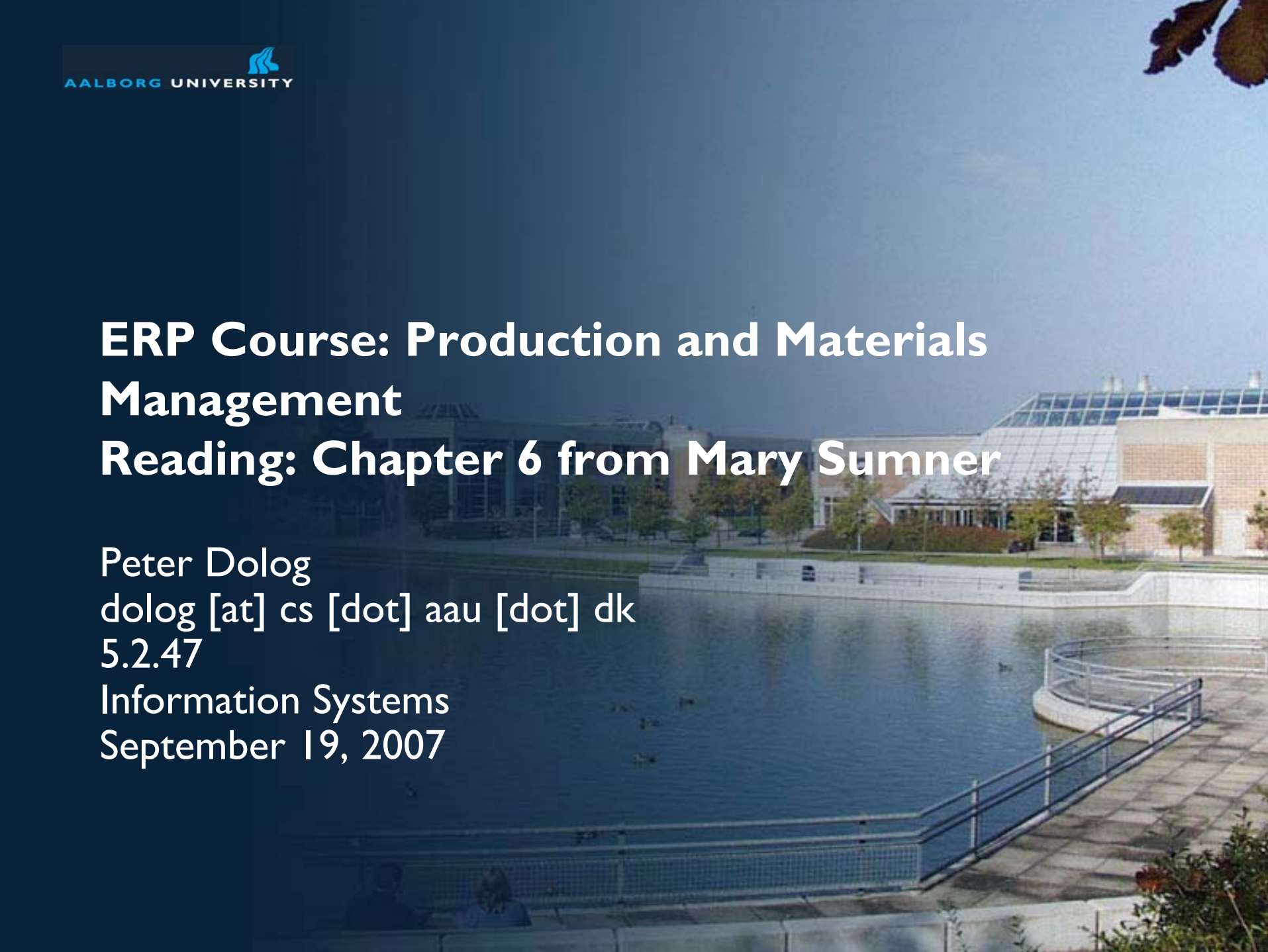
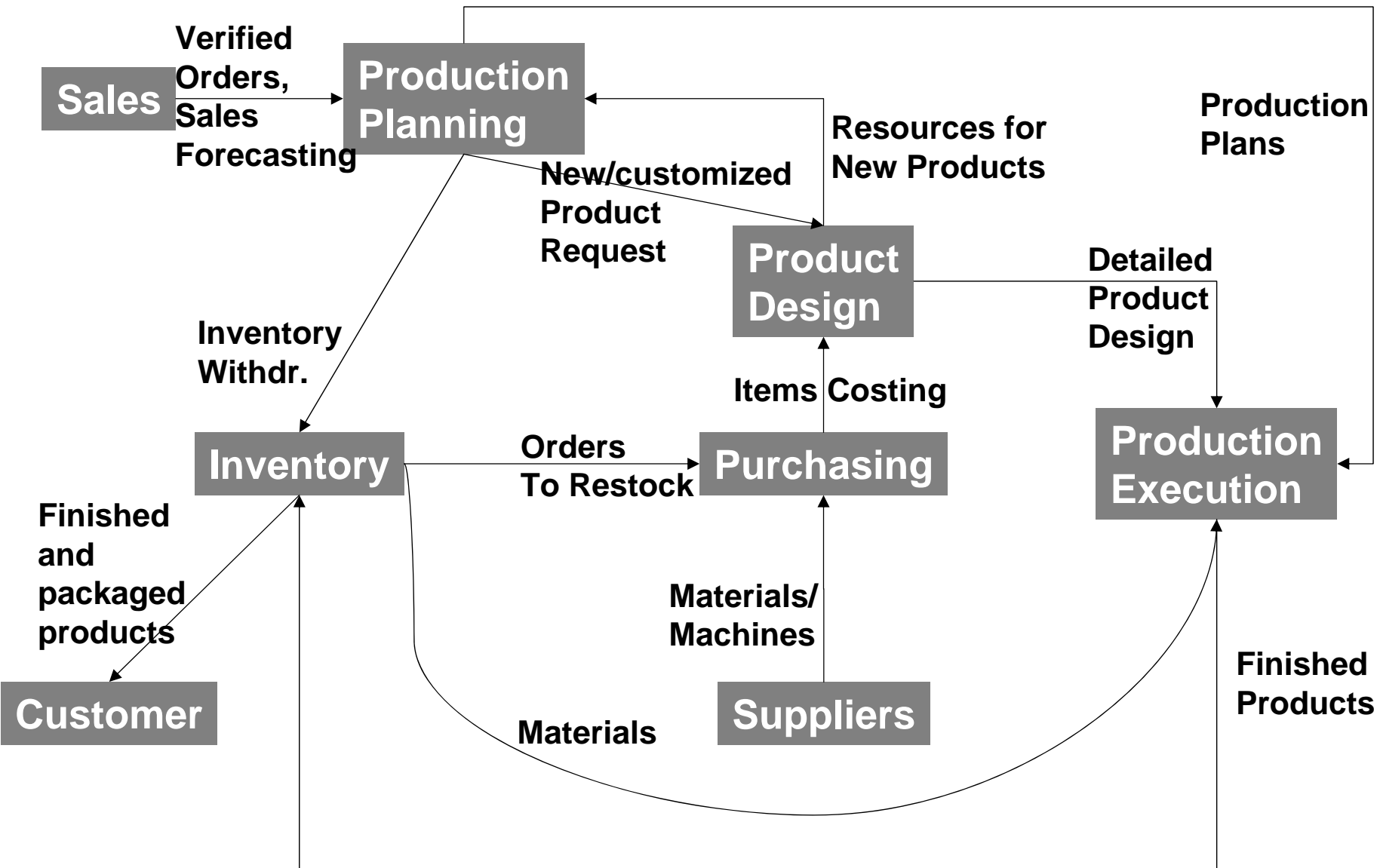


