Sales and Distribution Processing (SD)

Overview

The R/3 Sales and Distribution component enables you to fulfill your organization's sales and distribution requirements, and to supply data and information worldwide. The functions in Sales and Distribution are subdivided into the following areas:

❑ Sales support

❑ Sales

❑ Shipping

❑ Billing

Sales support enables office sales staff and field staff to collect and make use of invaluable information regarding customers, interested parties, contacts, competitors, and competitors' products.

Sales support

In the IDES system, sales support involves entering and evaluating customer contacts, competitor analyses, market analyses, and direct mailing campaigns.

You can use the IDES system to demonstrate all typical sales tasks, and show how these are integrated with other areas in an organization. The sales phase enables you to demonstrate a range of business transactions (pricing, availability check, delivery scheduling, and printing the necessary documents, for example) plus the functions that are used to process them.

Sales

In the IDES system, shipping processing involves deadline monitoring for orders that are due, creating and editing deliveries, picking, packaging, loading delivery items, and printing shipping documents.

Shipping

The billing functions you can perform in the IDES system include creating invoices on the basis of deliveries and services, editing debit and credit memos, and canceling billing transactions.

Billing

Organizational Structures

Sales organization

A sales organization is a means of classifying regional, national and international markets. Every sales organization represents a sales unit in the legal sense of the term. All of the business transactions involving sales and distribution are always processed within a sales organization.

IDES contains four main sales organizations with an extensive range of data and settings, and four sales organizations with data and settings that are restricted to a specific business task.

Sales organization	Location	Data defined?
1000	Frankfurt/Germany	Sales organization contains all required data and settings
1020	Berlin/Germany	Sales organization contains all required data and settings
3000	Philadelphia/USA	Sales organization contains all required data and settings
3020	Denver/USA	Sales organization contains all required data and settings
2100	Porto/Portugal	Sales organization contains all data required for ALE scenarios
2200	Paris France	Streamlined sales organization (no production) for cross-company sales processing and stock transfers
2300	Barcelona/Spain	Sales organization contains all data required for ALE scenarios
6000	Mexico City/Mexico	Sales organization contains all data required for material ledger scenarios

Distribution channels (Germany)

To provide optimum service to customers, Sales and Distribution uses various distribution channels. IDES products are marketed by means of the following distribution channels:

Distribution channel	Name
10	Final customer sales
12	Sold for resale
14	Service
20	Store chain
2	Industrial customers
24	Pharm. customers

If you sell and distribute an extensive product range, you can subdivide product lines on the basis of divisions. Salable materials and services in the IDES system are assigned to the following product divisions:

Division	Name
01	Pumps
02	Motorcycles
03	Paints
04	Lighting
05	Food
06	Elevators
07	High Tech
08	Service
10	Vehicles
12	Solvents
13	Pharmaceuticals
14	Cosmetics

A sales area is a specific combination of sales organization, distribution channel, and division. You define all sales-related customer data on the basis of sales areas.

IDES Germany has the following sales areas:

Sales organization	Distrib. channel	Division
1000	10	00
1000	12	00
1000	14	00
1020	20	00
1020	22	00
1020	24	00

In the IDES system, Division 00 (the division for document entry) is used for selling materials and services. This enables you to enter products from different divisions in a single document.

The product divisions (i.e. the divisions to which the various products are assigned) play a definitive role in determining the business area in the sales document, the Sales Information System (SIS), and Profitability Analysis (CO-PA).

The following diagram illustrates the sales areas contained in IDES Germany:
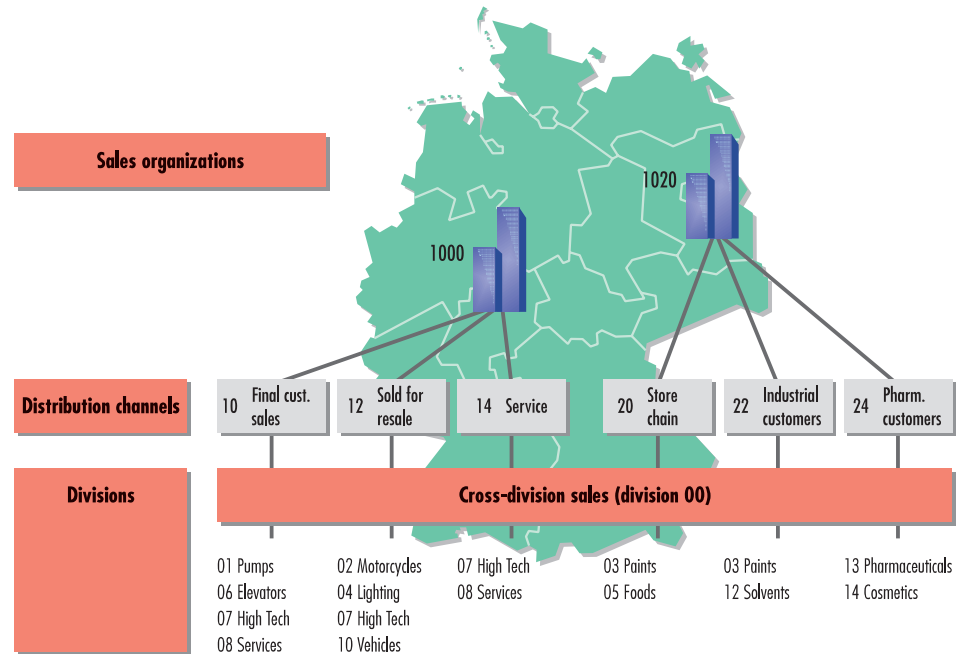
Fig. 3-1:   **Sales Areas in IDES Germany**

The appropriate assignments have been made to ensure that only certain products are sold in a given sales area.

Sales offices and sales groups

In Sales and Distribution, sales offices, sales groups and salespersons (sales employees) are used for internal organizational purposes. A sales office is a sales outlet, or a company, and can work for one or more sales areas.

IDES Germany has four sales offices. Sales groups can be used to show how these sales offices are staffed. A certain number of sales employees work in each sales group. The number of sales employees depends on the size of the sales office in question (see Appendix B – Sales Employees). Depending on his or her qualifications and strengths, each sales employee is allocated to a certain number of customers. Each sales employee has a personnel number, and is assigned to organizational unit 1400 in Human Resources.

IDES Germany has the following sales offices and sales groups:

Sales office	Sales group
1000 Frankfurt office	100 Gr. F1 Mr. Anton 101 Gr. F2 Mr. Mayer 103 Gr. F3 Mr. Ludwig
1010 Hamburg office	110 Gr. H1 Mr. Thomas 111 Gr. H2 Mr. Thiel
1020 Berlin office	120 Gr. B1 Ms. Schmale 121 Gr. B2 Ms. Vega
1030 Stuttgart office	130 Gr. S1 Ms. Chmiel 131 Gr. S2 Mr. Kaysers

A shipping point is an organizational unit which is situated at a specific location, and which carries out shipping processing.

Shipping point

In IDES Germany, you can plan and process deliveries to customers (or replenishment deliveries to several warehouses) from six shipping points, each of which is assigned to the appropriate plants.

Shipping point	Plant	Location
1000	1000	Hamburg
1100	1100	Berlin
1200	1200	Dresden
1300	1300	Frankfurt
1400	1400	Stuttgart
1999	1999	Dresden

Settings and Special Features in Sales Processing

Business transactions

In the IDES system, various sales-based business transactions can be demonstrated by means of sales documents. In sales processing, you can work your way through a wide range of business transactions.

Typical Business Transactions in the IDES System

- ❑ Inquiries and customer quotations
- ❑ Orders (standard orders, rush orders, cash sales)
- ❑ Outline agreements (scheduling agreements, quantity contracts, and service agreements)
- ❑ Customer problems and complaints (deliveries free of charge, returns, credit and debit memo requests)

Specific Business Transactions in the IDES System

- ❑ Consignment stock processing
- ❑ Make-to-order production
- ❑ Assembly processing using the Project System (PS)
- ❑ Individual purchase orders
- ❑ Bills of material in the sales document
- ❑ Cross-company sales processing and stock transfers
- ❑ Batches in SD
- ❑ Configuration of standard products
- ❑ Service Management
- ❑ Billing plans
- ❑ Entering sales orders via the Internet

All of the information required for sales processing is transferred to the sales document from realistically defined master data (customer, products, prices, and so on). Various checks (availability check, and credit limit check, for example) can be carried out. The data that is stored is passed on to subsequent documents (the delivery document, or invoice, for example), which are used to process the business transaction further.

Business area determination

The business area to which all financial data is passed on at the time of billing is determined on the basis of the division to which the ordered product is assigned, and the plant that is responsible for delivering the product (the delivering plant). Sales area 1000/14/00 (Services in sales organization 1000) is an exception to this rule. This sales area determines the business area itself.

For example, the revenue earned from selling a hi-tech product to customers or retailers would normally be passed on to the *Electronic products* business area since the product is assigned to the *Hi-tech* division. If, however, the same product is shipped to the customer as part of a spare parts delivery, the product revenue is credited to the *Service* business area.

Sales and Distribution is integrated with information from Financial Accounting. This enables you to implement a credit policy with a minimum risk factor, and to process documents quickly.

In the IDES system, the credit limit is only checked for specific customers during sales order processing (and for deliveries). There is a good reason for this – it means that you can work through business transactions that do not primarily deal with Credit Management even if the credit limit is exceeded.

The following customers have been defined in the IDES system to demonstrate Credit Management scenarios:

Credit limit check

Customer no.	Name
4999	Hallmann Anlagenbau GmbH
1350	HSM Pumpstechnik AG
1380	HSM Marschfelden GmbH
1390	Technik and Systeme GmbH

During sales document processing, important information is collected and passed on to Profitability Analysis at the time of billing. This data is a valuable source of market information for Controlling and for making strategic decisions. The following information is passed on:

Data for Profitability Analysis

Char. type	Characteristics
Fixed characteristics	Product, customer, business area, sales organization, sistribution channel, product division
Master data	Material group, industrial sector of customer, customer class, sales employees, sales office
IDES characteristics	Sales region, product category, product hierarchy

Sales documents are constantly being entered in the IDES system. This means that data is always up to date, and can be used for other purposes. These sales documents (most of them created automatically) regularly supply data to the Sales Information System (SIS), and Profitability Analysis (CO-PA). This means that you can use the functionality of these applications and be sure that the data which you are using is consistent and reliable.

Transaction data

Settings and Special Features in Shipping Processing

Creating deliveries

Deliveries play a central role in the shipping process. When you create a delivery, this triggers and monitors shipping activities such as picking or delivery scheduling. In the IDES system, you can create deliveries automatically (by means of work queues), or manually. Any agreements with customers regarding complete deliveries, partial deliveries and order combinations are also taken into account here.

Packaging delivery items

In the IDES system, you can package delivery items with predefined shipping materials (boxes, cases, or pallets, for example). This enables you to specify which packaging types have been assigned or should be assigned to which products. You can demonstrate how the packaged goods can be loaded using various means of transport.

Here are a few examples:

❑ Pallet boxes or wire baskets
Small parts that have already been packaged during production can be packaged further in pallet boxes or wire baskets during delivery processing.

❑ Wooden crates
Pumps can be packaged in wooden crates (for transport at home and overseas)

❑ Padded boxes
Monitors and onboard computers can be shipped in padded boxes.

You can create a hierarchical structure for packaging. Products packaged in the first level can be packaged further, or loaded for transport. For example, a *padded box* is loaded onto a pallet; the *pallet* is then loaded into a *wagon* or *truck*

Picking

In the IDES system, there are three different ways of performing picking (i.e. issuing the correct quantity of quality goods on time for shipping):

❑ Picking on demand
Once you have created the delivery, you enter the picked quantity for the delivery items manually (if, for example, a delivery is urgent and has to leave the company fast).

