

Contents

PREFACE, *xvii*

ACKNOWLEDGMENTS, *xix*

INTRODUCTION, 1

1

THE NEW ENVIRONMENT, 3

Planning and Control, 5
Computer Systems Assumed, 6
Integrated Information, 7
The New Environment, 8

CHAPTER 1 QUESTIONS, 9

2

KEY CONCEPTS, 10

Business Structure and Functions, 10
Systems—Formal and Informal, 12
Manual systems, 13 Computer systems, 13

Records, 16

Record interrelationships, 16

Data Bases, 18

Procedural and System Logic, 18

Information Pyramids, 20

Closed-Loop Systems and Subsystems, 21

APICS Terminology, 22

Supply and Demand Types, 22

CHAPTER 2 QUESTIONS, 23

3

MASTER PLANNING—SALES AND PRODUCTION, 24

STRATEGIC PLANNING—THE FOUNDATION
OF ALL PLANNING, 24

Goal Setting, 25

General Environmental Factors, 25

Specific Environmental Factors, 26

Identifying Company Strengths
and Weaknesses, 30

Developing a Strategy, 31

Implementing the Strategy, 33

MARKET RESEARCH, 34

FORECASTING INDEPENDENT DEMAND, 35

Dollars-Only Forecasts, 36

Planning Horizons, 37

Effect of Lead Times on Planning Horizons, 39

Forecasting Units, 40

Forecasting Techniques, 42

MASTER PRODUCTION SCHEDULING, 48

The Realistic Master Production Schedule, 54

CHAPTER 3 QUESTIONS, 56

4**PRODUCT STRUCTURES, 57**

The Concept of a Part, 57

Relationship Pairs, 59

Bills of Material, 61

Where-Used Lists, 62

As-Designed versus As-Built, 63

Drawing Control Systems, 64

The Integrated Method, 64

*Phantom part numbers, 65 Optional items, 66 Superbills
and pseudo part numbers, 66*

Lead Time Offsets, 67

Product Costing, 68

Management Considerations, 70

Engineering Change Control, 71

Material Planning Impact, 74

Impact on Production, 75

CHAPTER 4 QUESTIONS, 76**5****MANUFACTURING OPERATIONS
AND WORK
CENTER MANAGEMENT, 78**

Work Centers, 78

Work Center Capacity, 81

Operation Routings, 81

Relationships between Work Center
and Operation Records, 83

Tooling, 87

Manufacturing Information Relationships, 89

Managerial Considerations, 91

CHAPTER 5 QUESTIONS, 93

6

INVENTORY, 94

The Financial View, 94

Purpose—The Essential Question, 95

Classification Methods, 96

Control codes, 96 Purchasing codes, 97 Scheduling and stocking codes, 97 Costing codes, 98 Special codes, 98

Inventory Behavior—ABC Analysis, 99

Behavior—Demand Types, 99

Planning Levels of Customer Service, 101

Controlling Customer Service, 103

Manufactured Parts—Dependent and Lumpy Demand, 104

Purchased Parts and Raw Materials, 107

Physical Control, 108

Receiving and Inspection Control, 109

Work-in-Process Inventory Control, 110

Shipping, 111

Warehouse Control and Layout, 112

Documentation, 113

Cycle Counting versus Physical Inventories, 114

Inventory and Other System Elements, 115

Record Accuracy—Other Data, 117

CHAPTER 6 QUESTIONS, 118

7

EXECUTING THE BUSINESS PLAN—MATERIAL, 120

THE MASTER SCHEDULE—THE SYSTEM DRIVER, 120

The Concept of an Order, 120

Order Generation Logic, 123

Assumptions of Order Planning, 124

Order independence, 124 Inventory status is known, 125 All parts move in and out of inventory, 125 The master production schedule is realistic, 125 All products are defined in the product structure records, 126 Multilevel order generation, 126

- Time Phasing, 128
- Netting Against On-hand Stock, 131
- Planning Horizons and Lead Time, 132
- Subassembly Levels and Purchasing Requirements, 135
- Lot Sizing and Order Policies, 137
 - Economic order quantity, 137* *Period order quantity, 139*
 - Other formula methods, 140* *Fixed order quantity, 142*
 - Time period order coverage, 142* *Modifying factors, 144*
 - Order method selection, 145*
- Planned Order Management, 145
- Net Change Processing Assumed, 148
- Managing Planned Orders with the MPS, 149
- Engineering Changes, 151
- Use of Firm Planned Orders, 151
- The Order Releasing Cycle, 151
- Released Orders
 - and Work-in-Process Tracking, 153
- Pegging of Demand, 156
- Safety Stock, 156

PURCHASING UNDER MRP, 157

- The Goal of Purchasing, 158
- Extending the System into Vendors, 158
- “Paperless” Purchasing, 159
- The Flexible Purchasing Agreement, 160
- Limited-Capacity Vendors, 161
- Inventory Turnover
 - and Purchase Order Management, 162

DISTRIBUTION REQUIREMENTS PLANNING, 163

CHAPTER 7 QUESTIONS, 165

8

EXECUTING THE BUSINESS PLAN IN THE PLANT, 167

RELATIONSHIP TO OTHER PLANNING ACTIVITIES, 168

- Resource requirements planning, 170* *Production planning, 170* *Rough-cut planning, 170* *Scheduling unreleased orders, 170* *Detailed operation scheduling, 171*