# ERP Course: Production and Materials Management

## Reading: Chapter 6 from Mary Sumner

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5.2.47  
Information Systems  
September 19, 2007





# Material Requirements Planning

- Identify stock that planned production calls for
- Determine the lead time to get the stock from suppliers
- Calculate safety stock levels
- Calculate the most cost-effective order quantities
- Produce purchase order for needed stock items in the right amount

# Inventory

Goods and Material available at stock for use

Three kinds (for sales):

- Raw materials
- Work in Process Items
- Finished Goods

Some companies also fixed assets (not directly used for sales)

Stored in warehouses or shops for customers

Managed and identified through the stock keeping units (SKUs)

# SKU

Is an identifier used for systematic tracking of products and services offered

It is attached to a billable item:

- physical (item, variant, product line, bundle)
- service, fee or attachment

Different for each variant or packaging of the same product

# Inventory Costs

Inventory is an asset on the company balance sheet

Additional costs:

- Space to store (e.g. rent)
- Insurance
- Utilities
- Different inventory depreciation schemes depending on a country law

These costs can be  $1/3 - 1/2$  of the price

Tradeoff: to stock to little and to much

Some companies store more to inflate their apparent asset value

# Opportunity Costs

Costs connected with lost opportunity to sell it  
Need not to be assessed in terms of monetary value

# Inventory Expenditures

When sold, the value of the inventory decreases

Usually value per item

First comes first goes for sales

Last comes last goes sales

- Lower income, lower taxes



# Inventory in Navision

Item Journal – connection to sales, purchases

BOM Journal – bills of materials

Item reclassification journal – shifting items between locations and bins

Physical inventory journal – to maintain real values and physical locations of items

Revaluation journal – to change values of items

# Warehouse Activities

Bin contents management

Receipts

Shipments

Product orders to manufacture

Restock/Purchase orders

Transfer orders

Item movements and transfers

# Resource Planning

Pricing for unit of work

Price/Profit calculation

Resource capacities

Allocation to jobs

# Capacity Planning

To plan personnel, space, machines, and other production facilities to meet production goals

