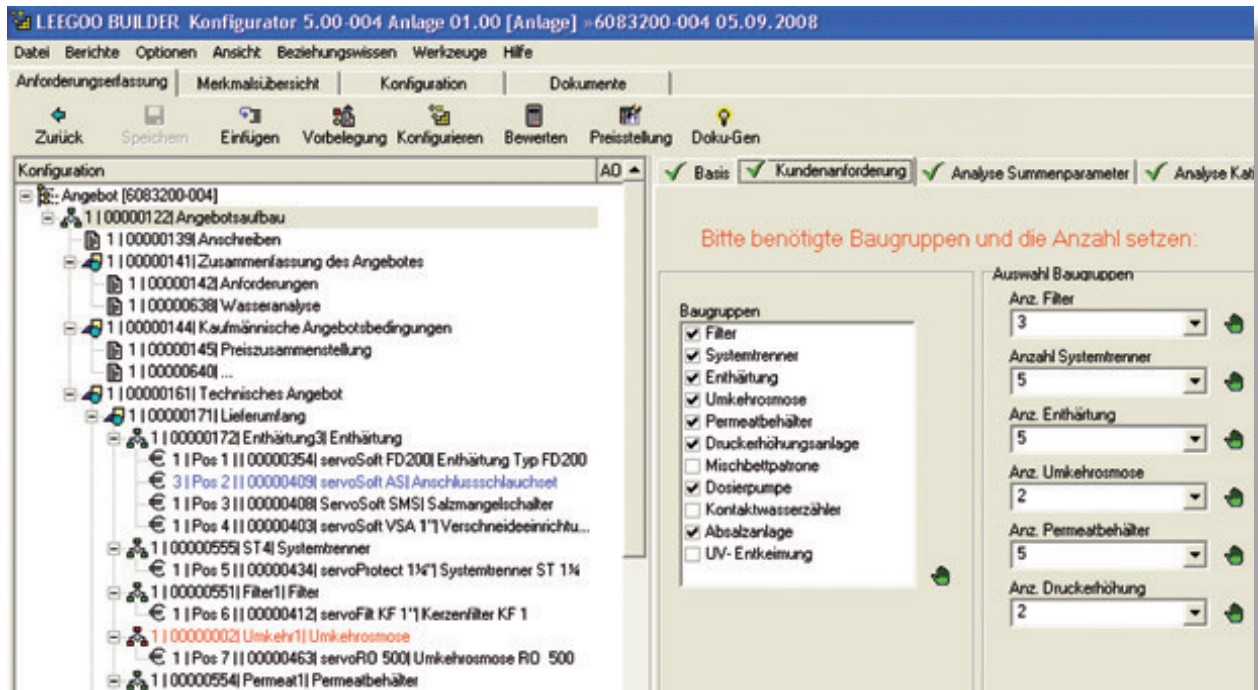
Configurator for the selection of equipment for an entire system with tree structure

**Hager + Elsässer is a leading manufacturer of plants for process and ultrapure water treatment, as well as for waste water treatment and water and recyclable material recovery.
The company provides solutions for selected industry markets, both as standardised compact plants and as complete plants, put together flexibly to suit industry, market and customer requirements.**

Post-treatment stage of a waste water treatment plant

High-purity water distributor

Reverse osmosis plant

» Objective

Initially, the proposal preparation for the standard equipment area, i.e. plants from a well-defined building block set, are to be converted from Word/Excel to a database-supported proposal system offering a product configurator and a consistent price calculation.

Subsequently, the realisation for the so-called design and built plants, see figure right, is to follow.

A complete plant of this type consists of multiple systems (assemblies) and realises a process-technology solution tailored to the customer requirements, e.g., for ultrapure water treatment in semiconductor production.

» Project

The use of LEEGOO BUILDER started with a practical trial in September 2007. In this phase, the application concept was to be demonstrated and evaluated by developing a real-world solution for standard equipment using the example of "reverse osmosis". The system was purchased in October 2007. The content-related system development required fundamental elaborations, e.g., the revision of the building block world. In addition to the existing product range, more highly standardised products were defined as a strategic innovation.

» Configuration

Product configurators are used on two levels. On the top level, a configurator is used to define the proposal layout (figure left). In the "Customer Requirements" view, the required assemblies, i.e., functional systems realising specific processes such as softening or desalination, for an complete plant are selected.

In the next stage, these assemblies are fully configured with the relevant configurator. This modular approach is always advisable when lines of assemblies form plants.

» Calculation

The proposal calculation considers financial costs, engineering, material costs, freight, preassembly, commissioning, insurance and warranty as well as overheads, risks, fees and profit.

» Proposal documents

A proposal document is built up in chapters in a modular fashion. Examples of these chapters are letter, cover sheet, table of contents, technical specifications, data sheet, service description, commercial data, etc.
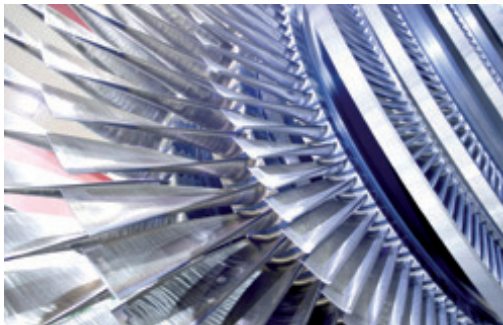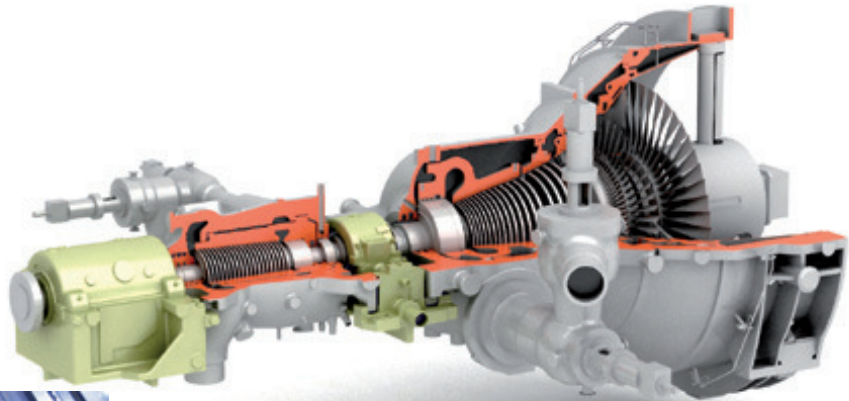

View of an entire plant

View of a water softening plant

Ultra-filtration plant

SIEMENS

3D model of a steam turbine of the SST-3000 series for power stations

Fins of a low pressure rotor

The Energy Sector of Siemens AG is one of the leading companies in the international power station business and supplies innovative and environmentally friendly technologies for energy generation. The system leader-ship for engineering and production for steam turbines in the performance range above 90 MW is based in Mülheim a. d. Ruhr, Germany. More than 1,000 steam turbo sets have been built here since 1927.
Targeted research, development and state-of-the-art manufacturing technology are a solid base for worldwide success – with continually new standards in terms of performance, efficiency, quality and service life.

" LEEGOO BUILDER delivers major advantages:

- Short proposal lead times
- Reproducible calclation results
- Simple data and logic maintenance by the experts themselves and without any programming
- Low non-conformance costs and high data quality through product knowledge embedded in configurators
- Transparency of deliverable variants and options
- Consistent, centralised calculation data, consistent calculation and document generation for all users
- Worldwide access via the Intranet with Citrix ®

Dirk Neumann, Proposal Configuration "

» Proposal process

The acquisiton of customer or basic plant requirements with LEEGOO BUILDER configurators from the perspective of the complete plant project engineering takes place at the sites in Mülheim, Erlangen and Orlando. Complete proposals for new plants or refurbishment business include not only steam turbine proposal, but also inputs from other business segments. Therefore, the steam turbine calculation is a company internal proposal.

» Project

A LEEGOO BUILDER trial took place in the second and third quarter of 2003. The initial introduction followed in October 2003. The majority of the building block world could be built up from existing data. Following the preparation, structuring and build up of the configurators and the realisation of proposal document output, the worldwide rollout and user training started early in 2005. The aim was for the system to start live operation at all sites involved in the proposal process. LEEGOO BUILDER finally replaced the previous proposal system for the new steam turbine plant business in September 2005. The continuous development of the product portfolio, new software functions and the continually changing requirements of the business process necessitate continuous system maintenance. Through the further development of the product portfolio, new features of the software, as well as the constantly changing requirements of the busi-

ness processes, requires a continuous data and system maintenance. These tasks are carried out by a staff trained specifically for this purpose. Because the required data maintenance processes differ from those for ERP, PDM and PLM systems, had to for this only appropriate processes be developed and introduced. More tools the company better to be able to support in the Division of labour, have been developed in addition to the LEEGOO BUILDER - internal systems of care for the basic data and logic maintenance.

Due to the positive experience in the area of the new plants offers was invested since beginning of 2009 increased in efficiency of further business processes across the supply. As a result, applications for production use will be rolled out in 2012 more LEEGOO BUILDER. To highlight the quote system for steam turbines modernization business are at this point and a „steam turbine package" Configurator.

» Configuration

The configurators are built in a modular and hierarchic fashion. High-level configurators are used to record basic project requirements. Subordinate configurators include all steam turbine modules, help systems and services such as engineering and project management. Modularisation of the configurable products is essential in supporting product complexity management and planned product variance. The structure of the entire tree in the quote system is equivalent to the product structure, which is needed for carrying out the project in the order in SAP ®. The „steam turbine package"-Configurator is a sales configurator decoupled from the rest of the applications. Its components consist of the configuration results of the other configurators and supply systems.

» Calculation

Because the proposals are submitted to the sales departments of the Energy Sector, the calculation generates company internal charge prices, so-called transfer prices. The extensive calculation scheme is built in such a way that it is used likewise for pre-calculation, order entry calculation and project controlling. Various results presentations for technical data, quantity frameworks, as well as cost information produced for the internal offer. Different result representations for technical specifications, bills of quantity and cost information are generated for the company-internal proposal. Due to the different requirements of the business segments and the dynamic changes of the proposal processes all results are automatically generated as Excel files.

» System environment

The LEEGOO BUILDER provided for global use applications via the Siemens intranet using Citrix ® MetaFrame Presentation Server the range of processors available. The range of results with regard to costs are passed to the SAP ® system as planned costs for the projects.