❑ Picking using a picking list
A picking list is printed, and the picked quantities are written automatically to the delivery items in question.

❑ Collective picking with confirmation
This involves picking a group of deliveries. In the IDES system, collective picking requires confirmation. The goods issue of the delivery items can only be posted if the picked quantMities have been confirmed.

Transportation zones and routes

To assist shipping and transportation processing, Germany has been divided into 10 transportation zones (based on the postal code). You can use predefined routes to help you define itineraries and means of transportation.

Settings and Special Features in Billing

Billing completes a sales-based business transaction. The following billing functions are available in the IDES system:

Creating invoices

❑ Creating invoices for deliveries and services

❑ Processing credit and debit memos on the basis of requests from Sales

❑ Creating pro forma invoices

❑ Cancellations

❑ Offering volume-based rebates

You can use the following forms of billing:

Forms of billing

❑ An individual billing document for each sales document

❑ A collective billing document for several sales documents

❑ Several billing documents for one or more sales documents (invoice split)

Billing data created in SD is passed on to the following components:

Integration with Accounting

❑ Financial Accounting (FI receivables)

❑ Controlling (CO)

During the billing procedure in IDES, documents are created automatically in the following Accounting areas:

❑ General Ledger

❑ Profit Centers

❑ Profitability Analysis

❑ Controlling

❑ Financial Accounting

Settings and Special Features in Sales Support

Sales support is an important tool for employees working in sales and marketing, particularly those dealing with business development and customer services.

Master data
Realistic master data records have been defined in the IDES system so that you have a real-life environment where you can work through the various steps involved in sales support (managing contacts, for example, or direct mailing campaigns). The following master data is used in sales support:

❑ Sales partners and customers

❑ Sales prospects and competitors

❑ Contact persons

❑ Sales employees

❑ Products

Contacts
In the IDES system, you can use various sales activity types to prepare sales activities and store information on the outcome of these activities. The following sales activity types are available:

❑ Sales calls

❑ Phone calls

❑ Letters

❑ Trade fair contacts

Direct mailing
You can use information that has already been defined in the IDES system to conduct direct mailing campaigns (sending a letter of advertisement, or an invitation to an information seminar), and include the appropriate enclosures (a sample, a brochure, or some documentation, for example). The addresses of customers and sales prospects are generated automatically.

Production Planning (PP)

Overview

R/3 Production Planning is a package solution for planning and controlling production. Production Planning is subdivided into the following areas:

❑ Sales and Operations Planning

❑ Long-term planning

❑ Demand management

❑ Material requirements planning

❑ KANBAN

❑ Repetitive manufacturing

❑ Shop floor control

In the IDES system, products are manufactured using different processes. All of the necessary planning and manufacturing processes can be demonstrated in the IDES system.

❑ Engineer-to-order production

❑ Production to order

   ❍ Planned independent requirements

   ❍ Customer requirements

❑ Repetitive manufacturing and mass production

❑ Process manufacturing

You can use Sales and Operations Planning (SOP) as a generic planning and forecasting tool for optimizing and streamlining the processes in your organization. The functions in SOP are fully integrated to give you a clear overview of the activities in your organization. You can collect information from various internal and external sources and use this information as a basis for establishing realistic company goals.

Sales and Operations Planning

In the IDES system, Sales and Operations Planning can be demonstrated for lightbulbs and PCs. In SOP for lightbulbs, the sales values are derived from the Sales Information System. A two-level planning hierarchy (PG-LIGHTBULB) has been defined. The sales values for specific products are transferred from SD, and aggregated on the basis of product groups. Bottom-up planning is performed for lightbulbs.

A one-level product group (PC-HOME) has been defined for PCs. Here, the sales values and production figures are generated manually, and disaggregated on the basis of the subordinate groups. Top-down planning is performed for PCs.

Long-term planning	Long-term planning involves creating different versions of the demand program, and simulating the effects of each version in material requirments planning, and capacity planning. As part of these simulations, capacity requirements, activity type requirements for cost centers, and the demand for purchased parts are calculated.

In the IDES system, you can perform long-term planning for a limited number of pumps that have been grouped together into one product group (PG-400). This is a one-level product group. You can simulate a range of scenarios, compare these scenarios against each other, and pass on requirements to purchasing.

Demand management   Demand management enables you to define requirement quantities and delivery dates for finished products and important assemblies. In order to manage demand, you first have to specify the planning strategy you are going to use to plan a particular product.

In the IDES system, production can be triggered both by sales orders (automobiles, motor cycles, elevators, and some pumps), and anonymous sales orders (lightbulbs, PCs, paints, and other products). In other words, planned independent requirements and customer requirements are passed to the production plan. In the IDES system, various pumps – and their assemblies – are used to demonstrate how planned independent requirements are generated. Materials (with or without configuration) are used to generate customer requirements. Automobiles and motorcycles are typical IDES examples of configurable materials.

Material requirements planning   You use material requirements planning to ensure that a material is available. In other words, you procure the requirement quantities required internally and for sales on time. This involves monitoring stock, and creating procurement proposals for purchasing and production.

In the IDES system, materials have been defined for use in the various MRP and lot-sizing procedures. Each product manufactured in-house in the IDES system is assigned to a bill of material. These bills of material have several levels. By exploding the bills of material, you can determine the purchase order quantities and dates needed to meet the requirements in question. These can be purchase requisitions (for parts procured externally), or planned orders (for parts manufactured in-house), and can be converted into accurate, concrete procurement elements (i.e. purchase orders and production orders).

❑ MRP procedures
In the IDES system, material requirements planning is performed with 'A' parts (all pumps, and their components, for example). Consumption-based planning strategies can be demonstrated using material AM2-730, or PCs. Material P-102 can be used to demonstrate master production scheduling.

❑ Lot-sizing procedures
Static, period, and optimum lot-sizing procedures can be shown in the IDES system. The precise lot size is calculated for many materials (for pump P-100 and its components, for example). Weekly lot sizes can be demonstrated using pump P-102. A least unit cost procedure is used for material 99-100.

❑ Assembly processing
The assembly order technique is used for assembly processing where production order data is accessed directly (material availability of all components, or capacity availability (BOM explosion)). When the sales order is entered, a planned order or production order is generated directly. Pump P-401 and automobile AM2-GT can be used to demonstrate assembly processing in the IDES system (as of Release 4.0, automobile AM2-GT will be redefined for repetitive manufacturing with a production cost collector).

❑ Discontinued parts
The IDES system has been defined in such a way that components of pump P-400 are replaced by other components when the original components are discontinued (i.e. when stock has been exhausted). Simple discontinuation can be shown using assembly 400-100/400-110; parallel discontinuation using assembly 400-500/500-510.

❑ Direct procurement and direct production (collective order)
Direct procurement and direct production allow you to procure/manufacture directly for usage. Pump P-400 and components 400-100, 400-400, and 400-500 can be used to demonstrate direct production in the IDES system. In assembly 400-100, assemblies 400-140 and 400-150 are produced directly. A multi-level BOM is created in which components are planned on the basis of consumption, and, at the same time, other assemblies are produced directly. All tasks further down the logical chain (release, deadline monitoring, and budget control, for example) are handled collectively.

❑ Cross-plant materials planning
In the IDES system, the manufacturing of automobile AM2-GT can be used to demonstrate cross-plant materials planning. Data has been defined and settings made so that stock transfers, withdrawals and production in other plants are possible. These plants have been assigned to different company codes than the assembly plant.

KANBAN

If KANBAN is implemented, a manufacturing level can pull the materials it requires from the preceding manufacturing level ("pull" principle). The materials do not have to be pushed through production by means of an overall planning framework ("push" principle). The various control cycles required between supply source and demand source have been set up for automobile production in the IDES system. Supply areas, and materials WIB-L1-1 and AM2-600 are required here. A supply area establishes a link between a work center and a storage location. It is possible to assign more than one supply area to a storage location. Containers (kanbans) have been created; these are filled using a range of replenishment strategies. The containers for onboard computers are, for example, filled on the basis of an MM scheduling agreement. In the IDES system, KANBAN production control is also used to manage materials for the production of PCs.

Repetitive manufacturing

In the IDES system, the planning functions of repetitive manufacturing for maintaining the production plan, and the control functions for handling actual manufacturing can be demonstrated using the demand programs for lightbulbs and PCs.

The two different repetitive manufacturing options (grouping together partial orders into a series, and repetitive manufacturing using run schedule quantities) can be demonstrated in the IDES system using materials R-1000 and R-1001. Two production lines are used for manufacturing. Work can be distributed automatically, or manually.

Shop floor control

As soon as a planned order or an internal requisition has been created in MRP, Shop Floor Control takes this information, and adds order-related data to ensure that the order can be processed entirely. In the IDES system, production orders are used to regulate and monitor production within the IDES companies, and as a controlling instrument. All of the necessary data (work centers, available capacity of work centers, routings, capacity requirements) has been defined in the IDES system.

Organizational Structures

Companies and plants

A plant is a place of production, or a grouping together of locations that are situated near each other and which have material stock (storage locations). A plant is a unit where stock records are kept and material requirements are planned. Plants are the most important organizational entities in Production Planning and Control.

In the IDES system, one or more plants are assigned to each company code where goods are produced and logistical structures are in place.

Company code	Plant	Location	Products
1000 Germany	1000	Hamburg	Pumps, automobiles, motorcycles
	1100	Berlin	Paints, tablets
	1200	Dresden	Lightbulbs, PCs
	1300	Frankfurt	Elevators
	1400	Stuttgart	
2000 Great Britain	2000	Heathrow/Hayes	Onboard computers (automobile supplier)
2100 Portugal	2100	Porto	Wheels (automobile supplier)
2200 France	2200	Paris	
2300 Spain	2300	Barcelona	Wheels (automobile supplier)
3000 North America	3000	New York	Pumps/motorcycles
	3100	Chicago	Paints
	3200	Atlanta	Lightbulbs/PCs
	3300	Los Angeles	
	3400	Seattle	
4000 Canada	4000	Toronto	PC components
	4100	Montreal	
6000 Mexico	6000	Mexico City	PC components
	6100	Monterrey	PC components

Companies 3000 (North America), 4000 (Canada), 1000 (Germany), and 2000 (Great Britain) have similar structures, and produce a representative range of products. There are only minor differences in the way that the various products are configured, and the dynamic data (quantity plans, run schedules, and production orders, for example) has been adapted to take country-specific factors into account.

The entire manufacturing process (including planning, procurement, and sales) has been set up for companies 1000 (Germany) and 3000 (USA). Companies 2000 (Great Britain), 2100 (Portugal), and 4000 (Canada) have been set up merely as manufacturing subareas. This is because these companies are used to demonstrate transactions that are connected with Financial Accounting and the cross-company code procurement chain.

Company 2200 (France) is a sales and distribution company, and does not have a shop floor area of its own. Companies 2100 (Portugal), and 2300 (Spain) are offshore plants, each with their own R/3 System. The R/3 Systems in Portugal and Spain are integrated with the corporate group's R/3 System via ALE.

A work center is an organizational unit in which (or by which) a work step is performed, producing output. A work center master record refers to a cost center (but it can also refer to a qualification, person, or position). Work centers provide information for production, costing, scheduling, and capacity planning. The work performed at a work center is subdivided on the basis of the activity types (manufacturing, plant maintenance, etc.) which the cost center in question is responsible for planning. The work centers in the IDES system have been arranged hierarchically. This means that you can search for and aggregate available capacity during Capacity Planning.