Requires precise information about human resources, BOM, goods-in-process inventories, finished goods, lot sizes, status of raw materials, orders in the plant, lead time for orders

Master production schedule from sales forecast

Product design and development information systems

# Strategies for Capacity Planning

Basic capacity plan includes number of workers, machines, shifts, utilization, and efficiency

Tries to deal with differences caused by customer demands and under/over utilized resources

Lead strategy (based on new customers)

Lag strategy (based on reaching maximum capacity)

Match strategy (based on tracking)

# Production

Set of customer orders which require products

They issue a request for materials, human resources and machines to perform the production

The production is based on BOM, resource allocation and work and machine centers utilization

The activities in the production results from a product design

The quantities, resource allocation and capacity estimation results from customer orders and sales forecasts

# Production Planning

Production forecasts

Planning worksheets

Order planning

Requisition worksheets

Subcontracting

# Production Forecasts

How many and which products are planned and in which quantities?

How much does it cost?

Where to get the parts from?



## Further plans

Purchase orders

Subcontracting orders

Decomposition to capacity, resource and warehouse plans

Decomposition into BOM

Routing in the production between work centers and  
warehousing (production process)

# Bill of Material (BOM)

Describes a product in terms of its parts and assemblies

This includes also packaging and labels

Hierarchy with references to other BOMs

Important for purchasing and configuration

Different types of BOMs (engineering BOM, manufacturing BOM, ordered BOM, ...)

Different ways to display it (ident, matrix, modular, ...)

# Production execution

Planned vs. real production time

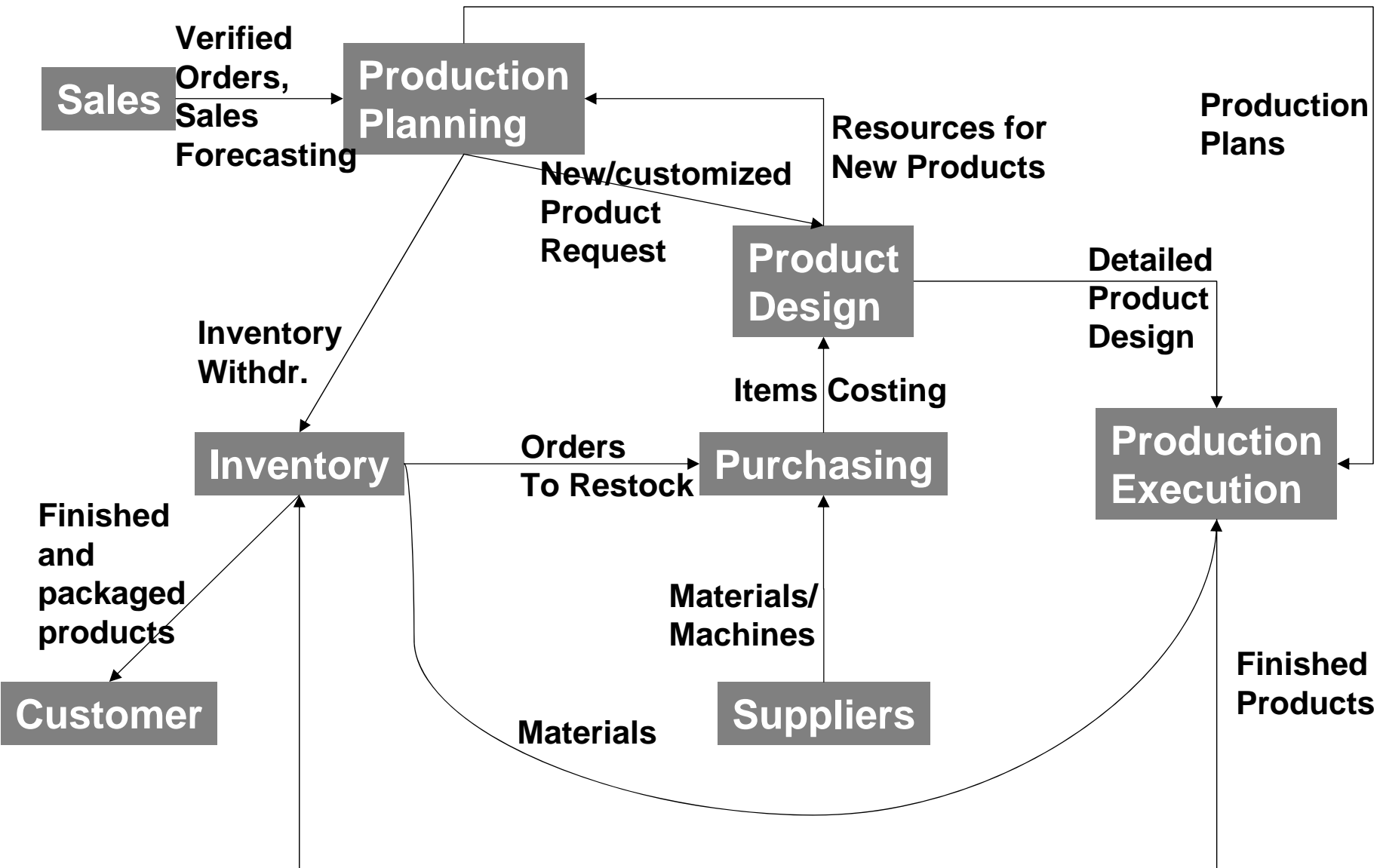
Measuring and controlling activities at the manufacturing floor