Turbo set in a power station
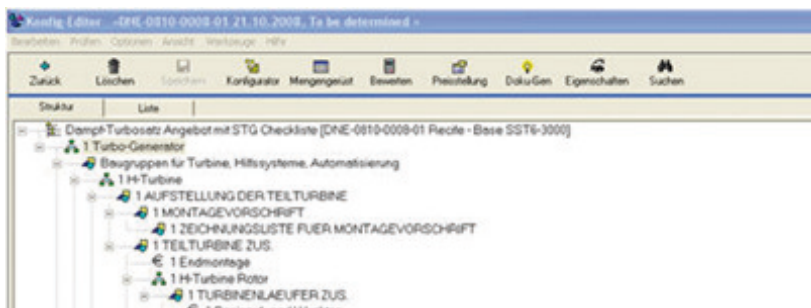
Section of a tree structure with configurators on various levels:
Turbo generator int. al. comprising an H turbine and an H turbine rotor below it

Rotor of a low pressure turbine in fronf of
the balancing bunker

HOSOKAWA ALPINE

Configuration and calculation of blown film and powder processing systems

9-layer blown film system

The Hosokawa Micron Group is an international machine, system, process and service provider.
With this service portfolio Hosokawa offers process solutions for key industries such as the chemical industry, pharmaceutical industry, minerals and metals industry, food processing and confectionery industry as well as the plastic processing industry.

» Objectives

- Ensuring a customer-oriented proposal preparation
- Provision of an extensive choice of consistent and up-to-date text/cost building blocks for all users
- Enabling the user to perform a solution-oriented proposal configuration for blown film plants as well as powder processing systems
- Consistent, fast and correct preparation of proposals for complex plants throughout. This means providing reliable and up-to-date cost information for all users
- A consistent proposal concept with a central database and a consistent proposal process design for all business divisions
- Consistent proposal calculation based on fixed costs and factors right through to the contribution margin
- Replacement of the "Alcatraz" solution developed in-house to reduce internal efforts
- Consistent sales support by calling LEEGOO BUILDER from the Selligent® CRM system. Order data transfer to the PsiPenta® ERP system

Loading of a Super-Orion S.O. ball mill

Isolator with integrated powder processing system

» Project

Following a brief system preselection, the practical trial of LEEGOO BUILDER started in the blown film business division in August 2007.

An employee of Hosokawa Alpine initially prepared an Excel table containing building block data for import to the LEEGOO BUILDER database. Following this import, a maximum structure (product building block set) for blown film systems was developed as part of the trial installation at Hosokawa Alpine.

A first version of the blown film system configurator was implemented following its elaboration under the expert and methodological guidance of EAS.

» Configuration

Initially, a simple configurator for blown film systems was implemented in the blown film business division (figure right).

The systematic knowledge engineering providing the field-specific foundations for the custom plant configuration in the powder processing divisions, with a very broad spectrum of different processes, has been underway with high pressure since mid 2008. These configurations will then be implemented and applied in the subsequent project phase.

» Calculation

The items in the tree structure and the rows in the calculation marked with the Euro symbol are the so-called "priced" items. Based on the stored calculation master data such as costs, hours, etc. or, alternatively, based on list prices, the actual proposal price is calculated in the target currency in accordance with the implemented calculation scheme.

The values in the rows of the calculation view representing the higher levels of the scope of supply and services are derived by summation. The columns of the calculation table can be simply defined in LEEGOO BUILDER in accordance with the developed scheme of the proposal calculation. The representation of the calculation master data, too, can be realised in a completely free and flexible way. Of necessity, because every company uses a different calculation scheme. Often, the introduction of a calculation across business areas and sites is an important objective. In most cases, the new proposal calculation realised with LEEGOO BUILDER is more differentiated as it does not involve any additional effort by the user. This is advantageous for the commercial evaluation of the calculation results and in terms of an improved transparency.

» Documentation

The proposal documents are generated in German, English, French, Spanish and Italian language. A calculation sheet in accordance with the specifications of Hosokawa Alpine is generated to present the calculation results.
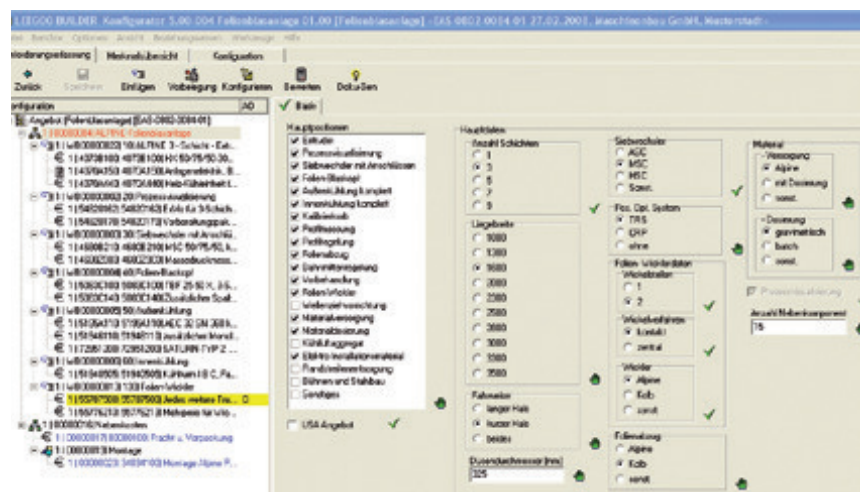
» Consistence

LEEGOO BUILDER is fully integrated with the Selligent® CRM system and is also launched from within CRM. Order data is passed to PsiPenta®.
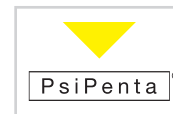
Interface to the PsiPenta® ERP system

Integration with the Selligent® CRM system

Configurator for blown film systems with basic requirements capture

Configurator for filament spinning machines: Entering of customer requirements into LEEGOO BUILDER for determination of the machine type followed by the detailed machine configuration

SwissTex is a global provider of filament extrusion plants for BCF (Bulked Continuous Filament) and industrial yarns. The core competencies are R&D, engineering, production and process technology.

» Project

Following a very successful initial presentation of LEEGOO BUILDER at SwissTex, it was first decided that the processing of quotations and orders will be implemented in SAP®. After efforts of a SAP® consultant, lasting approx. 6 months, LEEGOO BUILDER was finally implemented without a further trial phase because EAS could provide comprehensive references to comparable applications.


Heated draw roller modules for prestretching filament yarn

"The advantages of LEEGOO BUILDER at SwissTex are:

- Exact parameterised product configurators, based on the basic customer requirements (see figure above) facilitate the specification of the correct machine type and, therefore, the correct calculation of all required parts as well as the comprehensive description of the plants in the customer documentation
- The machines, including all details, are carefully specified and configured in the configurator, which results in more correct order sheets than without LEEGOO BUILDER
- The configurators are developed and maintained by own staff
- The visual appearance of the proposals is improved and standardised
- The central calculation database facilitates a consistent calculation

André Lienert, CEO
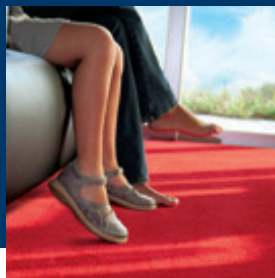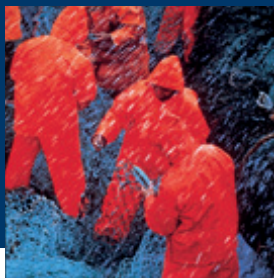
» Configurators

The configurators are used for the detailed configuration of the machines. Based on the customer requirements, for example ...

- Production in kg/h
- Polymer type
- Single- or multi-coloured
- Flexibility or productivity priority
- Machine split
- Specifications, etc.

... the corresponding machine type is determined by the configuration logic.

The requisite process technology knowledge is implemented in the configurator logic. The components and assemblies required for the defined machine are then determined by the configurators in a second step (figure right with a section of a tree structure).

» Calculation

The quotation calculation is based on manufacturing costs to which cost factors, such as overhead costs, commissions, installation costs, negotiation margins, discounts are added to become the final price.

» Quotation documents

The following proposal documents can be generated in German or English, if required:

- Short quotation with detailed price
- Short quotation with total price
- Short quotation without price
- Long quotation with detailed price
- Long quotation with total price
- Long quotation without price
- Short quotation with group price
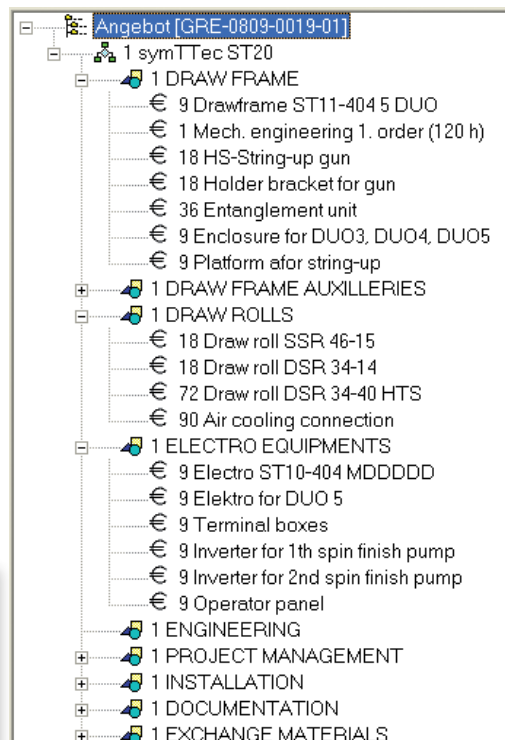- Long quotation with group price

» Technical specifications

Because the proposals mainly refer to very complex extrusion plants, they also contain datasheets as shown in the extract "General Technical Data" below.

These summarise the most important technical specifications of the described plant on 1 to 2 pages. LEEGOO BUILDER, for the first time, makes it possible to generate these technical specifications in a fully dynamic fashion, i.e., if the configuration of a part of a plant changes for some reason then the technical specifications are immediately adjusted to reflect that change.
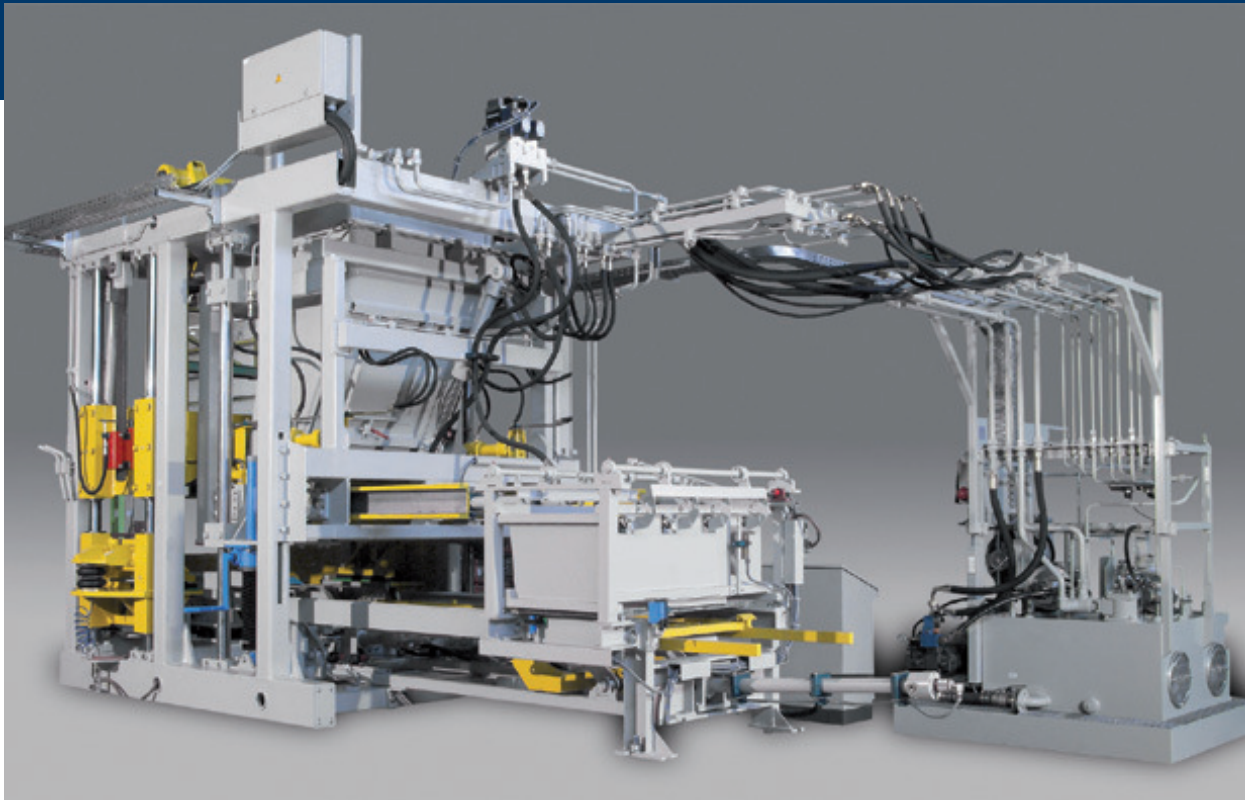