Work centers

IDES Germany
Plant 1000
Hamburg

Plant 1000
Pre-assembly
Work center
1000

Plant 1000
Production
Work center
1000

Statistical work center
19XX

Pre-assembly robot I
1901

Pre-assembly robot II
1902

Pre-assembly robot II
1903

Mechanical production
1100

Processing center 1110
1110

Universal lathe
1111

Universal lathe
Maho 1112

Drill press CAP
1113

Drill press
1114

Balancing machine
1115

Processing center 1120
1120

Electronic production
1200

Assembly areas I+II
1300

Assembly I
1310

Assembly II
1320

Assembly areas III+IV
1400

Assembly III
1410

Assembly IV
1420

Production
1500

Goods receipt
inspection I
1710

Goods receipt
inspection II
1711

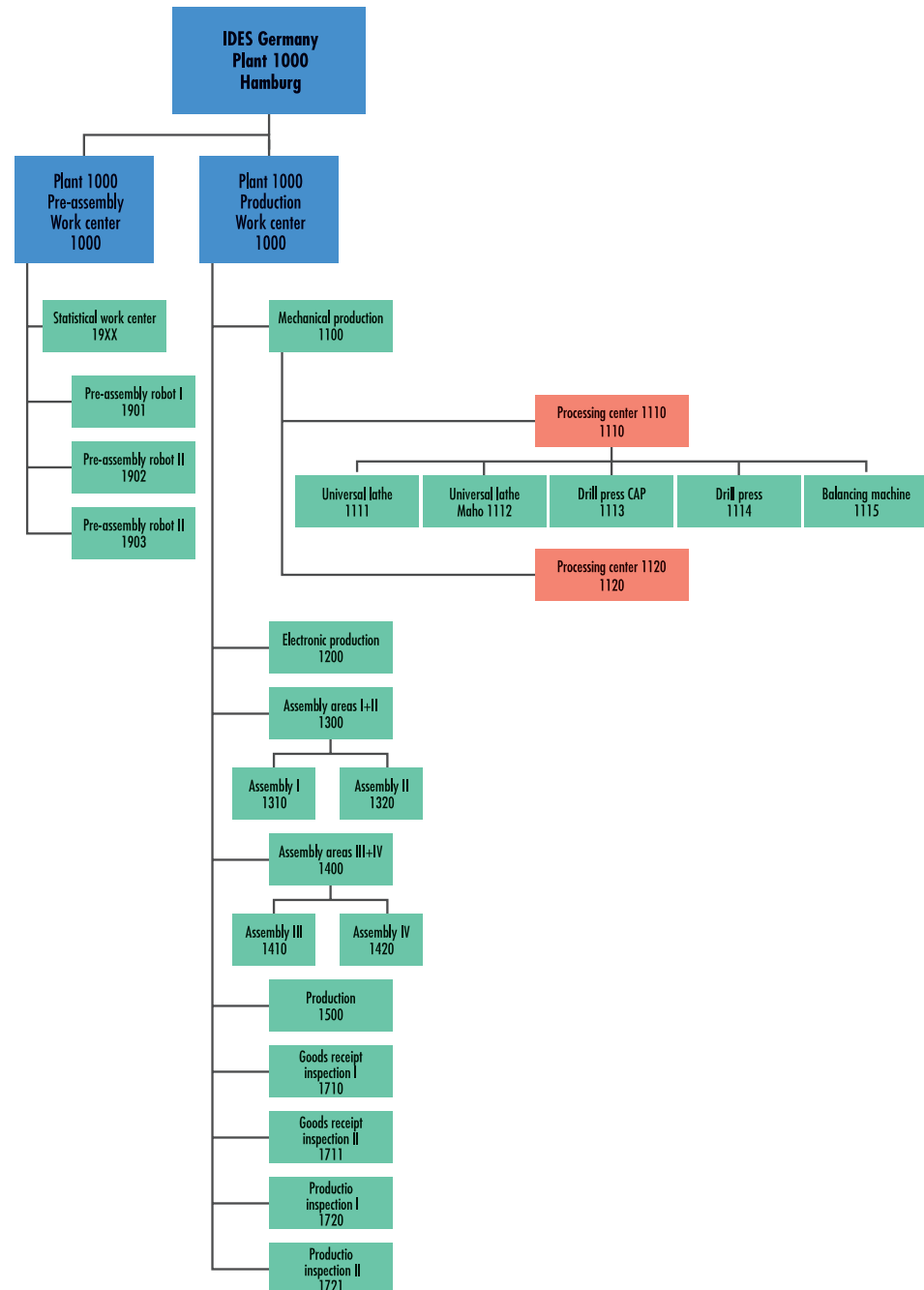Productio
inspection I
1720

Productio
inspection II
1721

Fig. 3-2:   Structure of the Work Center Hierarchy in Plant 1000

Settings and Special Features in Production

In the IDES system, different products are manufactured using different manufacturing processes. These manufacturing processes have been assigned to the various plants. All products involving discrete manufacturing are assigned to plant 1000 (Hamburg) or 3000 (New York). The process industries (PP-PI) for pharmaceuticals and chemicals are assigned to plant 1100 (Berlin).

Manufaturing process	Plant	Description
Engineer-to-order	1300 Frankfurt	Elevators(see chapter on Project System (PS))
Production to order (customer requirements)	1000 Hamburg 3000 New York	Motorcycles (individual PCs, pumps and automobiles are also produced in this way)
Production to order (planned indep. reqts)	1000 Hamburg 3000 New York	Pumps
Assembly processing	1000 Hamburg	Automobiles (a pump is also produced on the basis of the planning strategy for assembly processing)
Repetitive manufacturing	1200 Dresden 3200 Atlanta	Lightbulbs/PCs
Process manufacturing (customer requirements)	1100 Berlin	Paints/solvents
Process manufacturing (planned indep. reqts)	1100 Berlin	Tablets/cough mixture

In the production to order process, the requirements generated from sales orders are transferred directly to production as customer requirements. One type of production to order involves configurable products (that is, the product is specified in detail in the sales order, including details such as color, special models, or specific accessories). The characteristics to be taken into account for a product are grouped together into a characteristic class, and interdependencies are defined and assigned to the appropriate material masters.

Production to order
(Customer requirements)

IDES contains a range of configurable products. The HD-1300 motorcycle can be configured, as can automobiles and PCs. Certain elevator components are also configurable (elevator compartments, for example). However, since other factors play an important role in the manufacturing of PCs and automobiles, motorcycle production is used to demonstrate production to order in the IDES system.

Class HD-000, class type 300 contains all the characteristics that are required to define a configurable HD-1300 motorcycle.

Characteristics	Name	Values
HD_Country	Country	International California 49 states
HD_Motor	Engine	1340 cm³/35 kW engine 1575 cm³/59 kW engine
HD_Color	Color	Silver Black Red
HD_Wheel	Rear wheel	Normal Extra wide
HD_Seat	Seat	Standard Deluxe leather solo Upholstery
HD_Exhaust	Exhaust	Exhaust 74 dB Exhaust 78 dB Exhaust 82 dB
HD_Antitheft	Anti-theft protection	Handlebar lock Electronic demobilizer
HD_Options	Accessories	Leather saddle bag with tassles Leather saddle bag with studs Saddle bag special Windshield compact Windshield kingsize Chrome set

The bill of material for a motorcycle is defined as a super BOM. This means that all characteristics can be selected from the BOM. For example, the fuel tank might be available in three colors in the BOM, but the item number is the same for all three tanks. In this case, an item is selected in the production order where the characteristics are processed using the appropriate formula for object dependencies. The only exception here is the engine. A class item (class "Engine", class type 200) is entered in the BOM item for the engine. This class item is replaced automatically with a material number in the production order.

The BOM for a motorcycle has two levels – the materials on the first level have been defined as dummy assemblies. These materials are not included in the production order. From an engineering point of view, the materials are managed collectively. From a production point of view, however, they are not assembled.
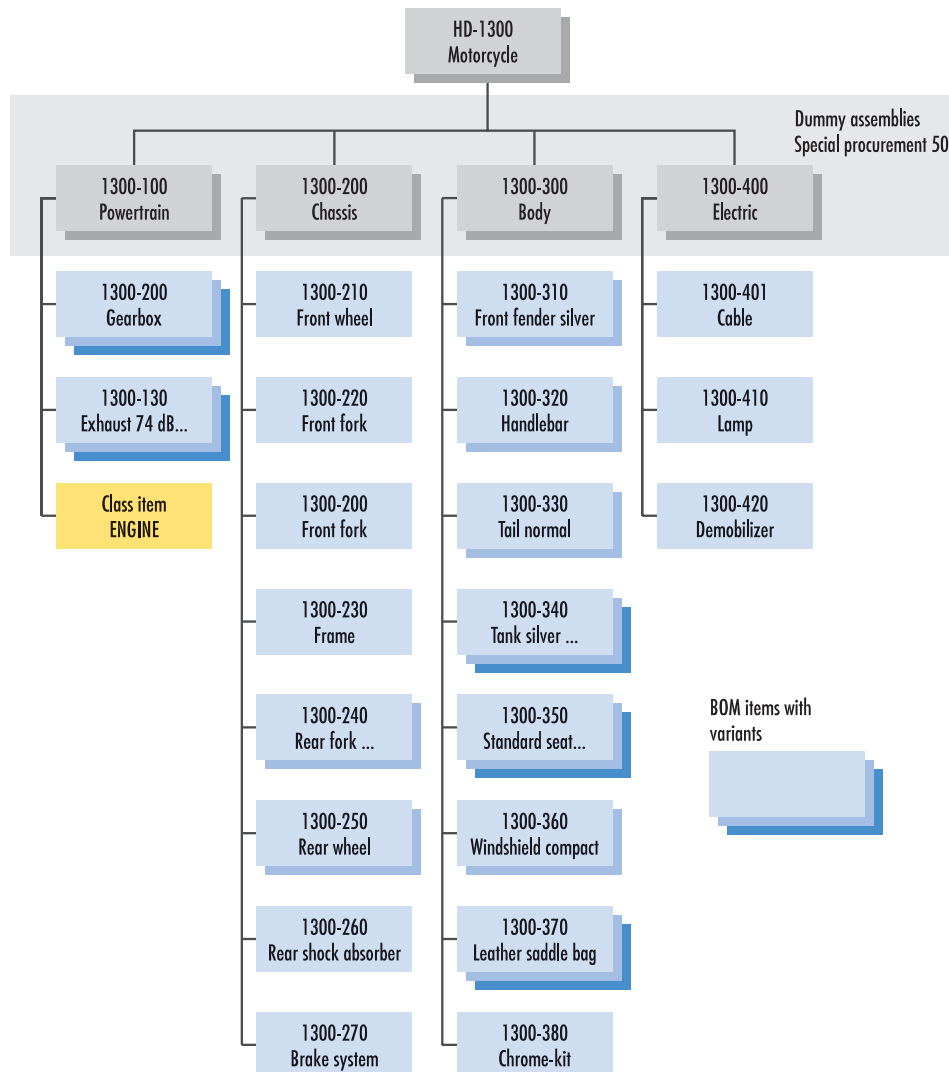
Fig. 3-3:   Motorcycle BOM

The backflush principle is used for all materials. This means that these materials are withdrawn automatically upon confirmation. The finished product is sent with the confirmation directly to the warehouse.

The routing for a motorcycle is also taken into account when the motorcycle is being configured. If, for example, you choose chrome trim as an accessory, a work-step for mounting the chrome trim will be added automatically to the routing. The last workstep in the motorcycle routing is defined as a milestone and is, therefore, the only workstep that is confirmed.

Production to order
(customer requirements)
with assembly processing

You can use assembly processing to create production orders or planned orders for manufacturing when entering sales orders. A planned order or production order to cover the requirements is generated automatically. When the sales order is being generated, an availability check is performed at the component level, and the planned/production order is used to reserve production capacity. Feedback between production and sales is also possible in assembly processing.