Observing productivity and quality

Observing consumption and output

Feedback to production and planning

Adjustments according to changes in sales





**Released - Production Order List**


No.	Description	Source No.	Routing ...	Quantity	Starting ...	Ending D...	Due
101001	100W OakwoodDeluxe-højttaler	LS-100		15	31-12-99	31-12-99	01
101002	100W OakwoodDeluxe-højttaler	LS-100		12	31-12-99	31-12-99	01
101003	100W OakwoodDeluxe-højttaler	LS-100		10	31-12-99	31-12-99	01
▶ 1011002	Cykel	1000	1000 ↑	27	25-01-01	30-01-01	31
1011003	Cykel	1000	1000	16	26-01-01	30-01-01	31
1011004	Cykel	1000	1000	10	29-01-01	30-01-01	31


OK Cancel Prod. Order Help


SH000001 - Warehouse Shipment

General Shipping

No. . . . . SH000001  

Location Code. . . . . GR4N 


Zone Code . . . . .  

Bin Code . . . . .  

Document Status . . . . .


Status . . . . . Open

Posting Date . . . . . 01-01-00

Assigned User ID . . . . .  

Assignment Date . . . . .

Assignment Time . . . . .

Sorting Method . . . . .  

S..	Source No.	Item No.	Description	Quantity	Qty. to ...	Qty. Shi...	Qty. Out...
▶ S..	6001	1908-5	LONDON Kontorstol, blå	12	0	0	12
S..	6001	1906-5	ATHEN Skuffemodul	22	0	0	22
S..	6001	80100	Printerpapir	20	0	0	20

Shipment Line Functions Posting Print... Help

10000 Fredborg Lamper A/S - Vendor Card

General Communication Invoicing Payments Receiving Foreign Trade Commerce Portal

No. . . . . 10000 [edit] Search Name . . . . . FREDBORG LAMP...

Name . . . . . Fredborg Lamper A/S Balance (LCY) . . . . . 976.566,51

Address . . . . . Nyborgvej 566 Purchaser Code . . . . . MR [up]

Address 2. . . . . Responsibility Center . . . . . KØBENHAVN [up]

Post Code/City . . . . . DK-1152 [up] København K [up] Blocked . . . . . [down]

Country Code . . . . . DK [up] Last Date Modified . . . . . 25-10-04

Phone No. . . . . [edit]

Primary Contact No. . . . . [up]

Contact . . . . . Fr. Lillian Hansen

Vendor Purchases Help

---

Vendor List

No.	Name	Responsi...	Location ...	Phone No.	Contact
▶ 10000	Fredborg Lamper A/S	KØBENH...			Fr. Lillian Hansen
20000	Elvstrøm Træindustri A/S	KØBENH...	GUL		Hr. Per Busk
30000	Schmeichel Møbler A/S				Hr. Rene Madsen
40000	Dansk Møbelcenter		GRØN		Hr. Thomas Olsen
50000	Elektronik Service A/S				Hr. Steffen Voulund
60000	Grassblue Aps.	KØBENH...	HVID		
61000	Elektronik til alt	KØBENH...	HVID		
62000	WalkerHolland	KØBENH...	HVID		
01254796	Progressive Home Furnishings				Mr. Michael Sean Ray
01587796	Custom Metals Incorporated				Mr. Peter Houston

OK Cancel Vendor Purchases Help

### 6001 Busterby Stole og Borde A/S - Purchase Order

General Invoicing Shipping Foreign Trade E - Commerce

No. . . . . 6001 Posting Date . . . . . 22-01-01

Buy-from Vendor No. . . . . 45858585 Order Date . . . . . 22-01-01

Buy-from Contact No. . . . . E000118 Document Date . . . . . 22-01-01

Buy-from Vendor Name . . . . . Busterby Stole og Borde A/S Vendor Order No. . . . .

Buy-from Address . . . . . Havnevej 6 Vendor Shipment No. . . . .

Buy-from Address 2 . . . . . Vendor Invoice No. . . . . D-010

Buy-from Post Code/City DK-4600 Kjøge Order Address Code . . . . .

Buy-from Contact . . . . . Fr. Karen Friske Purchaser Code . . . . . MR

No. of Archived Versions. 0 Responsibility Center . . . . .