Type SymTTex20 plant for filament yarn production

Section of a SymTTec ST20 tree structure

Extract from a generated quotation document

Hydraulically powered KRS 2 block machine for producing concrete blocks and pavers

Rekers GmbH is a mechanical and plant engineering specialist for the production of concrete products such as blocks and pavers.
The product portfolio comprises block machines as well as conveyor, storage, handling and control technology. In addition to the complete assembly and commissioning, the broad service portfolio also includes the worldwide project management and maintenance. Rekers GmbH is an independent, family-owned company based in Spelle, in the German state of Lower Saxony.

RS 2 KV block machine for processing BaseMix and FaceMix CONCRETE

» Objectives

The project objectives flow from the efficiency improvement potential in the consultancy-intensive, international sale of investment goods.

- Automation and acceleration of the proposal process, increased "cadence" and, at the same time, a reduced error risk
- Creation of a consistent database in terms of price lists and discount structures
- Realisation of a consistent and transparent price calculation and profit calculation
- Incorporation of machine-related cost rates for transport, assembly and commissioning, based on weights, packaging dimensions and REFA specifications
- Centralised standardisation and acceleration of the article and conditions management for all target markets for the harmonisation of the proposals
- Consistent proposal layout and an option to illustrate individual items with expressive images as well as an improved corporate identity

» Solution

LEEGOO BUILDER was selected following a systematic proposal comparison.
In addition to the comprehensive functionality, an essential criterion for Rekers was that the system is geared towards the requirements of the mechanical and plant engineering industry.

» Configuration

A high-level configurator requests attributes of the concrete products to be manufactured, essential geometric and product-related data in terms of basic requirements.
Detailed configurators facilitate the composition of the overall plant comprising the block machine, the conveyor and storage technology as well as the cubing line. The targeted selection of specific individual machines also supports the preparation of proposals for the replacement or performance improvement of existing plants. The configuration is completed by the incorporation of the individual commercial conditions and the scope of the assembly services.

» Documentation

The document generator currently produces proposals with detailed technical and commercial specifications in German, English and five further languages. Eastern European languages are planned for an additional expansion phase.

Due to the documents' contractual nature, a bilingual proposal design including two languages, e.g., English and Cyrillic, was also included.
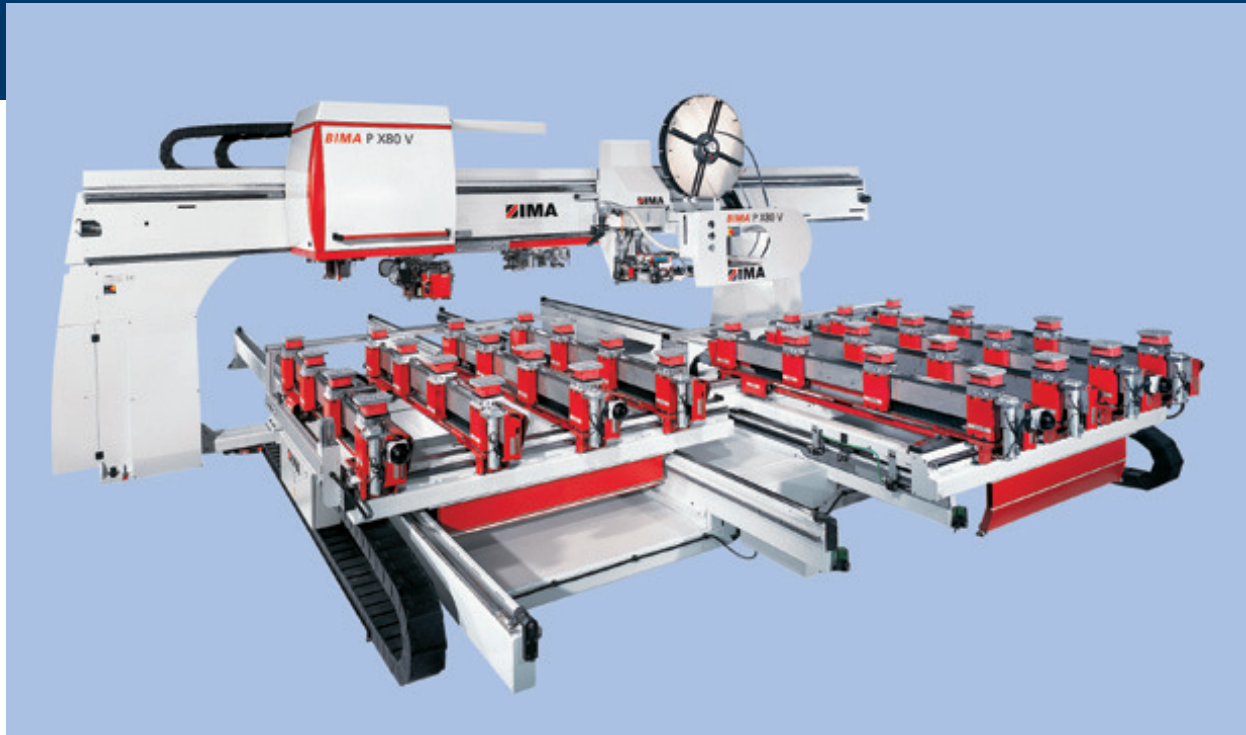

block machine KRS 3

block machine KRS 4

» Operation

The administration is to be based at the headquarters in Spelle until the completion of the implementation phase. The use as configuration tool for the field-based staff ("travel mode") is currently in preparation.

Examples of high-quality concrete block products

CNC-machining centre Type BIMA PX 80 V

Machines and plants for the professional production of furniture components.
IMA is setting the signs in furniture fabrication with groundbreaking innovations for increased productivity, complete machining, setup time optimisation and innovative production processes.
The product spectrum ranges from individual machines and high-volume edge processing machine lines through to machining centres for individual product solutions.
IMA always endeavours to meet the customers requirements.

» Project

LEEGOO BUILDER was trialled at IMA in cooperation with EAS at the end of 2006. After an internal interruption, the topic was picked up again in February 2008 and actively pursued, quickly leading to a decision to introduce LEEGOO BUILDER.

Company headquarters in Lübbecke/Germany

Edge treatment machine, type Novimat, including the KFA contour milling aggregate incorporating the latest linear technology

View of a front manufacturing plant

Drilling gear with cross-head

Starting with the sales item data of an AS400-based proposal system developed in-house, the first step was to thoroughly revise and structure the master data foundation for the various machine types in the IMA product spectrum.

The definition of building block sets as maximum structures for configurable machines was a central task in this context.

The revision of the proposal texts was the next waypoint in this preparatory work. The item data and building block sets were then machine-imported in LEEGOO BUILDER.

In addition, a solution to the issue of "higher/lower priced items" had to be found because the previously used data contained extensive basic machines defined as functional basic specifications.

This is not suited for the application of configurators in this form because a basic machine should be so lean that the configurator can only "add" to it, and nothing should be replaced as this would lead to problems not only during price calculation but also during the generation of proposal texts.
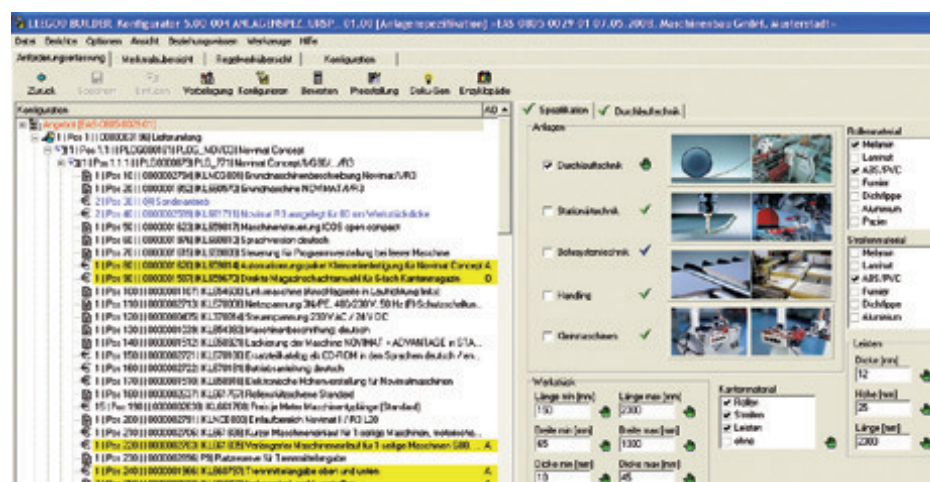
» Configurator

The configurators are kept simple (figure below). Based on the requirements captured in the configurator as values of major attributes, the manual-interactive building block selection is supported in such a way that non-matching building blocks do not appear in the selection lists (constraints principle).