In the IDES system, the AM2-G automobile, and pump P-401 are manufactured in accordance with an assembly processing strategy. When you create a sales order for pump P-401, a production order is generated automatically. The production of automobiles is, however, the main example used to demonstrate assembly processing. Automobile AM2-GT (class SAPSOTA, class type 300) is configurable. When you create a sales order for this vehicle, certain characteristics are processed. The planned order is then generated directly from sales processing.

Characteristics	Name	Values
AM2 engine	Engine	4-cyl. 66kW engine 6-cyl. 112kW engine 8-cyl. 180kW engine
Gearbox	Gearbox	5 gears Automatic
Paint	Paintwork	White Light red Black Dark green Metallic silver Metallic blue Metallic black
Upholstery	Upholstery	Fabric Leather
Interior color	Interior color	Anthracite Gray Beige Black Classic red
Extras	Extras	Air conditioning Onboard computer Airbag (passenger) Radio Business Sound Radio Mountain Sound (MC) Radio Beach Sound (CD)

You procure the "Air conditioner AM2-600" component using planning requirements. A scheduling agreement delivery schedule is then generated in MRP on the basis of these requirements. You can edit this delivery schedule manually (in scheduling agreement maintenance), or send it directly to the component supplier (JIT – just in time) via EDI (Electronic Data Interface). The "Onboard computer AZ2-730" component is used to demonstrate how materials are staged for the assembly line. This component is controlled using KANBAN production control. When the

automobile is being assembled, the onboard computer is installed, and the container in question is updated. The procurement transaction triggered by the container becoming empty generates a delivery schedule for the predefined MM scheduling agreement. This delivery schedule is sent to the component supplier via EDI (IDOC communication as part of an ALE scenario).

Assembly is principally event-driven. Trigger points (release, or end of release for example) are assigned to the individual worksteps in the production order.

The processes of the onboard computer and air conditioner suppliers are fully integrated. Both suppliers are assigned to company code 2000 (Great Britain). The components are produced in plant 2000 (Heathrow). The supplier's material number of the onboard computer is AZ2-730, and the supplier's material number of the air conditioning system is AZ2-600. The supplier's and manufacturer's material numbers are different because these two processes have been integrated into one business model using two company codes (1000 = manufacturer; 2000 = supplier).

The components of the exhaust pipe AM2-500 bill of material have also been defined as kanban materials.

Supply area	Material	Name	Replenishment strategy
WIP-L1-1	AM2-510	Manifold	Reservations/MRP
WIP-L1-1	AM2-520	Catalytic converter	Delivery scheduling
WIP-L1-1	AM2-530	Muffler	Run schedule quantities
WIP-L1-2	AM2-530-R	Muffler var.-sized	Stock transfer with reservation
WIP-L1-2	AM2-550	Towbar	Purchase order
WIP-L1-1	AM2-600	Air conditioning	Container control/MRP
WIP-L1-1	AM2-730	Onboard computer	Delivery scheduling

Material AM2-500, plant 1000 (Hamburg) is a finished product of repetitive manufacturing (run schedule number 10000233). Onboard computer AZ2-730, plant 2000 (Heathrow) is produced in two production versions (run schedule numbers 10000243 and 10000244) at two production lines (AZ-100 and AZ-200).

The KANBAN Internet application component enables IDES suppliers to monitor the kanban containers that have to be supplied. Supplier 1098 and material AM2-600 can be used to demonstrate this Internet scenario.

When planned independent requirements are created, planned orders are generated in MRP. The different planning strategies available in the R/3 System can be demonstrated in the IDES system using different pumps. All pumps are manufactured in plants 1000 (Hamburg) and 2000 (Heathrow). These pumps have been defined so that they can be used to demonstrate very specialized functions in the Production Planning module (CAP calculation of standard values, for example). All pumps have practically the same BOM structure. Only the assemblies are different for certain items to take into account the different pump finishes (steel, or chrome, for example). In the IDES system, pumps are manufactured both independently of orders, and for specific sales orders (P-500, for example). All pumps are made up of the same components, and are manufactured at the same work centers.

Production to order (planned independent requirements)
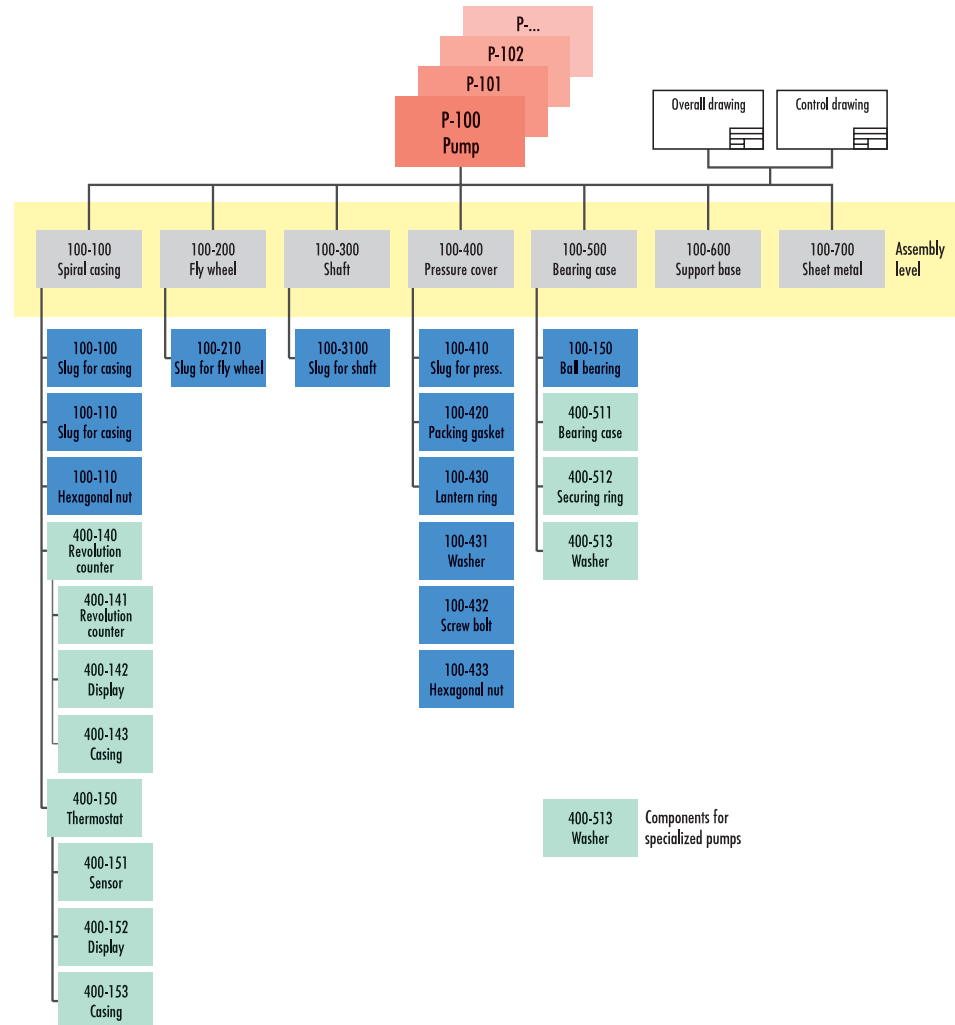
Fig. 3-4:   BOM Structure for Pumps

Pumps are identified by a 2-character product structure which is repeated in the BOMs for the pumps. The highest level of this structure is for final assembly; the lowest level for pre-assembly and mechanical production.

The routings for the different kinds of pumps are all based on the same structure.

Routing header
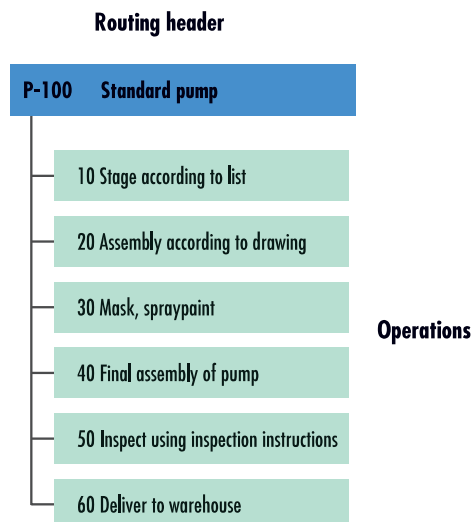
Fig. 3-5:   Routing for Pump

This structure shows how completely different manufacturing methods can be used to manufacture individual pumps despite the fact that many of the parts used (within the pumps) are the same. The BOM and routing for the pumps can vary slightly, since many functional factors of the PP component are incorporated into the pump production process. The following table gives an overview of the various functions that can be demonstrated using the different pumps:

Material	Task
P-100	Planning with final assembly (including integration with QM)
P-101	Planning with assemblies (101-200)
P-102	Production by lot size using master production scheduling
P-103	Non sales order based planning including external processing in production
P-104	Assembly processing with production order
P-109	Made-to-stock production
P-400	Direct production with collective order/long-term planning (product group PG-400)
P-401	Assembly processing with production order
P-402	Long-term planning (product group PG-400)
P-403	Long-term planning (product group PG-400)
P-404	Long-term planning (product group PG-400)
P-500	Make-to-order production for configurable material (one-level)
P-501	Make-to-order production for configurable material (order BOM)
P-502	Make-to-order production for configurable material (multi-level)

❑ Calculation of standard values (CAP) in IDES
The system bases its calculations on technical work center data, and on the definition of the appropriate technical procedure. The calculation is carried out in accordance with the methods defined for the technical procedure in question. Formulas which are based on characteristics and tables have been defined for each method.

In the IDES system, you can use work center 1113 (standard drilling device) to demonstrate how standard values are calculated. You can recalculate the standard values in transaction 30 of the routing for non-driven wheel 100-200 by using the procedure "Drilling", and the method "Process time drilling" (both DCS_0200).

Repetitive manufacturing

In repetitive manufacturing, the same products are manufactured for a certain period of time. A total quantity is defined, as are the production rates per partial period. Goods are produced in production lines. Assemblies are distributed among these production lines. The routings for repetitive manufacturing are relatively simple, and do not vary greatly. The components are staged anonymously for the production lines.

In the IDES system, repetitive manufacturing is used for some PCs, and for lightbulbs. Plants 1200 (Dresden) and 3200 (Atlanta) are used for repetitive manufacturing.

Lightbulbs

Sales and Operations Planning for lightbulbs is a relatively long-term process. Planning is based on the two-level PG-LIGHTBULB product group hierarchy.
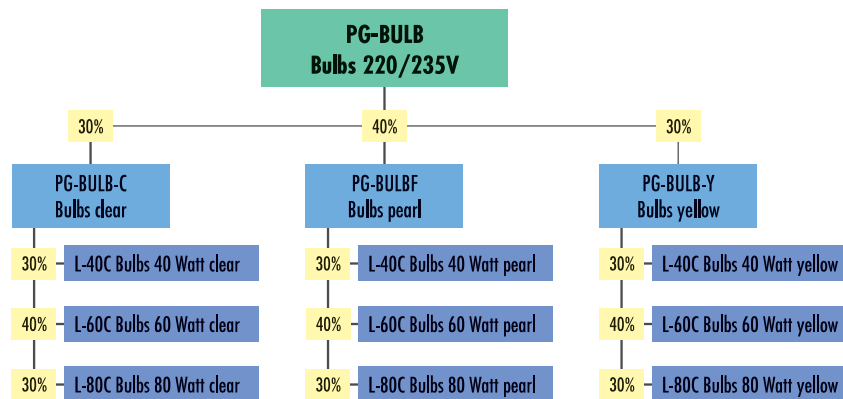

Fig. 3-6:   PG-LIGHTBULB Product Group Hierarchy

The sales values for Sales and Operations Planning are taken from the Sales Information System (SIS), planning type S004, and then assigned to a range of materials. The sales values (and, later on, the resulting production values) are aggregated on the basis of this information. This type of bottom-up planning enables you to draw up production values for overall production by analyzing just a small part of the production process.