Status . . . . . Released

T...	No.	Description	Location ...	Quantity	Reserve...	Unit of M...	Direct U...
I...	1908-5	LONDON Kontorstol, blå	GRYN	20		STK	823,00
I...	1906-5	ATHEN Skuffemodul	GRYN	20		STK	1.879,00
I...	80100	Printerpapir	GRYN	200		PALLE	832,00

Order Line Functions Posting Print... Help

### Order - Purchase List

No.	Buy-fro...	Buy-from Vendor Name	Vendor ...	Location ...
6001	45858585	Busterby Stole og Borde A/S		
6002	45858585	Busterby Stole og Borde A/S		
6003	47586622	Monabekken Barnesenger A/S		
6004	47586622	Monabekken Barnesenger A/S		
6005	30000	Schmeichel Møbler A/S		
104001	30000	Schmeichel Møbler A/S		
104002	40000	Dansk Møbelcenter		GRYN
104003	50000	Elektronik Service A/S		
104004	40000	Dansk Møbelcenter		GRYN
104005	50000	Elektronik Service A/S		
104006	30000	Schmeichel Møbler A/S		

OK Cancel Line Help

Steffen Voulund

Michael Sean Ray

Peter Houston

Help



The screenshot displays three overlapping software windows from an ERP system. Each window has a blue title bar and standard window controls (minimize, maximize, close).

- Work Center Groups:** Contains a table with two columns: 'Code' and 'Name'. It lists two entries: '1 Lagerafdeling' and '2 Produktionsafdeling'. A 'Planning' dropdown menu and a 'Help' button are at the bottom.
- Shop Calendars:** Contains a table with two columns: 'Code' and 'Description'. It lists two entries: '1 Ét skift - mandag-fredag' and '2 To skift - mandag-fredag'. A 'Shop Cal.' dropdown menu and a 'Help' button are at the bottom.
- Work Shifts:** Contains a table with two columns: 'Code' and 'Description'. It lists two entries: '1 1. skifte' and '2 2. skifte'. A 'Help' button is at the bottom.

**Work Center List**

No.	Name	Alternat...	Work Ce...	U..	Capacity	Shop Cal...	Search N...
▶ 100	Samleafdeling			1 M..	3	1	SAMLEA...
	200 Pakkeafdeling			1 M..	1	1	PAKKEA...
	300 Malerafdeling			2 M..	1	2	MALERA...
	400 Maskinafdeling			2 M..	1	2	MASKIN...

# 100 Samleafdeling - Work Center Load



Period St...	Period Name	Capacity	Allocate...	Availabili...	Load
▶ 25-01-01	Thursday	1.440	356	1.084	24,7
26-01-01	Friday	1.440	261	1.179	18,1
27-01-01	Saturday	0	0	0	0
28-01-01	Sunday	0	0	0	0
29-01-01	Monday	1.440	700	740	48,6
30-01-01	Tuesday	1.440	1.683	-243	116,9
31-01-01	Wednesday	1.440	0	1.440	0
01-02-01	Thursday	1.440	0	1.440	0
02-02-01	Friday	1.440	0	1.440	0
03-02-01	Saturday	0	0	0	0
04-02-01	Sunday	0	0	0	0

1 7 31 3 12 ≡ |...| ...|

Help

# Work Center Calendar

## Options

Work Shift Filter . . . . .  

No.	Name	24-01-01	25-01-01	26-01-01	27-01-01	28-01-01	
▶ 100	Samleafdeling	1.440	1.440	↓ 1.440			↑
200	Pakkeafdeling	480	480	480			
300	Malerafdeling	900	900	900			
400	Maskinafdeling	900	900	900			

1 7 31 3 12 ≡

**Machine Center List**

No.	Name	Work Center No.	Capacity	Effici...	Search N...
120	Daniel Goldschmidt	100	1	100	DANIEL ...
▶ 130	Anders Riis	100	1	100	ANDERS ...
210	Pakkebord 1	200	1	100	PAKKEB...
220	Pakkebord 2	200	1	100	PAKKEB...
230	Pakkemaskine	200	1	100	PAKKEM...
310	Malekabine	300	1	100	MALEKA...
320	Malerobot	300	1	100	MALERO...
330	Tørrekabine	300	1	100	TØRREK...
340	Inspektion af maling	300	1	100	INSPEKT...
410	Boremaskine	400	1	100	BOREMA...
420	CNC-maskine	400	1	100	CNC-MA...

OK    Cancel    Mach. Ctr. ▼    Planning ▼    Help

Machine Center List						
No.	Name	Work Center No.	Capacity	Effici...	Search N...	
	120 Daniel Goldschmidt	100	1	100	DANIEL ...	▲
▶	130 Anders Riis	100	1	100	ANDERS ...	
	210 Pakkebord 1	200	1	100	PAKKEB...	
	220 Pakkebord 2	200	1	100	PAKKEB...	
	230 Pakkemaskine	200	1	100	PAKKEM...	☰
	310 Malekabine	300	1	100	MALEKA...	
	320 Malerobot	300	1	100	MALERO...	
	330 Tørrekabine	300	1	100	TYRREK...	
	340 Inspektion af maling	300	1	100	INSPEKT...	
	410 Boremaskine	400	1	100	BOREMA...	
	420 CNC-maskine	400	1	100	CNC-MA...	▼

**Machine Center Calendar**

Options

Work Shift Filter . . . . .