A more detailed configuration logic is then to be developed in a second step.
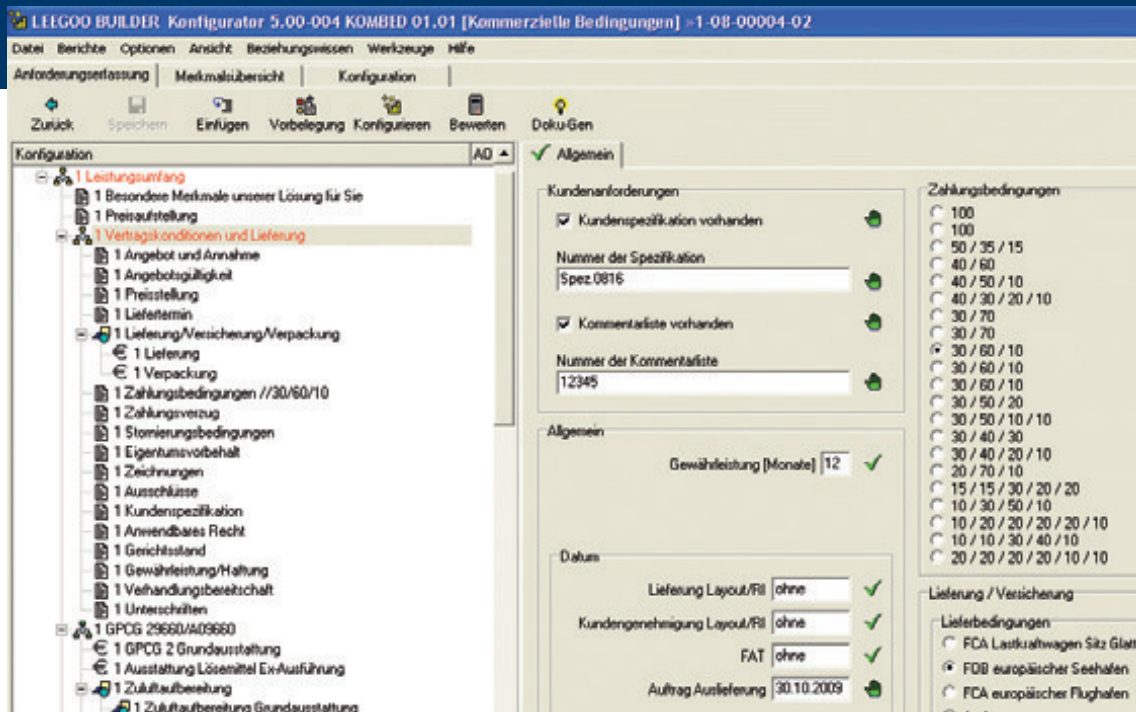
» Calculation

In a scheme comprising a total of 38 columns, the proposal price, and possibly rebates as well as other quantities such as the so-called superstructure length of the machine, are calculated on the basis of list prices.

Configurator for product selection from a machine range and capture of basic requirements

Edge processing by milling

Configurator for commercial terms and conditions

Following the foundation of the company in 1954 in Binzen, Germany, Werner Glatt, together with only a dozen employees, designed and installed the world's first fluid bed system for industrial use in the pharmaceutical industry in 1959.

Initially used as a pure dryer, the fluid bed machine was first developed into a granulator through the use of suitable nozzle systems and then, through suitable modifications, into a particle coater.

Today, Glatt presents itself as an international group of companies with more than 1,500 employees. In addition, more than 50 permanent representations are available to provide on-site contacts for customers around the globe.

» Products
Glatt selected "Machines for the pharmaceutical industry" as the first business area for the proposal preparation.
The first configurator was developed for the Glatt type GPCG2 product line of fluid bed systems (figure right).

» Project
The decision for LEEGOO BUIDLER and the start of the contents-related building up of the proposal solution took place in January 2007.
Extensive preparatory work for the definition of the building block world and the development of the GPCG2 building block set, the identification of calculation master data for the new building block world and the preparation of sales texts in a variety of languages are just some examples of note. The duration of the system implementation therefore largely depends on the status of the experts' specifications.

» Configuration
The fluid bed system logic was the first configurator to be created and implemented in LEEGOO BUILDER. As a general comment in this regard it should be noted that the expert-knowledge-based elaborations amount to app. 70 % of the time needed to complete this task in contrast to only about 30 % for the implementation of LEEGOO BUILDER.
The figure above shows a configurator for commercial terms and conditions. The tree structure top left shows the items covering the commercial terms and conditions of the proposal before the actual machine (see item GPCG2). The page symbol next to the items indicates that these are pure text items without a price.

» Calculation
Starting with list prices in several columns, the price calculation is carried through to the final proposal price. A particular requirement of Glatt was

*Site
Binzen*

that a customer- or customer-group-dependent pricing mechanism had to be defined and integrated into the calculation process. This is understandable if one considers that the customers of Glatt are companies of large pharmaceutical corporations with whom agreements have been entered into. The calculation scheme is also used for the calculation of representation and sales commissions. A special calculation process exists for assembly and commissioning items.

» Documentation

Documents are generated in German and English language. In addition to proposals, documents for order confirmations and internal purchase orders are of importance.
The figure below left shows a section of the chapters configured in the "Document Generator" module

of LEEGOO BUILDER. Experience shows that the entire proposal for all sites is rarely definable as a single document, whereas the definition of chapters such as cover sheet, table of contents, price list, etc. can be standardised. A document can then be composed from selectable chapters in a modular fashion providing a high degree of flexibility for the desired output format.

The figure below right shows a chapter of the proposal highlighting the particular advantages offered by the Glatt solution (fluid bed system) for the customer. The use of an image of the machine in the text module is highly recommended as it enables the customer to better visualise the machine, individual assemblies or other particularities. The advantage argumentation should not be missing in any detailed proposal.

Plant type Granulation Line for granulate production
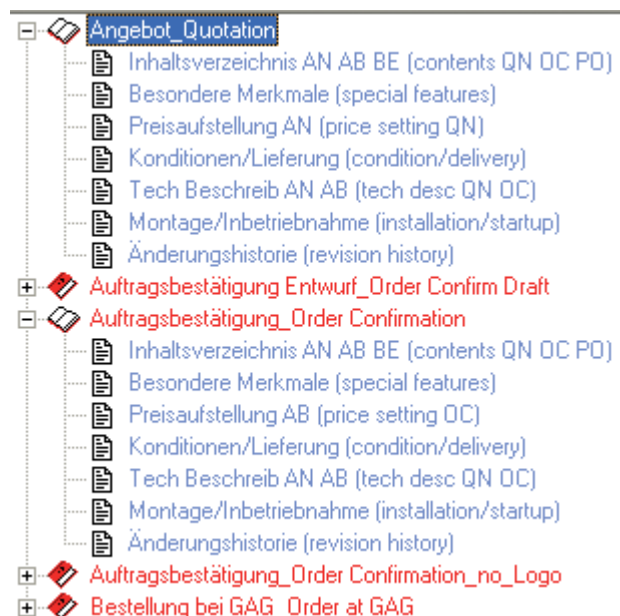
Modular design of proposal documents made up from chapters

Extract of a proposal document present the advantages of your solution in a comprehensible manner – pictures help achieving this

Support tower and vehicle of a tricable-ropeway

The Doppelmayr / Garaventa Group is a quality and technology leader in the field of ropeways.

The accurate understanding of customer requirements and professional, precise work are the basis of the worldwide market leadership.

» Objectives

The objectives of Doppelmayr / Garaventa with regard to a newly to be created, enterprise-wide ERP and proposal solution are very far-reaching and impact the entire sales and logistics chain at all sites of the internationally active organisation. The company initially had been looking for an ERP system that also covers the sophisticated proposal process in the ropeway business and in all other business areas as part of an internal project from 2007. However, such a system could not be identified so that the company was instead looking for a stand-alone proposal system for use as a front-end solution that could then be integrated with the ERP system in such a way that a consistent overall logistics process is created.

A particular aspect of the ropeway business is that the logistics process already starts at the proposal stage, i.e., the production of specific assemblies starts as soon as the probability of an order placement reaches a given value. The proposal system is therefore also of very high importance for logistics and production as early as the proposal stage.
The initial situation at Doppelmayr / Garaventa was typified by a proposal system that had been developed in-house and was well aligned with the requirements in terms of its functionality. However, the possibility of a further development was no longer ensured due to various influences.

Standard software continues to be the principle solution of choice for forming a base for the future, provided it meets all requirements.

Objectives for the new proposal system:
- A consistent overall process from design via configuration, calculation, project evaluation through to the transfer of logistics data to the ERP system
- Proposal preparation support in accordance with practical requirements as a meaningful combination of automation through product logic in configurators and flexibility through manual interactive working methods
- The configuration must achieve a distinctly higher degree of detail in comparison with the previous system in order to achieve logistic consistency in the first place
- Competence and long-term reliability of the provider; convincing references are obligatory

Wolfurt/Austria

Garaventa AG
Goldau/Switzerland

» Project

Doppelmayr / Garaventa contacted EAS in October 2007. LEEGOO BUILDER was already known in the company because an EAS customer, Schelling Anlagenbau GmbH, is based only a few kilometres away from Doppelmayr in Wolfurt. Bühler AG in Uzwil, Switzerland, was visited as another reference site in order to obtain first-hand experiences in the practical use of LEEGOO BUILDER over many years in the mechanical and plant engineering industry. The visits showed positive results so that the system selection with the intensified system trial of LEEGOO BUILDER was continued. The final decision for EAS and LEEGOO BUILDER was made after the consideration of all criteria, and a project contract with EAS was signed in August 2008.

The project is structured in phases. Project phase 1 comprises the proposal preparation for circular ropeways scheduled to be operative at the Doppelmayr sites in Austria and Italy as well as at the Garaventa sites in Switzerland in 2009.

» Design

The internal program Seiba is used for the design of circular ropeways. Data can be passed to LEEGOO BUILDER via an interface.

» Configuration

The ropeway configurator, subdivided into main elements, e.g., base station and top station, are developed on the basis of revised product structures that meet the logistics and sales requirements.

» Calculation

The calculation will be entirely revised and standardised for international use. There will be an appropriate differentiation of "standard assembly" and "adaptive and special design" cases.

» Documentation

- Calculation sheet
- Proposals in four languages
- Internal order confirmation

» ERP integration

The transfer of proposal and order data to the ERP system is of central importance because production on the basis of order data starts as soon as the project evaluation yields a sufficiently high score.

Tower group with sheave assemblies and carrier of a circulating passenger ropeway type 6-CLD

Main technical data of a circulating passenger ropeway

Carrier CWA Omega IV-8 with the Matterhorn as backdrop

Extreme variety in the ropeway business:
- Circulating passenger ropeways (chair and gondola lifts, combined installations)
- Special ropeways (aerial tramways and funiculars)
- Urban systems and many more

RheinEnergie power station

RheinEnergie AG safely and reliably supplies its customers with electricity, natural gas, water and heat. Three aspects are of particular importance to the company: supply security, cost-efficiency and environmental compatibility.

"

Advantages of using LEEGOO BUILDER instead of Excel/Word:

- All users create calculations on the same and up-to-date data basis with a consistent, reproducible calculation
- The items can be quickly selected from predefined bills of quantities. This accelerates the proposal preparation and makes the proposal process more reliable
- Consistent appearance of the proposals
- Reports for the proposal process support sales and controlling

Daniel Heise, Project Manager

"

» Overview

The example of RheinEnergie shows that the LEEGOO BUILDER proposal system is not only suitable for mechanical and plant engineering but, because of its great flexibility, can also be successfully deployed as a standard solution in other industries such as energy provision.

» Initial situation

To date, calculations and the associated proposals for the customer were prepared using the Office products Excel and Word in the technical departments of RheinEnergie. This approach resulted in a number of disadvantages. For one thing, the preparation was very time-consuming and error-prone. In addition, there were the problems caused by the lack of a centralised data maintenance. Consequently, a large number of master data was held redundantly, plus, the currency of the data could not be ensured either.