The packaged lamps (finished product), L-40C for example, have the planning and sales unit of measure "Box". Each box should contain 1000 lamps. The lamps are packaged at the end of the production line; that is why there is only one level for both manufacturing and packaging. This is also reflected in the BOM.
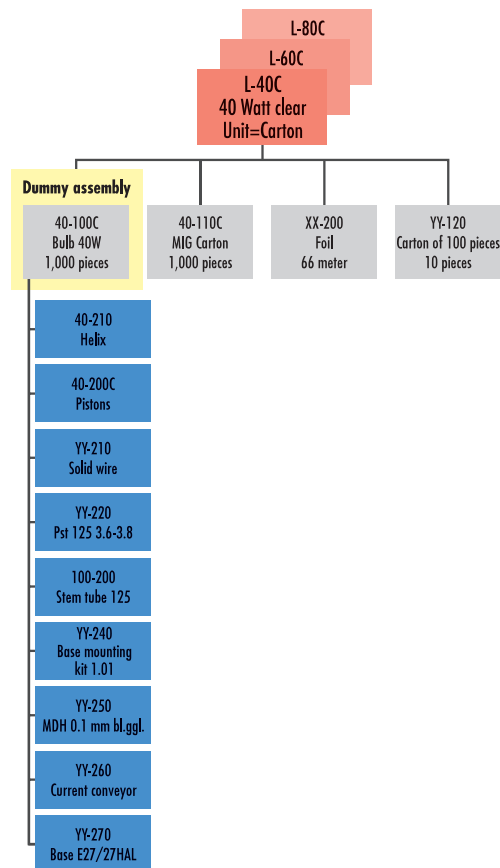
Fig. 3-7: **BOM for a Lightbulb**

100 lightbulbs are packaged in a box. Ten of these cartons are packaged to form the finished product. This means that each finished product (l-40C, for example) contains 1000 bulbs, packaged in 1000 individual lightbulb boxes (40-110C). These individual lightbulb boxes are, in turn, packaged in ten YY120 boxes. The conversion factor for the corresponding units of measurement are defined in the IDES system. One box contains 1000 pieces. The boxes are stacked onto pallets for storage and transportation. Four of these boxes are stacked onto each pallet. This conversion has also been defined in the IDES system.

Lightbulbs 40-100C are themselves intermediary products in the manufacturing process. They are not placed into stock, nor are they sold individually. That is why lightbulbs have been defined as a dummy assembly (special procurement 50).

The production rates and resource loads for each production line have been specified for the packaged products (L-40C, for example). Production lines L-1000 and L-2000 are used for production. These production lines have been defined as work centers. The production line routings contain only one operation (five boxes per hour). Production line L-1000 is more flexible and more automated that L-2000. This is why the production rate on line L-1000 is higher for certain products.

Product cost collectors are used to settle every run schedule header against total costs.

Personal Computers

Sales and Operations Planning for PCs is a relatively short-term process. Planning is based on a one-level product group hierarchy.
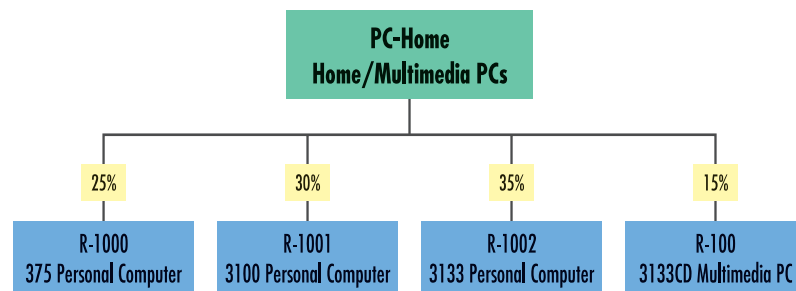

Fig. 3-8:   PC Product Group Hierarchy

The sales values for Sales and Operations Planning are entered manually, and then disaggregated for the individual PCs. This type of top-down planning is quick and easy.

Repetitive manufacturing is used for the final assembly of the computers, and for CPU assembly. The computers are manufactured on production lines Line1 and Line2, the CPUs on production lines Line3 and Line4. Generally speaking, 12 PCs are produced every 90 minutes.
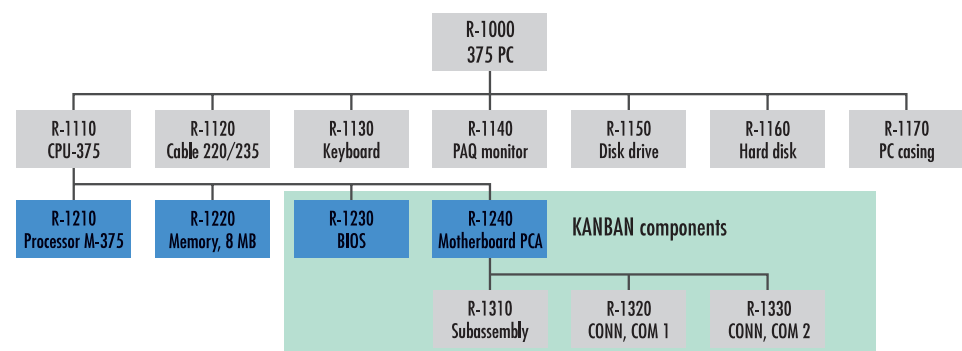

Fig. 3-9:   Repetitive Manufacturing: PCs

The main boards are assembled, and the components for the main boards pro-cured using KANBAN. The table below shows the components affected by this:

Supply area	Material	Name	Replenishment strategy
PVB_L3	R-1230	BIOS	Purchase order
PVB_L4	R-1230	BIOS	Purchase order
PVB_L1	R-1240	Motherboard PCA	Run schedule quantities
PVB_L1	R-1240	Motherboard PCA	Run schedule quantities
PVB_L5	R-1310	PCB sub-assembly	Stock transfer with reservation
PVB_L5	R-1320	CONN, COM1	Delivery scheduling

A sequence number is required when the finished PCs are withdrawn from the assembly belt, and when the subsequent stock-take of the finished product is per-formed.

Materials Management (MM)

Overview

R/3 Materials Management provides you with all the functions you need for procuring materials, MRP, inventory management, invoice verification, and material valuation. In the IDES system, Materials Management comprises the following areas:

❑ Forecast and MRP

❑ Purchasing and external services management

❑ Goods movements and Warehouse Management

❑ Invoice verification and material valuation

❑ Inventory management

❑ Logistics Information System

Materials Management interfaces with the Internet, and supports Workflow.

MRP   The IDES system shows you how to set up the master data required for forecasting.

Purchasing   In the IDES system, purchasing requirements are triggered by purchase requisitions. If sources of supply and suppliers are available, you can automatically convert the purchase requisition to purchase orders. Long-term supply relationships have been defined in outline agreements. RFQ management and quotation processing are passed on for source determination. In the IDES system, this type of communication can be sent via the Internet, EDI, or as hardcopy. The IDES system also contains an external service processing scenario.

Goods movements   The IDES processes involving goods movements concentrate on various forms of stock transfer. Particular emphasis is placed on cross-company code transactions. Fixed delivery relationships within the corporate group are stored as outline agreements. The Warehouse Management system is integrated with these processes.

Invoice verification   The special procedure for *Evaluated receipt settlement* can be used to demonstrate an automated process in invoice verification.

Inventory management and material valuation   The IDES system can be used to demonstrate period inventories, inventory sampling procedures, and continuous inventory. The lowest value principle can also be demonstrated as an example of material valuation.

Logistics Information System (LIS)   The R/3 Logistics Information System contains a range of tools for collecting, summarizing, and evaluating data from Logistics applications. Inventory Controlling and Purchasing Controlling have been set up in the IDES system. Vendor evaluation can also be demonstrated for vendors 1000, 1005, and 1050.

Organizational Structures

A purchasing organization is an organizational unit that procures materials or services for one or more plants, and negotiates general purchasing conditions with vendors. From a legal perspective, a sales organization is responsible for all purchasing transactions.

The IDES system contains both local and strategic sales organizations.

❑ The local sales organization is an operative organization that performs the entire purchasing transaction.

❑ The strategic sales organization is not an operative organization. The strategic sales organization is only used for negotiating terms and conditions with vendors, and passing these on to the various local sales organizations in the form of contracts.

Strategic purchasing organization	Company code
1 Europe	1000 2000 2100 2200 2300
2 North America	3000 4000 6000

Local purchasing organization	Company code	Plant	Location
1000	1000	1000 1100 1200 1300	Hamburg Berlin Dresden Frankfurt
2000	2000 2100 2300	2000 2100 2300	Heathrow Porto Barcelona
2200	2200	2200	Longjumean
3000	3000	3000 3100 3200 3300 3400	New York Chicago Atlanta Los Angeles Seattle
6000	6000	6000 6100	Mexico City Monterry

Plant and storage location structure

The organizational structure of a plant and storage location will depend on what the plant in question outputs, what it produces, and the materials that it uses. Each plant is the IDES system has been defined for a particular manufacturing process, or service, or as a distribution plant. The following table lists the plants in Germany:

Plant	Name	Emphasis
1000	Hamburg	Discrete manufacturing
1100	Berlin	Process manufacturing
1200	Dresden	Repetitive manufacturing
1300	Frankfurt	Make-to-order
1400	Stuttgart	Services

Plant	Storage loc.	Name
1000 1300 1400	0001 0002 0003 0004 0005 0006 0088	Material Finished goods Goods receipt PRT Hazardous materials External storage area Warehouse management
1100	0001 0002 0003 0004 0005 0088	Delivery Central warehouse Production Tank farm Hazardous materials Warehouse management
1200	0001 0002 0003 0004 0005 0006 1150ff. 0088	Material Finished goods Goods receipt PRT Hazardous materials External storage area Vehicle/service Warehouse management

Depending on what they are used for in an organization, different materials are assigned to different material types. In the IDES system, material types have been included for working through various business processes.

Material types

Material type	Description
COMP	Components (purchased)
CONT	KANBAN containers
DIEN	Service
ERSA	Spare part
FERT	Finished product
PIPE	Pipeline material
VERP	Packaging
HALB	Semi-finished product
HAWA	Trading goods
HIBE	Operating supplies
KMAT	Configurable material
LEER	Empties
ROH	Raw material

Settings and Special Features in Purchasing

In order to request and process complex services in the R/3 system, you require master data records for the service master and service categories. The service categories ALL, BULD und SERV have been defined in the IDES system. Valuation class 3200, account 417000 (Services) has been assigned to these service categories.

Service types for external services

Material	Description
ALL	Used in scenarios of the PM component
BULD	Made-to-engineer processing with external service order as part of a construction activity
SERV	Used in scenarios of the PM and MM components

Purchase orders are generated in Material Requirements Planning. Material 100-310 is a component of pump P-100, and is planned deterministically. The vendor is determined by performing a price simulation, and assigned manually. During the price simulation, you can access the infotype record to display the terms and conditions.

Standard purchase order with shipping notification

Once you have created the standard purchase order in the IDES system, you can edit shipping notifications, or start to enter the goods receipt immediately.

Outline agreement

An outline agreement is a long-term agreement with a vendor concerning the delivery of materials or the performance of services on the basis of predefined terms and conditions. Outside of the R/3 System, outline agreements are also referred to as framework agreements, or supply agreements. In MM Purchasing, there are two types of outline agreement: contracts, and scheduling agreements. Outline agreements can be subject to a release (approval) procedure. The IDES system can be used to demonstrate how to create outline agreements, and how to perform subsequent activities involving outline agreements.

Like the other documents in Purchasing, an outline agreement comprises a document header, and one or more items:

❑ The document header contains information applicable to the entire outline agreement (for example, vendor data, and conditions that apply to all items).