No.	Name	24-01-01	25-01-01	26-01-01	27-01-01	28-01-01
110	Jesper Ræbild	480	480	480		
120	Daniel Goldschmidt	480	480	480		
130	Anders Riis	480	480	480		
▶ 210	Pakkebord 1	480	480	480		
	220 Pakkebord 2	480	480	480		
	230 Pakkemaskine	480	480	480		
	310 Malekabine	900	900	900		
	320 Malerobot	900	900	900		
	330 Tørrekabine	900	900	900		

1 7 31 3 12

Mach. Ctr. Planning Functions Help

**LISE Lise Martin - Resource Card**

General Invoicing Personal Data

No. . . . . LISE      Search Name . . . . . LISE MARTIN

Name . . . . . Lise Martin      Resource Group No. . . . .

Type . . . . . Person      Blocked . . . . .

Base Unit of Measure . . . . . TIME      Last Date Modified . . . . . 19-09-00

Resource Prices Planning Help

---

**Resource Capacity**

No.	Name	25-01-01	26-01-01	27-01-01	28-01-01	29-01-01
▶ LIFT	Møbel-lift		↓	0	0	0
LISE	Lise Martin	8	8	0	0	8
MARTIN	Martin Hansen	8	8	0	0	8
METTE	Mette Djtrup	8	8	0	0	8
THOMAS	Thomas Søndergaard	8	8	0	0	8

1 7 31 3 12      Resource Prices Planning Help



**KVALITETSMYBLER,8 AP Montering af 8 arbejdspladser - Job Card**

General Posting Duration

No. . . . . KVALITETSMY...

Description . . . . . Montering af 8 arbejdspladser

Bill-to Customer No. . . . . 40000

Name . . . . . Kvalitetsmøbler A/S

Address . . . . . Løvstræde 10

Address 2. . . . .

Post Code/City . . . . . DK-4684 Holme-Olstrup

Contact. . . . . Hr. Klaus Sejr

Search Description . . . . . MONTERING AF 8...

Status . . . . . Order

Person Responsible . . . . . METTE

Blocked . . . . .

Last Date Modified . . . . . 25-01-01

---

**Job List**

No.	Description	Bill-to Cu...	Search D...
▶ KVALITE...	Montering af 8 arbejdspladser	40000	MONTER...
SV. H. M...	Montering af 10 konferencekontorer	50000	MONTER...

**KVALITETSMYBLER,8 AP Montering af 8 arbejdspladser - Job Card**

General | Posting | Duration

No. . . . . KVALITETSMY...  
 Description . . . . . Montering af 8 arbejdspladser  
 Bill-to Customer No. . . . . 40000  
 Name . . . . . Kvalitetsmøbler A/S  
 Address . . . . . Løvstræde 10  
 Address 2 . . . . .  
 Post Code/City . . . . . DK-4684 Holme-Olstrup  
 Contact . . . . . Hr. Klaus Sejr

Search Description . . . . . MONTERING AF 8...  
 Status . . . . . Order  
 Person Responsible . . . . . METTE  
 Blocked . . . . .  
 Last Date Modified . . . . . 25-01-01

Job Prices Planning Help

**Resource Allocated per Job**

Resource Filter . . . . .

No.	Name	4.2001	5.2001	6.2001
▶ KVALITE...	Kvalitetsmøbler A/S		0 30	
SV. H. M...	Svend Hansen Møbler	48	3	

1 7 31 3 12 | Job Prices Planning Help

**KVALITETSMYBLER,8 AP Montering af 8 arbejdspladser - Job Budget Entries**

Date	Description	Quantity	Total Cost	Total Price	Entry No.
▶ 01-02-01		3	0,00	20.000,00	4
01-02-01		20	5.500,00	9.200,00	5
02-02-01		2	924,00	1.840,00	13