» Project

RheinEnergie began early in 2007 with a project for the introduction of a calculation tool. The objective was to systemically support the user as far as possible in the calculation process and the proposal preparation in order to minimise the time required and the sources of error.

RheinEnergie became aware of LEEGOO BUILDER in their search for a suitable system. Following initial talks and an on-site live presentation, a test phase began during which LEEGOO BUILDER was carefully trialled in cooperation with EAS. The purchase decision was made after the successful test in November 2007. The content-related system development based on the existing spreadsheets began early in 2008. All the requirements of RheinEnergie regarding the arithmetic functionality were implemented in the system during several workshops and finally validated and accepted by the billing

department of RheinEnergie.
The system was populated with the material master data via an export from SAP®.
The experiences and results gained in the test phase could be fully utilised during the initial system setup so that live operation started on time in Q3 of 2008.

» Configuration

Because the products to be calculated at RheinEnergie are very different, LEEGOO BUILDER was set up on the basis of price lists that largely follow SAP®.
This allows the user to interactively create the calculation using the familiar product groups from the materials catalogue or the bills of quantities (BOQ). A tabular view that receives the necessary input parameters (e.g. quantity, cost centre, hours, holiday surcharges...) was created for the configuration of the inserted items.
Finally, the global factors required for the calculation (material surcharge...) can be defined via an implemented

configurator. The final calculation is then generated with a mouse click.

» Proposal document

For printing the proposals, templates based on the existing Word templates were implemented in the document generator. These facilitate printing the calculation with different degrees of detail on blank or headed stationery. The image below right shows the letter from a proposal document.

» System environment

Due to the large number of users and the simplified system maintenance, LEEGOO BUILDER was installed in a Citrix® environment at RheinEnergie. This provides every user with access to the system and its calculations from anywhere in the company via the intranet.
Additionally, an importer was developed that cyclically transfers all the information required for the building blocks to LEEGOO BUILDER because SAP® is the lead system for all material master data at RheinEnergie.
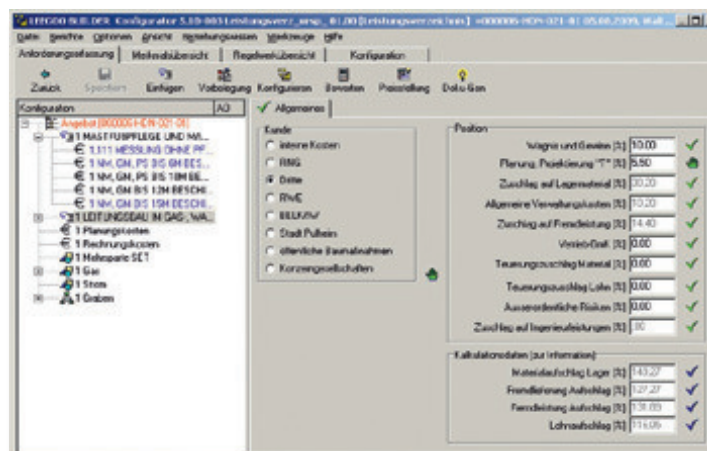

Gas containers for gas distribution

Water supply pipeline system

Extract of a proposal document

Configurator with global factors

Part of a tabular view

News and data transmission via high-voltage grid

ABB is a global leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact.

> *ABB's Key Benefits using LEEGOO BUILDER:*
> - Significant time savings in the offer preparation boosted the productivity of the bid & proposal team
> - A difficult to use and maintain excel-based spreadsheet portfolio was replaced with a comprehensive, database solution supporting the entire bid & proposal process
> - The structured, database centric approach reduced error possibilities and increased the proposal quality
> - Central maintenance of product configurator logics allow ABB's support team to keep the system easily up-to-date.
>
> *André Lehmann,*
> *Bid & propsal manager*

ABB operates in more than 100 countries and has offices in 87 of those countries to give its global and local customers the support they need to develop and conduct their business successfully.

ABB Utility communications designs and implements telecommunications networks requiring highest reliability to support the of supervision, control and data acquisition of mission critical, infrastructures like power grids, pipelines and railway networks.

Row of switch cabinets for telecommunications

» Initiation Phase
November 2008, a first contact was established between ABB Utility Communications in Baden, Switzerland and EAS in order to replace the existing bid & proposal tool, a portfolio of historically grown, difficult to use and maintain excel files, prone to errors, and requiring extensive manual work to generate proposals. ABB wanted a comprehensive solution for the entire bid & proposal process, supporting product configuration, calculation of sales prices and automatic offer text generation; with an integrated database, multi user support and world-wide access. The calculation had to follow the ABB's cost structure as implemented in the SAP® system.

» POC - Proof of Concept
In April 2009, after the POC ABB decided to go ahead with LEEGOO BUILDER as their future proposal system. During the POC, EAS demonstrated product configuration, proposal calculation and document generation as a comprehen-
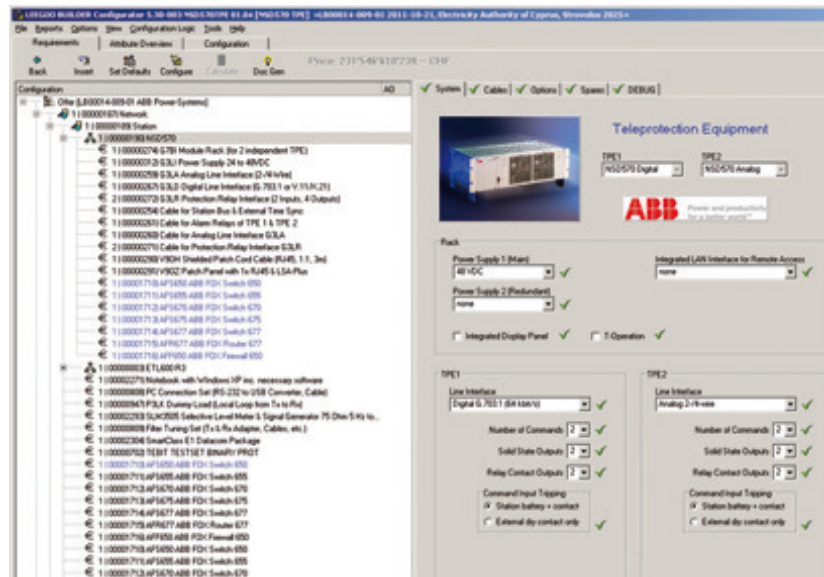
sive process with multi-user support and remote access.

» Product configuration

ABB specialists designed and implemented various product configurators to configure telecommunication systems. The screenshots on the right show examples of configurators with graphical user interfaces. Visible in the top right screenshot is the tree structure of a telecommunications network comprising of various stations that contain configurable devices - for instance a "Teleprotection Equipment".

» Configuration of commercial terms

In addition to the technical product configurators, ABB implemented one for commercial terms. The screenshot down right displays the high complexity of the commercial terms, also organized as a tree structure.

» Proposal documents

With one mouse click, LEEGOO BUILDER generates the entire proposal including cover letter, scope of supply with sales prices and commercial conditions in one document, in PDF or Microsoft word format. At present, proposals are generated in English, preparations have been made for German, French and Spanish languages.

» Internal documents

Documents to support the ABB internal proposal processes like SOX controls and compliance approvals are generated as customized excel sheets which can be easily implemented in LEEGOO BUILDER.

» Interface to SAP®

LEEGOO BUILDER imports data like customer names addresses and product costs from SAP®. In case an

Example of an configuratior of devices "Teleprotection Equipment"
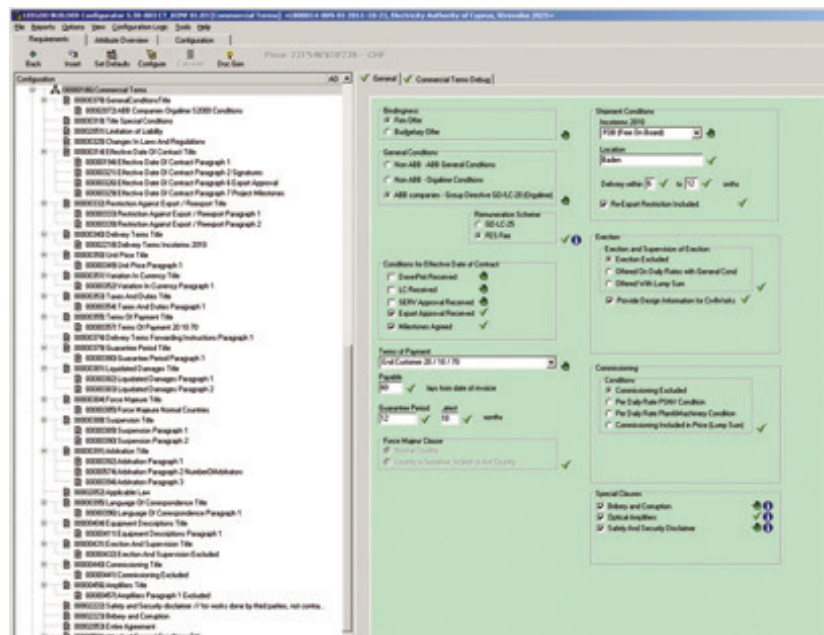
ABB configurator for commercial requirements

order is received, calculation data will be transferred to SAP®.

Configurator Impressions

Configurator with a variable process diagram for raw mill plants as components of cement factories (Source: Polysius AG)

Configurator for capturing main project data

Configurator for high-rise building elevator systems (Source: Schindler Elevator Ltd.)