Capacity Management Interfaces,	171
Long-Range Capacity Planning Techniques,	172
Resource Requirements Planning,	174
WORK CENTER LOADING LOGIC,	177
Planning Horizons and Time Fences,	179
LEAD TIMES,	181
Operation Lead Time,	183
MANUFACTURING ACTIVITY PLANNING	
—SHORT-RANGE PLANNING,	185
Pre-release Planning,	185
Operation Sequencing—After Release,	187
Dispatching,	188
Management Structure,	190
RELEASED WORK ORDER MANAGEMENT,	191
Cycle Counting	
of Work-in-Process Information,	193
Work Load Balancing,	193
Input/Output Control,	194
Information from Work Order Management,	196
Lot Control and Serial Number	
Traceability Considerations,	197
Summarizing Work Order Management,	198
MANAGEMENT OF WORK	
CENTER QUEUES,	199
Justifying Work Center Queue Investment,	202
Getting Control of Queues,	204
Results from Effective Queue Management,	205
MANAGING TOOLING,	205
MANAGING VENDOR-	
PERFORMED PROCESSING,	207
FACILITIES MANAGEMENT,	209
Maintenance of Equipment,	210
Plant Layout,	210
Production Balancing,	211
Overloading and Underloading of Machines,	211
Special-Purpose versus General-	
Purpose Equipment,	212
CHAPTER 8 QUESTIONS,	212

9

**MEASURING PERFORMANCE—
CLOSING ALL THE LOOPS, 216****THE PERFORMANCE****MEASUREMENT PROCESS, 216**

Ensuring Ongoing Planning, 218

Ensuring Accurate, Timely Data, 218

Understanding Automatic Functions, 218

Controlling System Interfaces, 219

Communicating via System Data, 219

Management by Limits, Tolerances,
and Exceptions, 220

Use of Cross-Checks and Reconciliations, 220

Continuous System Improvements, 221

THE INFORMATION BASIS**OF A CLOSED LOOP, 221**

Developing a Detailed

Performance Measurement, 222

Sources of Data, 225

Performance Measurement Results, 225

The Traditional Accounting Viewpoint, 227

IMPROVING PRIMARY DATA**BASE ACCURACY, 229**

Product Structures, 230

Operation Routings, 230

Work Centers, 231

Tooling, 231

Part Numbers, 232

OPERATIONS-ORIENTED**PERFORMANCE MEASUREMENTS, 232**

Forecasting and the Master

Production Schedule, 232

Purchasing Performance, 233

Warehouse Management, 234

*Cycle counting results, 235 Stock picking control, 237**Unplanned stockout rate, 238 Warehouse scrap, 238*

Production Control Performance, 238

Manufacturing Activity Performance, 240

*Standards effectiveness, 240 Capacity management and
planning, 241 Efficiency and quality control, 241*

- Product Costing, 242
- Shipping Performance, 243
- Customer Service Levels, 244
- Overall Business Plan Effectiveness, 244

CHAPTER 9 QUESTIONS, 245

10

FINANCIAL MANAGEMENT ASPECTS, 247

- Traditional Accounting Approach, 248
- Information Systems Approach, 249
- The New Responsibilities, 250
- Financial Information from Planned Orders, 251
 - Material cost planning, 253 Labor cost planning, 253 Projecting overhead absorption, 253 Purchasing commitments, 254*
- Actual Cost Data, 254
- Developing Variance Information, 256
- Direct Costing, 258

CHAPTER 10 QUESTIONS, 260

11

MANAGEMENT IN THE NEW ENVIRONMENT, 262

- Education and Training—A Central Issue, 263
 - Goals of education, 264 Goals of training, 265 Education and training methods, 265*
- Information-Oriented Management Structures, 267
- Constancy of Rapid Change, 271
 - The great awakening, 271 The new environment, 272 Barriers to change, 272 Springboards to flexibility, 273*
- The Computer Moves to Center Stage, 274
- New Management Skills, 276
- Cost of Traditional Orientation, 277
- Organizing for Planning and Control, 278

CHAPTER 11 QUESTIONS, 279

12

KEY COMPUTER FACTORS, 281

HARDWARE OVERVIEW, 281

Organization of CPU Memory, 283

Disk Organization and Functions, 287

Disk I/O Speed Limitations, 289

Other Peripheral Devices, 290

Visual display terminal, 290 Magnetic tape drives, 290

Printers, 291

SOFTWARE OVERVIEW, 291

File Organization Methods, 292

Data Base Management Systems, 294

Data Base Design, 296

Centralized versus Distributed
Data Processing, 297

*Advantages of centralized systems, 297 Disadvantages of
centralized systems, 298 DDP advantages, 298 Disad-
vantages of DDP, 299 Summary, 300*

AUTOMATED INPUT DEVICES AND APPLICATIONS, 300

COMPUTER PROJECT MANAGEMENT CONSIDERATIONS, 301

Lessons from Japan, 302

RETURN ON INVESTMENT FOR COMPUTER SYSTEMS, 302

CHAPTER 12 QUESTIONS, 303

13

THE PRESENT IS THE FUTURE, 305

INSIGHTS FROM JAPAN, 306

Simplifying the Business, 306

Impact of High Quality Standards, 308

Eliminating planning surprises, 308 Quality circles, 309

Participative Management Styles, 310

Disciplined, Formal Systems, 312

*KANBAN, 313 Synchro-MRP, 316 Common elements of
Japanese systems, 318*

Worldwide Planning, Marketing,
and Operations, 319

OTHER MODERN INNOVATIONS, 320

Plant Arrangements, 320

Group Technology, 321

Automated Storage/Retrieval Systems, 322

Highly Computerized Techniques, 324

*Computer-aided design, 325 Computer-aided manufactur-
ing, 326*

Changes in Product Design, 327

Truly International Operations, 328

CHAPTER 13 QUESTIONS, 329

BIBLIOGRAPHY, 331

INDEX, 335