Help

KVALITETSMYBLER,8 AP Montering af 8 arbejdspladser - Job Budget

Job No. . . . . . KVALITETSMY... ↑

Phase C...	Task Code	Step Code	T.. No.	Starting ...	Description	Quantity	Direct U...	Unit Cost	Total Cost	Unit Price	Total Price
▶ 1-SPEC	↑		R.. METTE	15-01-01	Møde med kunde	2	420,00	462,00	924,00	920,00	1.840,00
2-MYBL			R.. METTE	16-01-01	Valg af møblering	2	420,00	462,00	924,00	920,00	1.840,00
3-GODK			R.. METTE	19-01-01	Møde med kunde	2	420,00	462,00	924,00	920,00	1.840,00
4-MONT			R.. LIFT	01-02-01	Møbel-lift	8	0,00	0,00	0,00	2.500,00	20.000,00
4-MONT			R.. MARTIN	01-02-01	Levering og montering af møbl...	20	250,00	275,00	5.500,00	460,00	9.200,00
4-MONT			I... 1896-S	01-02-01	ATHEN Skrivebord	8	4.337,00	4.337,00	34.696,00	5.560,00	44.480,00
4-MONT			I... 1906-S	15-01-01	ATHEN Skuffemodul	8	1.879,00	1.879,00	15.032,00	2.409,00	19.272,00
4-MONT			I... 1908-S	01-02-01	LONDON Drejestol, blå	8	823,00	823,00	6.584,00	1.056,00	8.448,00
4-MONT			I... 1928-W	01-02-01	ST.MORITZ Reol med skuffer	4	1.644,00	1.644,00	6.576,00	2.929,00	11.716,00
4-MONT			I... 1964-S	01-02-01	TOKYO Gæstestol, blå	3	835,00	835,00	2.505,00	1.071,00	3.213,00
4-MONT			I... 1976-W	01-02-01	INNSBRUCK Reol med trædør	4	1.289,00	1.289,00	5.156,00	2.193,00	8.772,00
4-MONT			I... 1996-S	01-02-01	ATLANTA Whiteboard, basis	3	6.055,00	6.055,00	18.165,00	7.763,00	23.289,00
5-AFSL			R.. METTE	02-02-01	Møde med kunde	2	420,00	462,00	924,00	920,00	1.840,00

Functions ▾ Alloc. to Dates Planning ▾ Help

### Production Forecast

**General**

Production Forecast N...  ↑ Forecast Type . . . . . Sales Item ▾

Location Filter . . . . .  ↑ Date Filter . . . . .

No.	Description	1998	1999	2000	2001	2002
1000	Cykel				2.300	2.300
1001	Turcykel				240	240
1100	Forhjul					
▶ 1110	Fælg					▾
1120	Eger					
1150	Fornav					
1151	Forhjulsaksel					
1155	Forlygteholder					
1160	Dæk					

1 7 31 3 12 ≡ |<>| ...

Functions ▾ Help

### 1000 Cykel - Item Card

General Invoicing Replenishment Planning Foreign Trade Item Tracking E - Commerce Warehouse

No. . . . . 1000 Search Description . . . CYKEL

Description . . . . . Cykel Inventory. . . . . 32

Base Unit of Measure . . . STK Qty. on Purch. Order . . . 0

Bill of Materials . . . . . Qty. on Prod. Order . . . 44

Shelf No. . . . . F4 Qty. on Component Lines . . . 0

Automatic Ext. Texts . . . Qty. on Sales Order . . . 104

Created From Nonstoc... Qty. on Service Order . . . 0

Item Category Code. . . Service Item Group . . .

Product Group Code. . . Blocked . . . . .

Last Date Modified . . . 25-10-04

Item Sales Purchases Functions Help

### 1000 Cykel - Production BOM

General

No. . . . . 1000 Search Name . . . . . CYKEL

Description . . . . . Cykel Version Nos. . . . .

Unit of Measure Code . . . STK Active Version. . . . .

Status . . . . . Certified Last Date Modified . . . 25-10-04

T..	No.	Description	Quantity...	Unit of Meas...	Scra...	Routing ...
▶	I...	1100 Forhjul	1	STK	0	
	I...	1200 Baghjul	1	STK	0	
	I...	1300 Kædesaml	1	STK	0	
	I...	1400 Stænskærm, for	1	STK	0	
	I...	1450 Stænskærm, bag	1	STK	0	
	I...	1500 Lygte	1	STK	0	
	I...	1600 Ringeklokke	1	STK	0	
	I...	1700 Bremse	1	STK	0	
	I...	1800 Styr	1	STK	0	
	I...	1850 Sadel	1	STK	0	
	I...	1900 Ramme	1	STK	0	