LEEGOO BUILDER Community

» Germany
Aachen
Alfeld
Augsburg
Bad Salzuflen
Baienfurth
Beckum
Binzen
Braunschweig
Dortmund
Düsseldorf
Erlangen
Freudenberg
Freudenstadt
Göppingen
Hanau
Ittlingen
Karlsruhe
Köln
Königsbach-Stein
Krumbach
Leonberg
Mannheim
Mindelheim
Mülheim a. d. Ruhr
Spelle
Stuttgart
Übach-Palenberg
Weinsberg

» Europe
Budapest/HUN
Brüssel/BEL
Ebikon/CH
Istanbul/TUR
Langenthal/CH
Lissabon/POR
London/GBR
Madrid/ESP
Mailand/ITA
Malmö/SWE
Möhlin/CH
Moskau/RUS
Paris/FRA
Pischelsdorf/AUT
Prag/CZE
Rohrbach/CH
Salzburg/AUT
Schwarzach/AUT
St. Gallen/CH
Svoda/POL
Uzwil/CH
Verona/ITA
Wetherburry/GBR
Winterthur/CH
Wolfurt/AUT

» North America
Atlanta
Minneapolis
Oakdale
Ontario
Orlando
Plymouth
Raleigh
Toronto

» Central America
Mexico City

» South America
Bogota
Buenos Aires
Caracas
Joinville
Rio de Janeiro
Sao Paulo

» Middle East
Dubai
Riyadh
Tripolis

» Africa
Casablanca
Honeydew
Hydra/Alger
Johannisburg
Nairobi
Tunis

» China
Beijing
Chung Li
Guan City
Hong-Kong
Shanghai
Shenzhen
Wuxi

» Asia
Bangalore
Bangkok
Mumbai
Secunderabad
Seoul
Singapur
Yokohama

» Australia
Melbourne
Sydney
Vermont

» New Zeeland
Auckland

5. LEEGOO BUILDER - The Proposal System
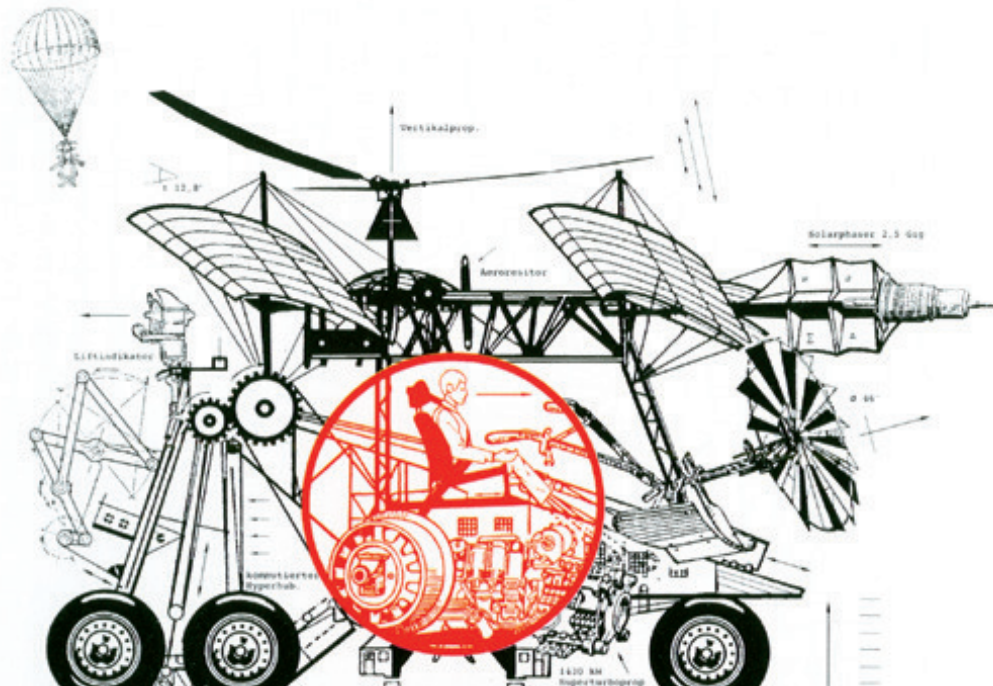
System design of the LEEGOO BUILDER proposal system
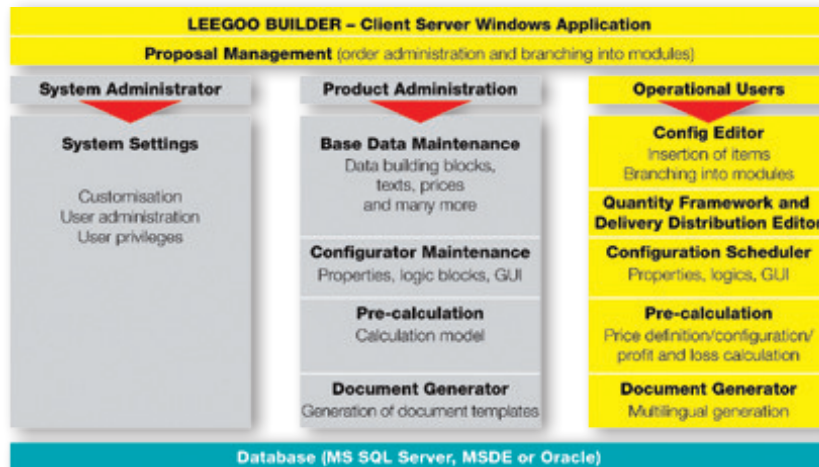
Principal modular system design of the LEEGOO BUILDER proposal system

» General System Aspects

The figure above shows the principal system design of the LEEGOO BUILDER core system. LEEGOO BUILDER is realised as an object-oriented client server application for Windows operating systems. Here, the term server refers to a database server.
LEEGOO BUILDER is entirely based on database technology and is therefore capable of handling large data volumes so that it is also suited for organisations with many users working at many sites around the world. The supported databases are Microsoft® SQL Server® and, with limitations, Oracle®.

In mobile use (stand-alone operation), a local MSDE or Microsoft® SQL Server® Express® database that is provided by Microsoft free of charge is utilised. The mobile use is supported by sophisticated replication mechanisms for data synchronisation with the central site. This replication is performance- and data-volume-optimised and easy to use.

» Operational Users

The operational users of the proposal system usually work in the expert departments of sales, project engineering and calculation.
In controlling, the system can be used to generate analyses and reports, e.g., forecasts.
In many cases the design office is involved in the specification of product structures and configuration rule sets. The yellow column in the figure above lists major modules of the core system for end users.

» Proposal Manager

The "Proposal Manager" module is the entry point to proposal processing in LEEGOO BUILDER. Projects and proposals are listed there (figure on the right-hand side above).
Well-developed navigation options support project and proposal searches. Proposal processing begins with creating a proposal or opening an existing one. The user then continues to work either in the "Configurator" or in the "Configuration Editor".

» Configurators

The end user uses the logic-based configuration for the fast setup of customer-specific product variants by entering requirements (attribute values). The customer applications described in this book contain many pictorial configuration examples. In most cases the application of the configurators is very straightforward. Expert background information for users can be made available directly in the configurators via help functions. This type of product "tutorial" is also useful for the induction of new employees.

» Configuration Editor

The Configuration Editor enables a user, e.g., a project engineer, to amend scopes of supply and services in a very flexible fashion or to build them up by manually interacting with the system. This is often a requirement in mechanical and plant engineering as configurators do not cover special customer requirements. Proposals for reconstructions, new developments and also for products that do not have configurators yet can be created with the mechanisms available in the Configuration Editor. The configurators support decision making processes during the capture of requirements and the selection of assemblies through product logics. A particular advantage of the Configuration Editor is the comprehensive support of the handling during proposal preparation. This applies to a wealth of configuration options for the tree structure and all aspects of item data processing. Some relevant examples of item data in this context of calculation master data, are costs, hours, prices, weights as well as multilingual proposal texts.

» Proposal Calculation

Because every company uses its individual calculation scheme, LEEGOO BUILDER offers complete flexibility in the implementation of the proposal calculation. A particular calculation scheme is realised by mapping calculation master data such as costs, hours, price lists, etc. (1). The user view provides data input columns and results output columns (2). This view is integrated into the Configuration Editor. The actual processing is performed by a freely definable algorithm that covers data access and calculation process, optionally right through to the contribution margin (3). Even the calculation for large tree structures is performed very efficiently. In addition to costs and prices, any other quantities such as weights and many others can be included in the calculation. The figure on the right-hand side (centre) shows the view of the "Pre-calculation" module. The columns of the calculation process can be defined with complete flexibility and can be adjusted by the administrator.

» Document Generator

The high-performance Document generator produces textual results documents, e.g., proposals, order confirmations, etc. in the desired language. The bottom right figure shows an extract from a proposal document generated in two languages.

» Product Administrator

In most cases, product administrators come from the users' specialist department or are lead users them-selves. They structure and maintain product data and product logics (configurators) and adjust the calcula-tion scheme, if required. They design the presentation of the results docu-ments by defining so-called templates in the Document Generator. Further tasks are user training, internal hotline support and the cooperation with EAS. The centre area of the figure on the left-hand side shows examples of product administrator tasks. The systematic processing of the product data ensures an organised product management at least from a sales perspective.

An essential feature of the creation and maintenance of configurators in LEEGOO BUILDER is that the experts can perform these tasks themselves without any programming.

The development of configurators is easy to learn. Configurators comprise logical constructs (rules), formulae of all types and, if required, so-called queries, i.e., queries of freely definable tables. The layout of the configura-tors' user interfaces can be modified with standard Windows® controls. A graphical Screen Designer facilitates the design of corresponding, intuitively useable configurator interfaces with-out any programming.

» System Administrator

A system administrator, a member of IT, installs LEEGOO BUILDER, main-tains the database and carries out data backups. If Citrix® is used, the administration of the Citrix® server is also performed by the IT department.
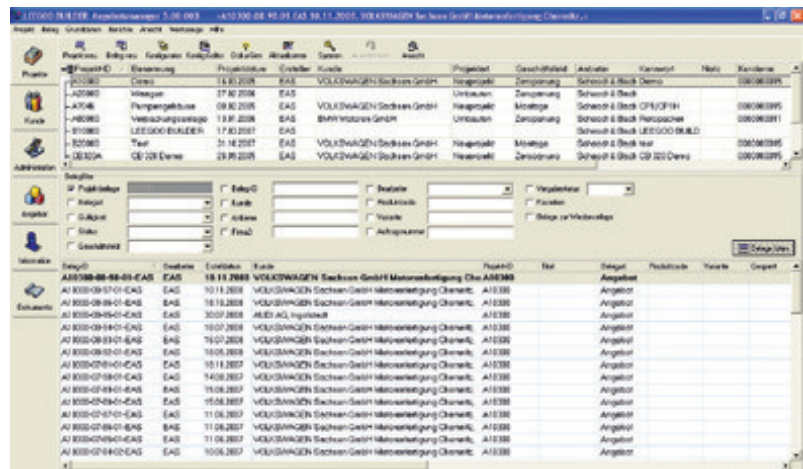
Initial screen in LEEGOO BUILDER – Proposal Manager module

View with sample calculation columns – Pre-calculation module

Extract from a bilingual proposal – Document Generator module

Optional system modules and functions

The LEEGOO BUILDER core system can optionally be supplemented by the following system modules and functions:

System Operation

» Mobile Option
This option is used to support the "Travel Mode". Users create or update their local database on the notebook and take projects and proposals along on business trips. Data synchronisation is via a performant, user-friendly data replication utility.

» Global Engineering
In the majority of applications, the so-called remote system operation is based on Citrix® Metaframe. This facilitates the worldwide use on a master database as well as the scalability of the system when the number of users increases. This operating mode is a frequent form of using LEEGOO BUILDER.

» Concurrent Engineering
In large-scale plant engineering and plant project engineering it is sometimes necessary for several people to work simultaneously on a proposal. This aspect is covered by this functionality.

Texts & Documents

» Translation Manager
This module is used to control the translation processes and to detect missing and out-of-date proposal texts ahead of printing. It is also used for the cooperation with external translation agencies.

» Unicode Capability
Proposals in Asiatic languages require Unicode. The Document Generator module also supports the generation of bilingual documents, e.g., English and Chinese in adjacent columns. This function is included in the standard version.

» Marketing Enzyclopaedia
This module is used to associate building blocks with image files and to display them.

» Booking in Documents
This facilitates the booking in of all types of files with links to a project or to a proposal.

Sales Information

» Sales & Projects
Management of projects, documents and activities as well as realisation of workflows (planned).