❑ Items contain information for a specific material or service. Examples of items are:

○ Statistics regarding ordering activities for the item

○ Quantity or price of the item

○ Pricing terms and conditions (quantity discounts, for example, or surcharges)

Procurement with scheduling agreements

Scheduling agreements are outline agreements that request a delivery, but do not use a separate document to do so. When you use a scheduling agreement, the vendor receives a scheduling agreement release instead of individual purchase orders or contract release orders. The scheduling agreement specifies the quantities to be delivered, delivery information, and the delivery date. It also contains information on previous goods receipts. A scheduling agreement can contain fixed or provisional delivery data. You can create a further delivery schedule manually, or directly from MRP. In Purchasing, you can convert requirement coverage requests to scheduling agreement delivery schedules automatically.

The IDES system contains a scheduling agreement for material 99-160 with vendor 1930. This agreement can be maintained manually. Automatic scheduling by MRP is used in many of the core processes to procure components with a minimum of fuss.

Consignment contract

A consignment is a form of business in which the vendor (external supplier) maintains a stock of materials at a customer (purchaser) location. The vendor retains ownership of the materials until they are withdrawn from the consignment stores. Payment for consignment stock is required only when the material is withdrawn. The materials that are withdrawn are invoiced at regular, predefined intervals (once monthly, for example).

The IDES system can be used to show how to enter a consignment contract, what a contract release order is, how to post the goods receipt, how to withdraw materials from consignment stocks for a cost center, and how to determine consignment liabilities on a regular basis.

A pipeline material is a material that flows directly into the production process from a pipeline (oil, for example), a pipe (water, for example) or another type of conduit (electricity, for example). Material type PIPE is used for pipeline materials. Pipeline materials have the following characteristics:

❑ Pipeline materials are not planned or procured. They can be withdrawn from the pipeline at any time.

❑ Pipeline materials are not stored, nor are they managed in inventory management.

❑ Only postings with account assignment can be made for pipeline materials.

❑ When a pipeline material is withdraw, a pipeline liability toward the vendor is incurred which must be accounted for and settled on a periodic basis.

The IDES system can be used to show the master data of a pipeline material, and in particular its purchasing data, withdrawals, and periodic settlement.

The introduction of the single European market has meant that the economies of the individual EU member states have become more interdependent. In order to determine their own international competitiveness, and the interdependencies regarding the import and export of specific goods and sectors, and evaluate foreign trade pricing policies, EU member states have to statistically record goods flows within the EU, even though internal customs duty no longer applies. The INTRASTAT System was developed to collect this data.

In the IDES system you can create an Intrastat report in Purchasing. To do this, you define import data in the vendor master, material master and infotype record, and then evaluate it.

A volume-based rebate is a discount based on the volume of business done with a customer within a specified period. In a volume rebate agreement, you can specify the recipient of the rebate, criteria for giving rebates, the validity period, and whether provisions should be posted automatically.

The following agreement types have been defined in the IDES system:

Agreement type	Description
1000	Vendor volume rebate
2000	Material volume rebate
Z101	Credit memos, credit-side settlement accounting
Z102	Billing document, customers WRK
Z103	Billing document, vendors EKO
Z104	Credit memos, vendors, monthly
Z105	Billing document, EKO, monthly
Z1V0	Broker vendor volume rebate
Z2V0	Broker material volume rebate

Settings and Special Features in Inventory Management and Warehouse Management

Inter-company-code transfer orders using MM and SD

It should be possible for international organizations to process deliveries between plants, regardless of whether the plants belong to different company codes and controlling areas. International organizations must also be able to supply the necessary delivery documents and billing documents that are generated by Logistics transactions. Furthermore, these organizations must also be in a position to work with materials in different currencies, and to process surcharges and rebates. You can use the IDES system to demonstrate all these business processes.

Inter-company-code stock transfer

In Materials Management and Inventory Management in the IDES system, you can transfer a material between different company codes. These stock transfers can be posted as an inventory posting using the one-step procedure, or two-step procedure. It is also possible to post them as purchase or sales transactions. In this case, the delivering plant acts as a vendor, and the receiving plant as a customer.

❑   In the IDES system, stock transfers can be posted using Inventory Management. If the valuation procedures and the delivered prices of the two plants are different, all costs incurred and value variances are borne by the receiving plant.

❑   In the IDES system, it is also possible to demonstrate a customer-vendor relationship between two plants. This relationship is recorded in a stock transfer scheduling agreement. Since there is a special contract type for stock transfer, this means that a delivery scheduling in one plant can trigger shipping in another plant.

Settings and Special Features in the Logistics Information System

Vendor evaluation

You can use the vendor evaluation system to optimize the procurement of materials and services.

This makes it easier for you to choose sources of supply, and constantly monitor existing supply relationships. The evaluation system supplies information on cheap prices, and terms and conditions regarding payment and delivery. You can identify any problems that might arise at a relatively early stage. You can check each plant to see how reliable its service providers are.

You can evaluate vendors in the IDES system. Automatic re-evaluations can be generated, and results displayed.

Purchasing Information System

The Purchasing Information System (PURCHIS) is a flexible system used to collect, summarize and analyze purchasing data. PURCHIS is a component of the Logistics Information System (LIS). LIS contains other information systems, such as the Sales Information System (SIS), and the Shop Floor Information System. You can use all of these information systems to select, edit, and summarize company data.

You can generate standard analyses, and flexible analyses in the IDES system. You can also edit these analyses, and display them graphically.

Service Management (SM)

Overview

The Service Management application component is a solution with integrated functionality that enables you to work through various customer service scenarios, and meet high customer requirements. You can process on-site maintenance measures and services quickly and effectively, and use the functions of order controlling and the information system to monitor costs and the quality of the services you have provided.

In the IDES system, Service Management comprises the following areas:

❑   Service contracts

❑   Call management (service processing)

You use service contracts to define the content and scope of services to be performed. Service contracts describe which services are to be performed for which objects, and under which conditions. Service contracts are chiefly used for the following tasks:

Service contracts

❑   Checking to see if a customer is entitled to services requested

❑   Price agreement regarding service contracts

❑   Regular billing

❑   Determining tasks automatically for service notification

In the IDES system, you can define the scope of a service contract by basing it on a pre-configured service package, or by configuring the contract yourself.

Call management involves all the activities performed as part of call logging, planning and editing services and necessary resources, completing a notification, and billing the costs incurred.

Call management (service processing)

You can evaluate the data you enter from a wide range of perspectives. The same reporting options are available as for plant maintenance processing.

Call management is subdivided into the areas of notification processing and order processing. You can use the IDES system to demonstrate notification processing with and without a service order. In the IDES system, you can show how Service Management order processing (that is, the carrying out of the actual repair) is integrated with material withdrawals (MM), capacity planning at the employee level (PP and HR), and Controlling (CO).

Organizational Structures

Plants   The maintenance planning plant is the organizational unit responsible for planning maintenance, preventive maintenance, and service requests. This planning plant can be responsible for its own maintenance and services, and for maintenance and services in other plants.

In the IDES system, call management can be demonstrated using the following plants:

Plant	Location
1200	Dresden/Europe
3200	Atlanta/North America

Sales area   A sales area is a specific combination of sales organization, distribution channel, and division. The following sales areas are used for call management in the IDES system:

Sales area Europe	Name	Description
Sales organization	1000	Frankfurt
Distribution channel	14	Service
Division	08	Services

Sales area America	Name	Description
Sales organization	3000	Philadelphia
Distribution channel	14	Service
Division	08	Services

Settings and Special Features in IDES

Service object and equipment   The chief objects defined for IDES call management are PCs of the type R-1001. An equipment master record has been created for each object. The PCs are manufactured in plants 1200 (Dresden) and 3200 (Atlanta). These plants are also responsible for performing services. Each product is given a unique sequence number.

Customers 1171 (HiTEch AG) and 3800 (Candid International Techno) regularly purchase a large quantity of this type of PC, and have a large operational system which uses these PCs. These customers can be used to demonstrate IDES call management.

A bill of material is used for PC call management. This BOM is used mainly to identify possible spare parts in call management. The structure and spare parts of all devices (equipment) of this type are described in this BOM. IDES does not use any equipment BOMs because PCs are produced using repetitive manufacturing. At present, the content of this BOM is the same as the content of the PP BOM.

BOM for material R-1001

Material	Name
R-1111	CPU
R-1120	Cable
R-1130	Cable
R-1140	17" monitor
R-1150	Disk drive 1.44 MB
R-1160	Hard disk 750 MB
R-1170	Casing

The IDES system contains both a configurable and a preconfigured service material which can be used for service contracts. The configurable material has characteristics that help define the configurable aspects of the service in question. Object dependencies have been defined so that price proposals can be triggered for specific characteristic values. The characteristics are linked to the configurable service by means of object dependencies.

Material master records for contract processing

Material	Name	Description
PC_SERVICE_CONF	PC Service (configurable)	Contract can be configured individually
PC_SERVICE_A	PC Service Plus	Predefined contract
REPAIR_SERVICE	Desktop Repair Service	Non configurable service material

A work center is an organizational unit in which (or by which) a task is performed, producing output. A work center's master record references a cost center, and has limited capacity available.

Work center

Two work centers have been defined in the IDES system for processing service orders.

Work center	Name	Plant	Cost center
PC_SERVPC	TS Technician North	1200	4100
PC_SERV	Customer PC service	3200	4100

Service contract

In the IDES system, you come to a service agreement with customers 1171 (HiTech AG) and 3800 (Candid International Techno), and create the corresponding service contracts. You can define the scope of a service by basing it on a pre-configured service package, or by configuring the contract yourself. You also agree on special pricing conditions for certain materials that are installed in a piece of equipment during repair work.

A charge is made for the services defined in the contract. This charge is invoiced once a month using periodic billing. The revenue or costs that come from the contract are passed on to Profitability Analysis.

Call management
(service processing)

In the IDES system, you create a service notification for a piece of equipment. You create a service order from the notification since a repair has to be made on site. Information on the damaged piece of equipment and on the customer in question is stored in the service notification. You use the service order to plan the repair tasks required, and to determine the planned costs for the repair.

You perform capacity planning at the employee level, and assign the order to an employee. You define the components that are required. Once the order has been released, these are withdrawn from the warehouse. Once the repair has been made, the service order is confirmed, and the actual costs are calculated.

A billing request is created on the basis of the costs incurred and the tasks that were collected in the order when the service was being performed. A service contract exists for the piece of equipment on which the repair was carried out. The prices specified in this contract are transferred to the billing request. The billing request is then passed on to an invoice, and the resulting revenue is collected in the service contract. When an order settlement is performed, the costs of the service order are also posted to the service contract.

Quality Management (QM)

Overview

R/3 Quality Management can be used to carry out quality checks throughout your organization. The separate functionality of *QM in Procurement* can be used to influence materials management processes. Quality notifications are used to manage the processing of quality-related problems. Internet scenarios are also available now.

Settings and Special Features

In the IDES system, you can use Quality Management to demonstrate an incoming inspection in conjunction with the tools available for controlling the materials management processes in QM.

Quality Management in Procurement

❑ Incoming inspection
  The necessary settings for incoming inspections have been made in the QM view of the material master. An incoming inspection involves entering the results of characteristics from the inspection plan, deciding whether to accept or reject these characteristics, and, on the basis of these results, making a usage decision for the characteristics. The goods are transferred from inspection stock to unrestricted use stock.

❑ Inspection plan
  You can easily adjust the inspection plan to take various situations into account. Generally speaking, the inspection of incoming goods concentrates on different factors than a shipping inspection, or production inspection. In QM, these plans are classified by means of a usage key. Additional settings have been made in Customizing for the IDES scenario. In the IDES system, you can make more detailed classifications within the same usage. An incoming inspection is used as an example of this. This incoming inspection is subdivided into model inspection, preliminary inspection, and inspection for order.