Prod. BOM Component Functions Help

**1000 Cykel - Routing**

**General**

No. . . . . 1000

Description . . . . . Cykel

Type . . . . . Serial

Status . . . . . Certified

Search Description . . . . . CYKEL

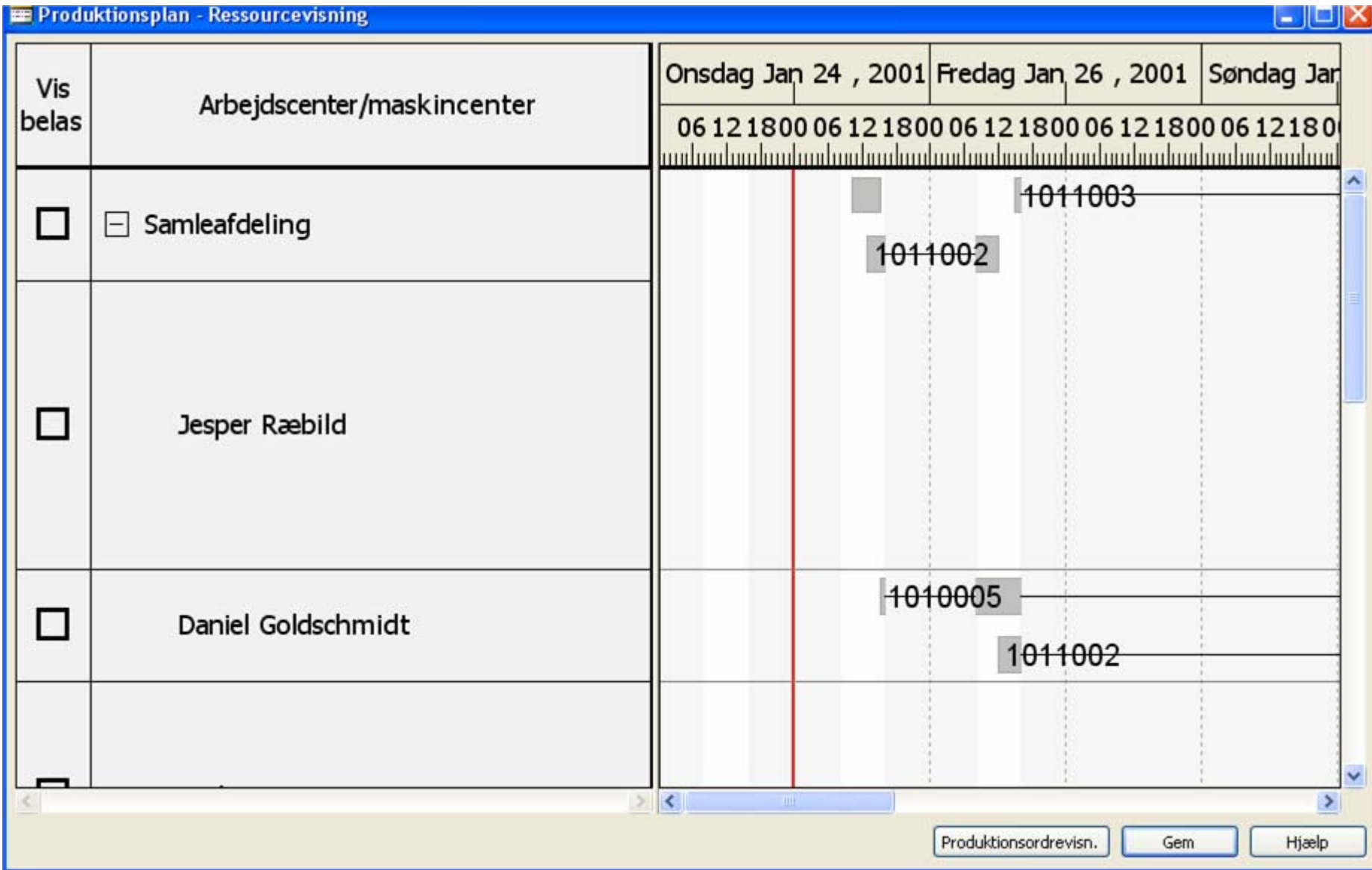
Version Nos. . . . .

Active Version. . . . .

Last Date Modified . . . . . 25-10-04

Operatio...	T..	No.	Description	Setup Time	Run Time	Wait Time	Move Time
▶	10 W.	100	Fælg med dæk	110	12	0	0
	20 M..	120	Kædesamling	15	15	0	0
	30 M..	130	Endelig samling	10	20	0	0
	40 M..	110	Kontrol	10	8	0	0

Routing    Operation    Functions    Help



**Shortage List**

CRONUS Danmark A/S

26. September 2006

Page 1

Status	No.	Description	Due Date	Finished Date						
Item No.	Description	Remaining Qty. (Base)	Quantity on Hand	Qty. on Hand after Productio	Scheduled Receipt	Scheduled Need	Qty. on Purch. Orde	Qty. on Sales Order	Needed Quantity	
Released	101001	100W OakwoodDeluxe-højttaler		01-01-00						
LSU-15	15" 100W basenhed i hø	15	0	-15	0	15	0	0	15	
LSU-8	8"100W mellemtone i hø	15	0	-15	0	15	0	0	15	
LSU-4	4" 100W diskant i højttal	15	0	-15	0	15	0	0	15	
FF-100	Frekvensfilter til LS-100	15	0	-15	0	15	0	0	15	
C-100	Kabler til LS-100	15	0	-15	0	15	0	0	15	
HS-100	Kabinet LS-100, Oakwoo	15	0	-15	0	15	0	0	15	
SPK-100	Pigge til LS-100	60	0	-60	0	60	0	0	60	
Released	101002	100W OakwoodDeluxe-højttaler		01-01-00						
LSU-15	15" 100W basenhed i hø	12	0	-12	0	27	0	0	27	
LSU-8	8"100W mellemtone i hø	12	0	-12	0	27	0	0	27	
LSU-4	4" 100W diskant i højttal	12	0	-12	0	27	0	0	27	
FF-100	Frekvensfilter til LS-100	12	0	-12	0	27	0	0	27	