» Strategic Selling
Supports the worldwide sales controlling in project business with comprehensive project header data used as the basis of analyses such as the so-called "sales funnel report".

» Sales Reports
These can be freely built on database tables (see Developer option below).

» Archiving
Used to free up the live database when a large number of proposals are created.

» Customer Configurators
Enables customers to use configurators. Corresponding permissions can be assigned.

Change Management

» Change List
Changes are certain to occur during proposal preparation. Often there are many iterations. This option therefore allows each change of a proposal to be documented from its "release", including the specification of user name, time stamp as well as old and new value. The changes can be presented in a clearly structured way. This results in a significantly improved transparency of the proposal process and a tighter control of the responsibilities for technology, costs and prices.

» Delta Analysis
Used to identify the differences between the current proposal and the previous proposal status: "WHAT has changed HOW?". This function enables the sales force to provide meaningful responses to customers and internal processing.

Interfaces

» CRM Integration
LEEGOO BUILDER is made available for integration with CRM systems as a so-called "COM object". This COM technology is a Microsoft® integration technology. The implementation of this integration is supported by classic examples. In this case, the customers address data typically originate in the CRM system and is used, but not maintained, in the proposal system.

» ERP Integration
Applies to the import of item data, including costs, prices, etc. as well as the handover of order data from the proposal on order placement. A large number of realised ERP integrations facilitate the design and implementation of interfaces with the existing sample solutions.

Developer

» LEEGOO BUILDER API
Executable program texts, so-called methods, can be written, stored and executed in LEEGOO BUILDER. This makes it possible to extend the standard software with a large variety of company-specific processing steps and functions without changing the standard. It is important to note that these "soft-programmed" methods are stored as texts in the database and not as part of the application programs in the program directory. Methods are used, e.g., for the representation of algorithms used in calculations, for technical calculations, the output of results, e.g., for calculation sheets or also for exporting interface files. The administrator performs the relevant maintenance tasks following some initial training.

Operating modes of the proposal system

LEEGOO BUILDER supports the following operating modes with identical functionality:
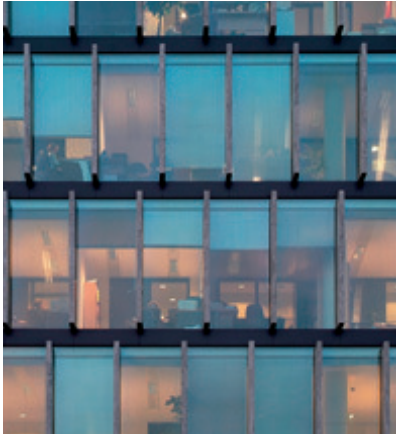
» In-house Use

Multi-user operation with a central database connected to the network. The development of the solution typically starts in the network with multi-user operation.

» Database

EAS favours the use of Microsoft® SQL Server® as database. Oracle®, with certain limitations, is also supported. Microsoft® SQL Server® Express® is supported for mobile use.

» Installation on the Client

In the basic configuration of LEEGOO BUILDER the proposal system is installed locally on the client PCs. Data access to the central database is via the network. This system configuration is therefore also called a "client-server application".

LEEGOO BUILDER supports the current versions of the Windows® operating systems.

In the event of LEEGOO BUILDER program updates the distribution to the clients can be automated with a mechanism implemented in the LEEGOO BUILDER core system.

» Installation on a Remote Server

If the proposal system is to be accessed by users from multiple sites, the use of a so-called remote solution, described in more detail below, is recommended.

» Worldwide Use

Remote operation with Windows Server® Terminal Services® or on the basis of Citrix® Metaframe supports the worldwide use from different sites (Thin Client technology). VPN connections are also used with certain limitations.

When using Citrix® Metaframe, the proposal system is installed on Citrix® server(s). For a large number of users, several Citrix® servers (server farm) can be used. In this scenario, Citrix® Metaframe also implements "load balancing" so that users logging in are distributed across the different servers of the server farm. This allows the application to be scaled to an increased number of users.

A company currently uses LEEGOO BUILDER with more than 500 users from more than 20 countries with about up to 150 users temporarily working simultaneously (Bühler AG).

» In-house Use with Citrix®

If a Citrix® environment is used by users at remote locations away from headquaters and the database is accessible via the network, local users can either have LEEGOO BUILDER installed locally on their client PCs and use the system from there, or they can work remotely via Citrix® Metaframe. This approach offers organisational and performance advantages.

» Use on Business Trips

Mobile use on notebooks with user-friendly data replication for data exchange with the headquaters.

The LEEGOO BUILDER "Mobile Option" provides comfortable, user-friendly and powerful support for this operating mode (see description under Options).

MSDE or Microsoft® SQL Server® Express® are used as local database. These are provided by Microsoft® free of charge and are compatible with the Microsoft® SQL Server® database. For this reason and also because of the simpler operation EAS favours the use of Microsoft® SQL Server® as the basis for LEEGOO BUILDER.

» Going on Business Trips

In the first step a mobile database is generated from the central database. Specific projects and proposals can optionally be "taken along" as originals or as a copy. Locking mechanisms prevent any in-house double processing of the originals taken along and vice versa.

» Data Exchange

Sophisticated replication mechanisms facilitate the data synchronisation on business trips as well as via the network on returning to base. Master data, e.g., prices, configurators, texts, as well as project and proposal data can be exchanged.

LEEGOO BUILDER Editions

Professional Edition

Suitable for suppliers of variant-rich catalogue products not requiring in-depth knowledge of product relationships. This system edition offers an attractive price/performance ratio and results in a very fast master data acquisition.

It is operative within a very short time span ensuring a fast return on investment.

Enterprise Edition

The proposal system with product configurator supports the sales division in configuration, calculation and the creation of proposal documents.

The results are time savings due to short proposal creation lead times and a highly automated proposal process.

Engineering Edition

This edition offers proposal preparation and project engineering support as well the support of the pre-calculation process for plant engineering and the ancillary project business. The Engineering Edition allows the efficient handling of multi-stage plant and machine configurations with thousands of proposal components, comprehensive calculation, e.g., based on manufacturing costs, and proposals filling several folders, by teams of project engineers.

Overview of the advantages and benefits of LEEGOO BUILDER

Methodological advantages

- The consistent proposal and project engineering system supports the entire proposal process on the basis of a central database

- Centralised and decentralised proposal preparation and project engineering

- The applicability of the proposal system ranges from individual systems through to the project engineering of complete plants

- Safeguarding the preservation of knowledge for the organisation

- Knowledge provision for worldwide sales through the use of product configurators

- Introduction of project-neutral master data in the sales department; structuring of products

- Management of product complexity and planned variance for the market (required external variance)

- Avoidance of unnecessary internal variance and reduced effort

Application advantages

- Product configurators with relationship knowledge are developed and maintained by the experts themselves without programming

- Comprehensive support of a free and flexible proposal processing and project engineering

- Support of all working methods: Similarity principle, reuse, generic principle

- In-house and mobile use on notebooks as well as worldwide remote operation with identical functionality

- Capacity for comprehensive and deep tree structures with configurators on hierarchic levels

- Achieving consistent calculation data and reproducible, transparent calculation results

- Bulk data capability; high performance also for a large number of users

- Multiple interfaces to CRM and ERP, e.g., to SAP®

Competitive advantages

- Increased productivity of proposal preparation by sales force; project engineering and proposal calculation

- Faster, more consistent preparation of more proposals of higher quality with the same team

- Realisation of shorter lead times, a faster proposal submission and time savings in sales

- Improved technical reliability of the proposed solutions

- Control over product complexity and avoidance of unnecessary special solutions; promotion of standardisation

- Compelling, systematically designed proposal documents, consistently designed contents (corporate design); up-to-date proposal documents in different languages

- Early and better clarification of customer requirements

- Increased order rate, turnover and EBIT for the organisation

6. Summery & Outlook - Glossary

Summary and Outlook

» An account of practical experiences in book form

This book attempts to summarise my personal experiences, those of our EAS team and in particular also the experiences of the LEEGOO BUILDER customers and their teams over the period from approximately 2000 to 2008 from an application perspective. All descriptions of the organisations involved have been carefully compiled, checked and approved for print by the organisations. We only represent what has been actually realised and occasionally indicate currently planned next steps.

The various approaches to the implementation of LEEGOO BUILDER "with or without extensions" differentiated below are all based on one and the same standard software. For introductions that represent or will represent an EAS customer project, parts of the LEEGOO BUILDER standard will be substantially extended on the basis of current customer requirements. These extensions, that can be switched on or off, benefit all LEEGOO BUILDER customers. This is one of the central ideas behind the use of standard software in contrast to individual solutions.

» Proposal system implementation with LEEGOO BUILDER extensions

The extensive EAS customer projects for the setup and implementation of LEEGOO BUILDER at Gebr. Schmid GmbH + Co., Bühler AG, Polysius AG, Schindler Elevator Ltd., Hitachi Power Europe GmbH and Doppelmayr Seilbahnen GmbH / Garaventa AG are only described in summary here in relation to the actual extent of the development work to give an insight into the motivations together with some highlights and milestones.

» Proposal system implementation without LEEGOO BUILDER extensions

Other applications as for example those at BEUMER Maschinenfabrik GmbH & Co. KG, Handtmann A-Punkt Automation GmbH, ALD Vacuum Technologies GmbH, Rhein-Nadel Automation GmbH, FELSS GmbH, VAG-Armaturen GmbH,

Schelling Anlagenbau GmbH, Brückner Trockentechnik GmbH, MAG Boehringer, Loesche GmbH, Hans LINGL Anlagenbau und Verfahrenstechnik GmbH, GROB-WERKE GmbH & Co. KG, Rosendahl Maschinen GmbH, Ammann Group Holding AG, Bruker AXS GmbH, Hager & Elsässer GmbH, Hosokawa Alpine Aktiengesellschaft, SwissTex Winterthur AG, Rekers GmbH Maschinen- und Anlagenbau, IMA Klessmann GmbH, Glatt GmbH, RheinEnergie AG and more, did not have project characteristics with regard to the introduction of LEEGOO BUILDER. In these cases EAS provided the LEEGOO BUILDER licenses and mostly no more than 10 to 20 days of training and introductory support.

» Method Library

The concentration on the large "machine, special machine and plant engineering" market with its demanding and comprehensive requirements for a consistent proposal system that supports the entire proposal process, in conjunction with a large number of system implementations, resulted in a broad spectrum of sample solutions for special challenges and scenarios.

This EAS Method Library is a valuable repository for current and future implementations of the proposal system. The existing sample solutions can be utilised during the test installation and trial phase as well as during the product introduction. In many cases this provides the basis for reaching a common understanding of the problems posed by and solutions for a special customer requirement within a short period of time. The "reconfigurability of devices" at Bruker AXS GmbH is just one example of this type of problem scenario. A further example is the sample solution for the problem of supporting "structured enquiries, including tender enquires or invitations to tender". EAS has dozens of such sample solutions that are available for incorporation into the design of an overall solution for a proposal system at any time. Hence, customers not only benefit from the functionality offered by the standard software but also from the solution

methods developed to overcome specific challenges. This contributes substantially to the acceleration and the reduction of costs and risks during the introduction of a proposal solution.