❑ QM procurement data
  In the QM procurement data in the material master, you can use a control key to activate tools that will affect purchasing, procurement and invoice verification. The following scenarios can be demonstrated in the IDES system:

  ❍ The QM department can request that a vendor be released for a material. If this release is missing, you can prevent the purchasing department from issuing a purchase order.

  ❍ When the purchase order is issued, you can print out and send, say, technical delivery terms and quality agreements with the purchase order documents.

  ❍ Vendors can request quality certificates. This request is queried interactively in the goods receipt. If the confirmation is still missing in the usage decision, the invoice is blocked and is not passed on to the payment run in Accounting.

Quality Management
and the Internet

Internet scenarios are classified depending on whether the processes involved are between customers and vendors, between business partners, or company-internal processes.

The scenario *Outputting a Quality Certificate via the Internet* is an example of a consumer-to-business relationship in IDES. The scenario *Outputting a Quality Notification via the Internet* is an example of a business-to-business relationship in IDES.

Quality management
functions in a core process

R/3 Quality Management can be integrated extensively into an organization's business processes. You can use the IDES system to demonstrate this. The core process *Production of loose goods and filling in process industries* shows an incoming inspection and an inspection during production. This process can be used to demonstrate how QM, batch management, and process management work closely in conjunction with each other.

Project System (PS)

Overview

Projects usually play a role in an organization. A project-specific method of organization is required in order to monitor and regulate all the tasks that are involved in realizing a project. This method of organization should be positioned so that it overlaps with the departments involved.

Projects have the following properties:

❑ Complex, unique, to be undertaken in a defined time period

❑ Cost-intensive, capacity-intensive

❑ Goals defined in detail (sponsor and contractor in conjunction with each other)

❑ Of strategic importance for the organization in question

Before a project can be carried out, detailed project goals have to be defined, and the project work to be performed has to be structured. A structured project forms the basis for planning, monitoring, and control. A project is structured from two aspects:

❑ Structuring using a work breakdown structure
The project is divided into individual work breakdown structure (WBS) elements, which are arranged hierarchically. The project structures for project management and control are defined.

❑ Structuring using a network
The elements are arranged into a chronological sequence.

❑ Two separate projects have been defined in the IDES system so that you can demonstrate how to structure and work through projects in the R/3 System:

❑ Information technology project

❑ Engineering project

The information technology project (IT project) involves drawing up a concept and implementing software for a new incentive wages system („Nellos"). Particular emphasis is placed on the following project phases, which have been defined in full in the IDES system:

Information technology project (IT)

❑ Structuring

❑ Project planning

❑ Release

❑ Execution

❑ Completion

Engineering project

The engineering project involves processing an assembly with variant configuration in the Project System. When you execute this project in the IDES system, you work through the following processes:

❑ Inventory management

❑ Sales and distribution

❑ Engineering/design

❑ Procurement

In this project, particular emphasis is placed on assembly processing, variant configuration, milestones, integration with Production Planning and Control, confirmation, time recording, and delivery.

❑ Assembly processing
All of the functions connected with sales orders and networks can be used in assembly processing. When a sales order is created, the system automatically creates the network as a procurement element. In this network, scheduling and material availability checks are used to determine the correct delivery date. Changes made to dates or quantities in the network are passed back to the sales order. This integration is bi-directional: changes made to the sales order are automatically passed on to the network. You also have the option of generating a work breakdown structure using the network.

❑ Variant configuration
You can use variant configuration to describe complex products that are manufactured in a large number of variants. All these variants are defined as one variant product. The variant product has a super BOM, containing all of the components that can be used in at least one variant of the product. Characteristics are also assigned to the variant product. Object dependencies ensure that the correct components are selected automatically from the super BOM.

❑ Milestones
Milestones can be used to release subsequent project steps automatically once an activity has been confirmed as completed. Billing milestones determine the structure of the billing plan. The milestone billing document in the sales order is released automatically when the network activity is finally confirmed.

❑ Material requirements planning
In MRP, planned orders are generated for reservations from the network. These planned orders are then converted into production orders. Variant configuration is also used in production to select the correct components from a super BOM automatically (using object dependencies). The variant product, though, is valuated earlier in the sales order. This one-time characteristic valuation controls the selection of components at various points in the network and production order.

❑ Delivery
Materials are delivered from the Project System. In IDES Version 3.1H, you can select materials for delivery from the network, and create the appropriate delivery document in the Project System. This document is processed further in the SD system.

❑ Confirmation
The IDES system contains a range of confirmation options:

  ❍ Individual confirmation in the R/3 System

  ❍ Individual confirmation via the Internet

  ❍ Pool of confirmations from the info system: transfer using Workflow

  ❍ Pool of confirmations from the info system: time recording in time sheet

❑ Time recording using the Cross Application Time Sheet (CATS)
This functionality is available in IDES Version 3.1H. The person-based working times recorded in the CATS are passed on to the appropriate components (Project System, or Materials Management (Services)) in a second step.

Settings and Special Features in the IT Project

To create and edit projects, you can use structural planning (in addition to the WBS and network). This enables you to create WBS elements and activities together, and to maintain the data required. You use relationships to define the sequence in which the activities should be carried out. In the IDES system, structural planning is used to structure the activities in the "Nellos" project.
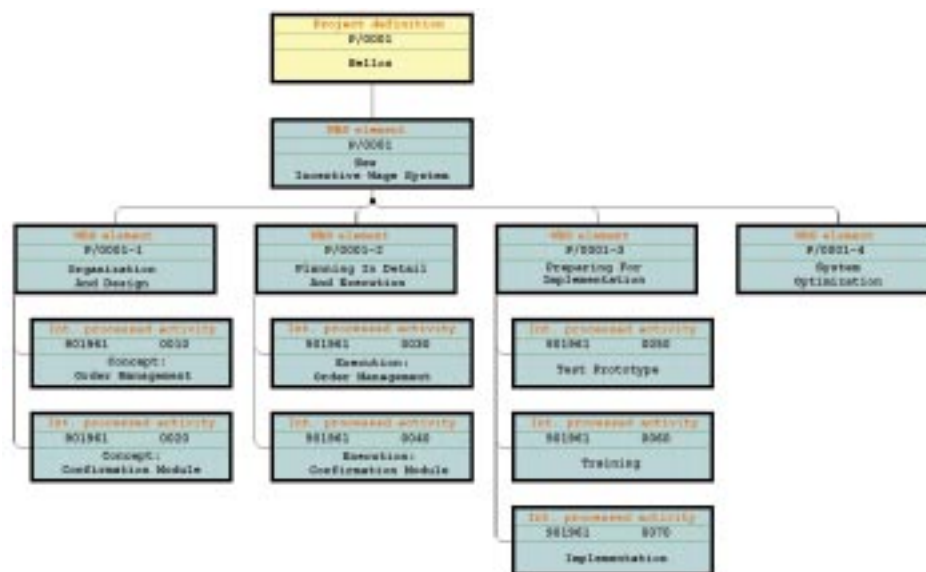
Structuring

Fig. 3-10:   **Structural Graphics**

The work that has to be performed, the planned duration, and the work center for each individual activity are stored in the system. Project planning also involves time-based planning. You normally use a project planning board to plan deadlines. You set additional basic dates by transferring the dates (deadlines) of the activities to the dates of the WBS elements.

Project planning

Project costs for the current year are planned in the work breakdown structure. They are not planned on the basis of cost elements. An activity input is also performed.

Release   The current values from Controlling are transferred for budget allocation. To release the project for execution, you set the status "Released" for the WBS elements and activities. This allows you to post actual costs to the project, or to reset actual dates.

Execution   You enter actual values for the project in the "Execution" phase. To do this, you have to confirm the activities of the „Conception" phase, specify internal activity allocation to the WBS element "System optimization", and analyze the actual dates in the project planning board. The project is then evaluated using the information system.

Completion   The last step in the project planning system involves settling the costs of the WBS element "System optimization". Here, the actual costs incurred for the WBS element are allocated internally to the commissioning cost center. The corresponding offsetting entries are generated and credited to the WBS element.

Settings and Special Features in the Engineering Project

Project structure   The project structure graphic shows how the Engineering project is structured:
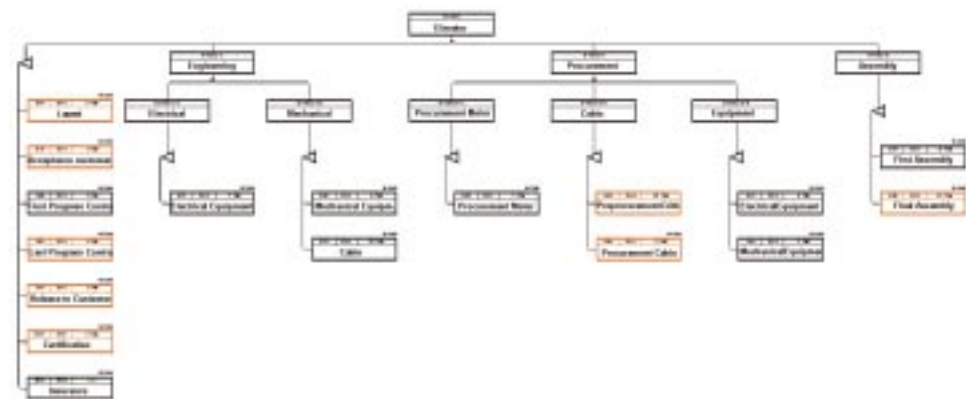
Fig.: 3-11: **Project Structure Graphic**

Sales and distribution   The following processes can be demonstrated during the sales and distribution phase.

❑ Order entry – variant configuration
When you create the sales order for the elevator, you configure it to meet the customer's specifications. Values are given to characteristics such as compartment measurements and color of carpet. When you save the order, the system automatically generates a work breakdown structure and network.

❑ Displaying project data
The graphical display options in the R/3 Project System give you a clear overview of the project structure generated by the system.

❑ Confirmation
When the first project activities are confirmed, the elevator design has been drawn up, and the plans have been presented to the customer, the system records what progress has been made on the project, and releases the subse-

quent activities for processing. A work item is taken from the information system for confirming the engineering activities. The pool of confirmations is sent to the engineering team (HR organizational unit). When this happens, the manager of the engineering team finds a work item with the pool of confirmations in his inbox. Once he has carried out the work item, the collective confirmation transaction is started automatically.

Once this has final confirmation, an activity is automatically released so that critical parts can be procured. A purchase requisition is also created.
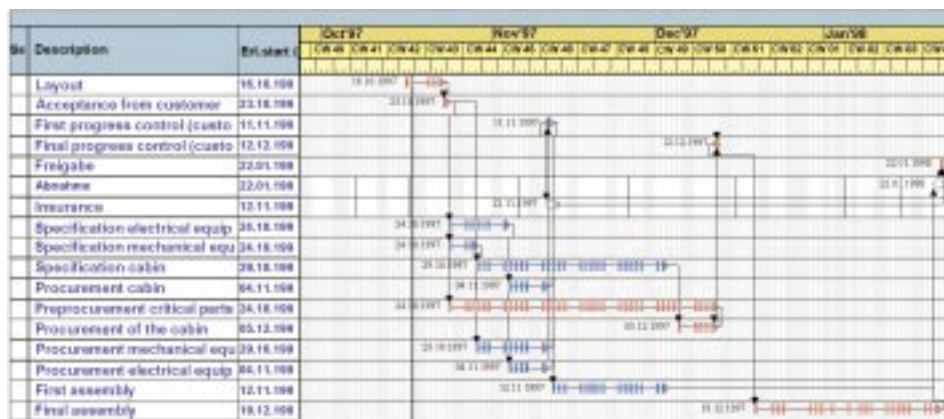

Fig.: 3-12: Project Planning Board

In the engineering/design phase, you plan the resources required for the project.

