

Production Engineering

Production Engineering for Job Orders and Continuous Series Production

As a component of a fully integrated solution, the proALPHA® Production Engineering Module is designed to meet a wide range of specific requirements found in many types of production - from make to order and single unit or short runs, to mixed mode and continuous series production - with a high degree of user satisfaction. A typical manufacturing plant needs a rolling production planning mechanism to determine resource requirements, whereas a construction project may call for general, interdepartmental management. This combination of production requirements occurs frequently in European middle-sized companies. These distinct operations can be managed easily with event driven processes created in proALPHA through user-defined sequences of activities.

proALPHA's common functions and centralised data model underpins the integration of all data within modules such as Materials Management, Sales, Purchasing and Finance and Accounting. This not only guarantees continuous availability of real time information from all departments but also makes sure that production data is delivered throughout the system to wherever it is needed, without additional effort.

The Basic Functions

A proALPHA bill of materials contains all part oriented data required to establish demand, production, and documentation. This information can be presented as parts lists arranged by storage bin, structure and quantity. In addition to the manufacturing bill of materials, proALPHA manages external design and engineering, and spare parts lists as well - with a multi-language capability. Menus of product features allow the rapid location of all parts and drawings, ensuring that a "new design" of a part already in existence can be avoided. The online integration of CAD Systems opens up considerable opportunities for streamlining design and production processes. In production planning, a scheduler can call up and view drawings and other documents on his or her desktop, putting an end to costly, time consuming, searches through the storage cabinets.

Beyond commonly available functions, proALPHA Production Engineering includes support of multiple machines, multiple production lines and advancing of split batches. Material and machine requirements as well as any numerically controlled (NC) programs can be included at the production cycle level. In addition, a machine operator can determine standard operating times using unique geometric formulae. External sourcing, which can include in plant or materials provided externally can, not only be planned, but, in the case of a bottleneck, can be initiated by the machine operator.

From the Drawing Board to Workshop Management

Manufacturing orders arrive in one of three ways: directly from sales orders, from the materials requirements plan, or from a manual entry. proALPHA supports both design modification and variant production. An existing bill of materials or production schedule can be edited manually or you can simply generate a parts lists and schedule using previously defined logic. Both methods may be used in combination.

The proALPHA Production Engineering Module supports several scheduling and planning methods.

When the design or scheduling of required components is not complete, a forecast of an aggregate production plan, using estimated cycle times, can still be created. The results of a completed schedule are actual cycle times that include total job time, overlaps and job-splitting, specific workplace delays, or required cycle down times, as well as transport times. In initial planning, as well as final release, proALPHA checks for the availability of critical elements - capacity, materials and machines.

The preparation of a work order is possible from two perspectives. First, the organisational view presents the total work order structure. At each level, individual departmental tasks can be worked on directly, while still maintaining a view of the complete work order. The second view shows a composite of all concurrent work orders requiring the attention of one specific department. Thus, for example, an employee is able to define a filter that displays all activities in a department that are currently scheduled to start on the following Monday. Changes in any bill of materials or in a schedule can be entered for each work order operation.

To ensure cost effective processes, proALPHA provides a number of organisational and technical alternatives for capturing actual cost data in real time. Included among these are the acknowledgment of production milestones, automatic picking of piece parts at the start of production, complete job order break outs, partially automated booking of labour and materials using barcode technology and access to the complete cost accounting system.

proALPHA WorkflowAutomation - A New Generation of Manufacturing Functions

proALPHA WorkflowAutomation can dramatically simplify production engineering through the use event driven processes. WorkflowAutomation provides many operational advantages due to the simple fact that activities tend to be carried out by employees from different departments.

Single activities within the order fulfilment process - such as scheduling, or, matching supply with product demand, or, the release of inventory - can be linked together and automated. proALPHA recognises decision points, a term which includes events such as, missing parts, bottlenecks, or incomplete documentation, and presents them to those responsible via his or her activity manager as outstanding tasks.

So, as an example, following a design change for a production order that has already been scheduled, the scheduler responsible for that order is automatically informed of the change, and, if necessary, the production schedule can be modified immediately.

All activities, decision points, and responsibilities within WorkflowAutomation are user definable.

proALPHA Calculation - Flexible Administration, Accurate Statements

Whether calculating the net profit of a complex work order or for an inventory valuation for the cost of manufactured goods, the proALPHA system is the perfect tool.

A user may design any number of customised versions of the standard costing methods provided with proALPHA. The user decides what combination of manufacturing costs are relevant to the analysis and can select cost summaries by type of cost. Discounts and mark-ups, whether defined as a percentage or as a fixed amount can be set up individually.

Materials, for example, can be computed using a choice of base prices. Manufacturing costs can be differentiated by the employee, the machine performing the work or by handling and tooling costs.

When costing manufactured goods, the high degree of system integration passes values directly to the appropriate proALPHA module. Costing rates and surcharges associated with each cost centre are split according to budgeted, actual, or standard rates and can be referenced by fixed and variable portions. As the work order is debited, the correct cost centres are credited.

Change Management - Shorter Innovation Cycles and their Consequences

Because of the ever-shortening cycles of product and process innovation, managing engineering change is of utmost importance. Change management within proALPHA ensures that all changes are documented, and offers a convenient function for modifying or editing data used in design, planning or production.

proALPHA uses a unique change number to record and associate any technical, design or manufacturing changes with any corresponding documents. The resulting change keys for individual drawings, parts lists and schedules refer back to this standard number. Changes can be attached to effectivity dates; a company wide communication system can notify all employees impacted by changes, ensuring they are implemented as planned.

Continuous Production Programming - Knowing the Long-Term Demand

Based on a planned turnover, proALPHA can evaluate the mid and long term resource requirements for capacity as well as inventory. The planning horizon can be broken down into calendar week, month, or three month time-periods.

A key part of the proALPHA Production Engineering Module is its ability to simulate alternative plans and seek optimal demand coverage and asset utilisation. Production plans can be continuously modified as many times as required to match the real world situation.

All About Orders, Resources, and the Master Data Files

All, important information used in decision making, from the design, planning, and production departments is presented by proALPHA in an operational perspective. The online query capability not only connects to all master data - such as drawings, bills of material, components, schedules, and production cycles, - but, all available links between them are also displayed. It is always evident therefore, which assemblies remain to be finished for specific production schedules, or which production cycle requires the use of an essential machine resource.

In addition to the master data and statistics, information on the usage and availability of materials, capacities, and tools, is also readily accessible. So, for example, it is known when and what production cycle is about to reach a capacity bottleneck and the on-hand balance and demands for purchased items over time. From here, it is possible to branch out to view the source of the demand or the coverage for the demand. If we are interested in the effective utilisation of capacity, all details surrounding the production order that caused the capacity bottleneck can be displayed; perhaps a priority order from an important customer, advance production, or simply, the accumulated costs.