» Continous development

In addition to EAS-internal ideas and plans, the continuous development of LEEGOO BUILDER is driven by the existing and potential customers. The organisations that already productively work with LEEGOO BUILDER or that are currently introducing or testing the system, employ a large number of imaginative and expert people with practical knowledge of their requirements for the proposal process. In the majority of cases solutions are developed through the cooperation of EAS and the respective customers. EAS intensively works on the realisation of solutions to these requirements each day.

» Optimisation

Following the completion of the majority of the LEEGOO BUILDER core system as well as a large number of optional system modules, the optimisation of the existing base is an important focal point of the system development in parallel to the continuous development of the functionality. This refers to the handling of the software, to the documentation and to solving specific tasks as well as to the constant endeavour to achieve higher and higher speeds. Systematic benchmark tests under the high load of several hundred users and large proposal structures with 5,000 to 10,000 items provide the necessary context. For example, the LEEGOO BUILDER Document Generator is capable of generating app. 100 pages in one minute – also in Chinese.

» Extending the installed base

The continuous evaluation of the LEEGOO BUILDER application at newly won and potential customers is a central objective of EAS. This also actively includes industries outside mechanical and plant engineering, e.g., utility companies, building equipment providers, etc. because the suitability of LEEGOO BUILDER is not limited to "mechanical and plant engineering" which hitherto has been the focal point.

» On the right track «

» Practical experience tells us that we
are on the right track. «

Markus Hofer, Bühler AG – VDMA Erfa lecture on August, 12 2008 in Dortmund, Germany

Glossary

Below are explanations of some of the main terms used in this book. They are ordered thematically.

» General terms

Application
An application program with a specific functional scope. Here for different types of proposal preparation on the basis of LEEGOO BUILDER.

Users
Users of LEEGOO BUILDER subdivided into end users and product administrators.

Knowledge engineering
Experts support the product administrator in the elaboration and matching of product data and product knowledge. Both are represented in the proposal system as a basis for proposal preparation and for other purposes and made available for application by the end users. As a rule of thumb, EAS has found that about 70 % of the introduction effort is spent on knowledge engineering and only about 30 % on the implementation of LEEGOO BUILDER.

» System-related Terms

Application concept, working method
This book describes very different application examples. Each example has its own application concept that is based on working methods and fulfils the practical requirements. The right application concept is the key to the realisation of a successful proposal system.
The proposal system must be both applicable across a wide spectrum and adjustable to ensure the efficient realisation and maintainability of the desired concepts.

Method Library
A set of sample solutions for specific subtasks involved in the realisation of a specific application concept that EAS calls Method Library.

Proposal system
LEEGOO BUILDER is used as adaptable standard software for building and applying proposal solutions. A proposal solution can be adapted in different ways by customisation (system settings) and by defining suitable company-/product-specific working methods (application technology concept). This book presents a variety of different adaptations of the proposal system.

Project engineering system
Project engineering describes the preparation of an event, a process or a real-world construct in a project management plan. The term is used for the creation of technical and other documents, for the presentation of processes as well as scopes of supply and services in plant engineering (Source: Wikipedia). The purpose of a project engineering system, in this case LEEGOO BUILDER, is to support this project engineering process in a holistic and consistent manner. This involves building up, calculating and providing a potentially large scope of supply and services as a tree structure. In this context, the scope of supply and services often is also referred to as a bill of quantity. It is the result of the technical project engineering and the input for the pre-calculation. The users usually refer to themselves as project engineers. They come from the specialist departments sales, project engineering and pre-calculation.

Calculation system
(see project engineering system) Where there is a stronger emphasis on the support of the proposal calculation, sometimes also called project calculation, rather than the support of the development of the scope of supply and services (configuration), the users frequently refer to the system as a calculation system. They refer to themselves as project or calculation engineers.

» Master data

Master data
Master data is a term used in information technology and business economics (operational application programs). The data of an application can be grouped into master data, also base data or core data, and update data or transaction data (Source: Wikipedia). In most cases, but not always, the LEEGOO BUILDER proposal system introduces sales master data for the purpose of preparing proposals. Frequently, this master data is not yet or not clearly structured and/or not centrally mapped in a database.

Building block
The name "LEEGOO BUILDER" conveys the notion of a building block world of sales elements that are defined in a project- and order-neutral fashion and used to build up the individual proposal items of proposals in the proposal process.

Calculation master data
A building block (synonym: sales or functional assembly, sales item) can be associated with calculation master data such as costs, prices, hours, weight, etc. Building blocks associated with calculation master data, displayed with a Euro symbol in the LEEGOO BUILDER tree structure, are referred to as "priced building blocks". Proposal items with priced building blocks are used to calculate the final proposal price with an implemented calculation scheme (calculation process) on the basis of specified calculation data.

Sales texts & style guide
Building blocks can always be associated with sales texts in the desired languages (including Asiatic languages via Unicode). From a customer and sales perspective, the sales texts should be formulated in a meaningful way and well laid out. A style guide should define and adhere to conventions such as a consistent font, font size, text width, tabstops, etc., to facilitate the generation of consistent proposal documents (corporate design).

In addition to proposal texts, it is also possible to define other text types, e.g., "short text" for budget proposals and "long text" for detailed proposals as well as "internal description" for internal purposes.

- Product building block set
  In LEEGOO BUILDER a product building block set represents a maximum structure comprising mandatory components plus options and alternatives. The items of the building block set reference building blocks.
  A product building block set is part of the system master data and represents the structural product definition in the sense of "what a variant of the product can contain". A configuration usually, but not always, is a subset of such a maximum structure.

- Product configurator and logic
  A product building block set provides the structural basis of a configurator.
  The capture of customer requirements takes place via a freely designable configurator user interface in the Customer View, which is to be understood as a "functional view" rather than an "item view" of the configurable product.
  The inputs apply to the setting of attribute values, e.g., for machine type, performance, design type, etc. The product logic embedded in a configurator governs the logical control during the capture of customer requirements and the selection of the required proposal items from the corresponding building block set.
  The configuration logic can be defined in LEEGOO BUILDER without any programming. Essential logic elements are logical constructs (rules), formulae and queries of freely definable product data tables.

» Transaction data
- Project header data
  The project and proposal header data as well as the proposal item data is part of the proposal system's transaction data.
  The project header defines a project number, project name, etc.

- Proposal header data
  Multiple proposals can be assigned to a project, e.g., due to different proposal statuses (versions). The proposal header data comprise, e.g., the customer as proposal recipient, the creator of the proposal, resubmission date and app. 120 additional fields. Project and proposal header fields that are not required can be hidden (customisation).

- Proposal items / configuration
  In addition to the proposal header data, a proposal also comprises the proposal items that are also referred to as the components of a tree structure.
  Priced items are not subdivided any further and are therefore the "leaves" of a tree structure.
  From a calculation perspective, proposal items can also be referred to as the rows of the calculation. The system distinguishes between "priced" rows and "summation" rows.

- Tree structure / configuration
  The hierarchical layout of the proposal items on the various levels of the product structure, such as plant level, plant area, machine, assembly, component, are referred to as tree structure in the LEEGOO BUILDER environment.
  Synonymous terms are: Proposal bill of materials, bill of quantity, scope of supply and services. The term "configuration" also refers to this tree structure.

» Proposal preparation
- Configuring with and without logic
  "Configuring" refers to the compilation of the proposal items as a

hierarchical structure in the sense of a proposal bill of materials.
In LEEGOO BUILDER, this is done either with a logic-based product configurator (generic principle) or with the Configuration Editor in a manual-interactive process in the sense of free project engineering (similarity principle). In addition, so-called "free items" can also be created.

- Proposal calculation
  Synonymous terms are: Pre-calculation, project calculation and price calculation.
  The proposal calculation applies to the commercial evaluation of the tree structure.
  The way in which the tree structure is created has absolutely no bearing in this context. The term "calculation scheme" refers to the calculation process that calculates, starting with costs or list prices, through to the proposal price in the desired target currency.
  The calculation master data serve as specification for the calculation process (see building block). The calculation master data can enter the calculation process either via building blocks or via the proposal items.

» Proposal results presentation
- Calculation sheet
  The calculation sheet is generated as an Excel sheet by the proposal system to present the calculation results through to the contribution margin for internal valuation.

- Proposal document
  The proposal document is based on a so-called document template and can be generated as a multilingual and even dual-language document. This functionality is provided by the Document Generator module of LEEGOO BUILDER.

- Change Management
  The Change Management answers questions like "WHO changed WHAT WHEN?".

Notes

Fax reply to EAS: +49 (0) 27 23 / 979 311

Company adress

Company name: ....

Street: ....

Postcode / Town: ....

Country: ....

Contact

Title / Name: ....

Position: ....

Phone: ....

Email: ....

We have the following request

[ ] Please contact us

[ ] Send us .... additional copies of the book

[ ] Send us the book as a PDF-file on CD

[ ] Arrange a meeting or presentation date with us

[ ] Create a configurator example to our specifications

[ ] Send an informational proposal for .... user(s)

[ ] We would like: ....

Diethard Struck

The author, Diethard Struck, born in 1955, studied mechanical engineering with the special subject production technology at the RWTH Aachen and received his diploma in 1982.

In the following years he developed several company-specific project engineering solutions for a large German plant engineering firm in the iron and steel technology sector as assistant to the Chair of Machine Tools of the machine tool laboratory (WZL) at the RWTH Aachen.

After subsequent foundation work for product configurators followed the dissertation in the field of knowledge-based systems for mechanical and plant engineering In 1988.

Further industrial experience from 1988 to 1992 as co-worker in the aircraft construction industry at the former MBB in Augsburg, Germany, today, EADS Deutschland GmbH. Iniatially as project manager for production-critical components of the Airbus A340 prototypes and then as head of Industrial Engineering.

The foundation of EAS Ingenieurbüro Dr.-Ing. Diethard Struck and the start of the commercial development of manufacturing and production solutions followed in 1992. These knowledge bases represent computer programs whose primary purpose is not the administration but the generation of data.

EAS began to develop the first product configuration solution for proposal preparation in mechanical and plant engineering in cooperation with Gebr. Schmid GmbH + Co. in Freudenstadt, Germany in 1995.

The idea of universally applicable standard software for the proposal creation instead of the company-specific solutions developed until then quickly took shape.

The conception and development of corresponding software began in 1997. The baby was named LEEGOO BUILDER – as a symbol for building block sets.

The founding of EAS Engineering Automation Systems GmbH for the development, marketing and implementation of the LEEGOO BUILDER proposal system took place in 1999.

From 2000 onward LEEGOO BUILDER was then developed and introduced at the first large EAS customers in mechanical and plant engineering.

By 2009, the author, together with the EAS team, had continually developed the LEEGOO BUILDER proposal system in close cooperation with the EAS customers and successfully implemented it in more than 47 mechanical and plant engineering companies.

This book is an account of these experiences.

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