Engineering/design

❑   Resource planning
    In the IDES system, the standard network can provide data on the activities, materials, capacities, and production resources/tools required for all elevator variants. This means that resources are planned automatically when the sales order is entered.

❑   Capacity requirements
    Work is used to define the performance of machines and/or persons required for production. You can plan capacity requirements using resource planning.

❑   Services
    Services are used to perform unplanned and planned activities. Each service is processed by Purchasing.

❑   Purchasing
    By assigning materials, you determine the components and raw materials that have to be reserved or ordered for the operation in question. This creates a link to MRP and Purchasing. The purchasing process has been simplified in the Engineering project for materials procured externally.

    ❍   Fixed sources of supply (source list)

    ❍   Automatic ordering for purchase requisition

    ❍   Evaluated receipt settlement (ERS)

❑   Production resources and tools
    Production resources/tools are used to specify the drawings, tools and documents required for executing the project.

❏ R/3 document management system
In the Engineering phase of the project, technical engineering activities are performed outside of the R/3 System. You use the R/3 document management system to assign documents that were created in non-SAP systems to the project. You can store the required administrative data on CAD drawings, graphics, and so on. It is also possible to display this data directly from the Project System. In the IDES system, sample elevator graphics are available in two popular Windows formats.

Procurement In the Procurement phase of the project, material components are procured and delivered to the construction site. You can demonstrate the following procurement options in the IDES system:

❏ The material components for mechanical engineering and electrical engineering are kept in stock. When the appropriate procurement activities are released, these material components are reserved, and kept as plant stock.

❏ The elevator door is managed as project stock. The door has been created as a non-stock item, and is procured externally to specific measurements. The door measurements are determined automatically during characteristic valuation, and made available to purchasing as a BOM item text.

❏ A cable is ordered in advance (due to the high delivery times), the requirement (reservation) is not created until the procurement of the elevator compartment has been released. The cable is managed as make-to-order stock. Both the purchase order and reservation are managed and settled using the requesting WBS element.

❏ Up until the Procurement phase, only independent requirements are planned for the BOMs and routings stored in the system for the elevator compartment and operating mechanism. Planned orders for procuring both assemblies are created during a project-based MRP run. The assembly BOMs are exploded in the planning run, and secondary requirements are generated for the components. The MRP run takes account of the characteristic valuation from the sales order. Measurement data such as the length and breadth of the elevator compartment, and data used to select components such as a wooden or metal wall are determined on the basis of the characteristic valuation in the sales order. The actual production of the compartment and operating mechanism can be demonstrated in simplified form. The Project System is integrated with the Production application, but the processes within Production do not need to be demonstrated here.

❏ CATS (available in R/3 Standard System as of Release 3.1I)
The employee responsible for procurement records the work that has been performed in this time sheet. He or she finds the activities that have to be confirmed in the pool of confirmations that was generated from the Project Information System at the beginning of the Procurement phase.

❏ CNSO (available in R/3 Standard System as of Release 4.0)
The components that have to be delivered are transferred from the Project System for further processing in the Sales system. Picking and goods issues are performed in the Sales system.

Assembly In the Assembly project phase, the elevator components that have been delivered are assembled on site (construction site, customer site). The progress made is monitored and confirmed. Here, the Internet is used to carry out confirmations.

Plant Maintenance (PM)

Overview

R/3 Plant Maintenance is used to ensure that an organization's operational systems and devices function properly. In the IDES system, the Plant Maintenance component comprises the following areas:

❑ Structuring technical systems

❑ Maintenance planning

❑ Maintenance processing

To implement R/3 Plant Maintenance in your company, you will have to enter, structure and administrate any existing technical systems. This will enable you to refer to individual objects, and draw up a maintenance history.

Structuring technical systems

In the IDES system, a clarification plant is used to demonstrate the structure of a complex technical system, and how this is handled in the system. The clarification plant (depicted as a hierarchical structure of functional locations) can also be used to demonstrate other typical plant maintenance processes in the IDES system.

The most important task in maintenance planning is to keep a production system constantly operational from a long-term perspective. Preventive maintenance ensures that a technical system does not malfunction, and reduces unnecessary costs incurred as a result of repairs, downtimes, or a system having to be replaced.

Maintenance planning

The PM System uses the following tools for planning and preparing for preventive maintenance tasks.

❑ Preventive maintenance strategies

❑ Preventive maintenance plans

❑ Maintenance orders

In the IDES system, the planning instrument used is the preventive maintenance plan. You can use the preventive maintenance plan to describe the scope of and deadlines for preventive maintenance and inspection tasks on technical objects. IDES uses maintenance plans for regularly recurring tasks at existing functional locations. Maintenance plans are used to generate date proposals and maintenance orders for tasks that have to be performed.

First, a maintenance plan is generated so that the tasks to be performed can be scheduled. The maintenance item that is assigned creates a link to the technical system that needs to be maintained, and creates the task list to be used for this system. When the system schedules the maintenance plan, it proposes dates for which maintenance orders are then generated (depending on the various due dates).

Once the scheduled tasks have been completed, the system checks the follow-on dates, and (on the basis of the due dates) generates follow-on orders automatically.

Maintenance processing

In the R/3 System, maintenance processing involves entering, planning, performing, monitoring, and analyzing a maintenance task. These maintenance tasks might be unplanned, the result of a malfunction, or planned. The PM component can also be used to demonstrate activities such as investments, modifications, and refurbishment. Although these activities do not belong directly to Plant Maintenance, the same tools can still be used to process them.

Maintenance processing in the PM component is a multi-level process. However, you do not have to work through all these levels. The range of functionality available is very extensive. This means that you can work through an extensive repair involving a large number of planning steps such as preliminary costing, work preparation, material charging, resource planning, and approval procedures. It also enables you to react swiftly to malfunctions which result in downtimes, and generate the necessary orders and documents with a minimum of fuss.

The following maintenance processing functions can be demonstrated in the IDES system.

❑ How to process an order quickly and with a minimum of fuss

❑ How to create a maintenance order in order to inspect a damaged object (including the malfunction report that results)

❑ How to add to an existing order

❑ All aspects of notification processing and order processing

❑ How to enter and analyze counter readings and operating criteria.

Organizational Structures

Maintenance planning plant

Maintenance tasks are planned and prepared in the maintenance planning plant. Tasks can be planned for technical objects in this plant or in another plant. Maintenance plants are normal plants that have been defined as maintenance planning plants in Customizing.

Since the clarification plant and its individual pumps belong to plant 1000, plant 1000 is responsible for planning and performing its maintenance tasks. The order is processed in company code 1000. Business area 1000 is defaulted on the basis of the reference object.

Functional location

The technical system is structured on a functional basis, subdivided into what are referred to as functional locations. In the IDES system, clarification plant K1 is the functional location used for performing maintenance tasks.

Clarification plant K1 is a self-run technical system in plant 1000 (Hamburg). Pumps of type P-1000 are also produced and sold in this plant. Some of these have been installed in clarification plant K1.
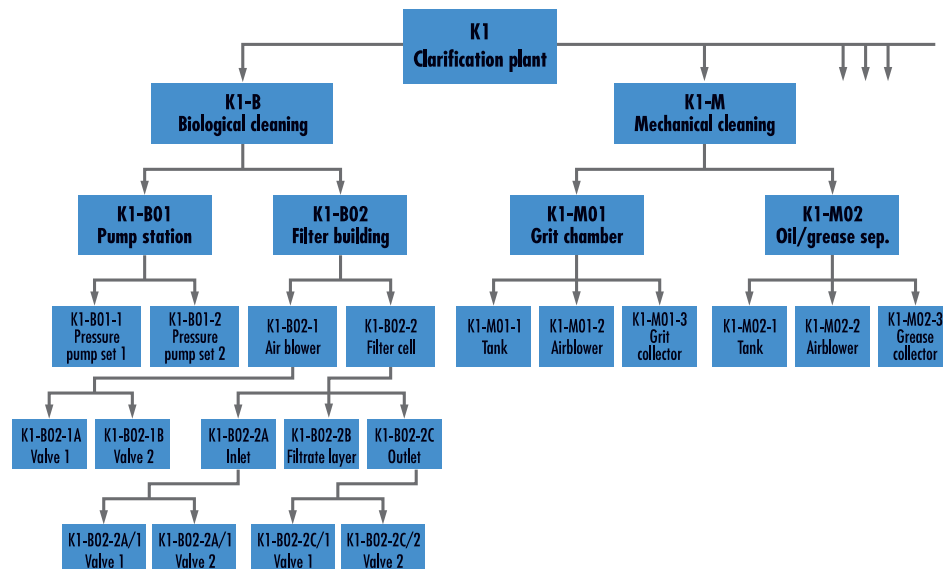
Fig. 3-13:   Hierarchical Structure of Clarification Plant K1

Clarification plant K1 is defined as a hierarchical structure comprising functional locations at several levels. Maintenance tasks can refer to the clarification plant as a whole, or to a specific subarea of the clarification plant. Pieces of equipment (which can be maintained or replaced) are to be found at some functional locations at the lowest level of the structure.
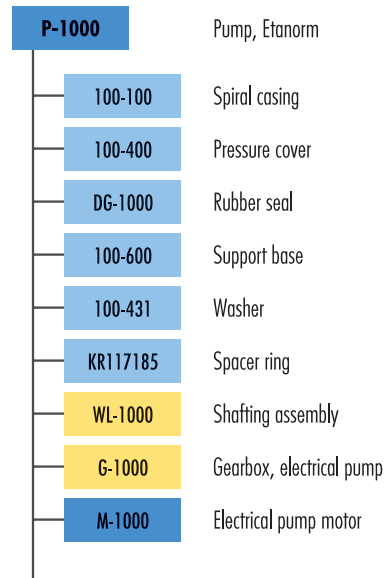
Settings and Special Features

A piece of equipment is a physical object that can be maintained in its own right, and which can be installed in a technical system or part of a technical system. Each piece of equipment has its own equipment master record.

Equipment

In the IDES system, pump P-1000 is used to demonstrate maintenance tasks. The pumps are manufactured and sold in plant 1000 (Hamburg). Spare parts for pump repairs in the clarification plant are usually kept in stock.

A separate maintenance BOM is used for plant maintenance. This BOM is theoretically independent of the PP BOM, but at present, there are no differences between the two in the IDES system. The maintenance BOM is used for identifying possible spare parts, for example.

One special feature of equipment P-1000 is that, in the BOM with the pump motor of type M-1000, a further piece of equipment has been created under it in the structure in addition to the usual material components. This means that an equipment hierarchy can be demonstrated.

P-1000	Pump, Etanorm
100-100	Spiral casing
100-400	Pressure cover
DG-1000	Rubber seal
100-600	Support base
100-431	Washer
KR117185	Spacer ring
WL-1000	Shafting assembly
G-1000	Gearbox, electrical pump
M-1000	Electrical pump motor

Fig. 3-14:   Equipment Hierachy for Pump P-1000

Maintenance order

Maintenance orders play a central role in maintenance processing. Maintenance orders can be triggered by an internal malfunction notification, or by a maintenance contract.

A maintenance order usually refers to a reference object, a technical system, or a piece of equipment that has to be maintained. In the IDES system, an order refers to a specific part of clarification plant K1, or to a specific P-1000 pump.

Maintenance planner group

From a Logistics point of view, planner group 100 is responsible for planning resources in plant 1000 (Hamburg). The Plant Maintenance Department has a headcount of five. These employees are assigned to the workplace MECHANICS (this is the workplace used to process all maintenance orders). The charge rates for the work performed are determined using the Maintenance Department's cost center (4300).

Settlement

The expenses and costs incurred are collected in the maintenance order and, once the work has been completed, passed on to cost center 4111 – the cost center of the technical system at which the tasks were performed.