Management Decisions for Production Operations

ROBERT GOODELL BROWN

International Business
Machines Corporation



THE DRYDEN PRESS INC. HINSDALE, ILLINOIS

CONTENTS

•	
	. v
ıction	1
The Course	· 2
Plan of Development	3
Hierarchies	5
Functional Analysis versus Solution Techniques	7
Why Learn All This?	. 9
How to See Extensions	10
Basic Logical Structure	11
Decision Rules for Routine Operations	15
,	
•	
Finished Goods Inventories	19
Inventory Control	23
Inventory Management	24
Economical Order Quantity (EOQ)	27
	The Course Plan of Development Hierarchies Functional Analysis versus Solution Techniques Why Learn All This? How to See Extensions Basic Logical Structure Decision Rules for Routine Operations Repetitive decision problems that can be reduced to computable rules Finished Goods Inventories Inventory Control Inventory Management

	Order Points	32
	Operating Level	36
	Summary	37
	Appendix: The Seriousness of Shortages	38
Chapter	2 Demand Forecasts	53
-	Models of Demand Patterns	56
	Revision of the Estimates	58
	Trends	60
	Estimates of Uncertainty	61
	Initial Conditions	63
	Marketing Intelligence	67
	Integration of Marketing Intelligence with Routine	
	Forecasts	71
	Review of New Products	74
	Summary	76
	Appendix: Seasonal Forecasts,	76
Chapter		84
•	Organizational Conflict	87
	Decision Alternatives	89
	Warehouses	92
	Warehouse Location	98
	Channels of Distribution	108
	Mass Movement	109
	Local Delivery	111
	Information Flow	112
	Allocation	113
	Inventory Policy	116
	Systems Studies	117
Chapter	4 Management's Inventory Policy	123
	Allocation of Effort	127
	Inventory Estimates	133
	Exchange Curves	137
	Appendix: The Lognormal Distribution	139
Section	II Manufacturing Operations	149
	Decisions that arise in operating a factory	
Chapter	5 Capacity Requirements	157
	Forecast of End Product Requirements	161
	Production Planning	167
	Requirements at Earlier Stages of Production	181
	Appendix: Production Lot Quantities with Known	
	Irregular Demand	187
Chapter	6 Scheduling and Dispatching	197
	Assembly Line Balancing	200
	Back Scheduling of Components in an Assembly	208
	Job Shop Scheduling	212
	The Foreman as the First Line of Supervision	221
	Appendix: Optimum Scheduling of M Jobs for Two	
	Operations	223

Chapter	7	Work Measurement and Ergonomics	229
		Standards for Production Performance	233
		Transients for Learning in a Changing Environment	241
		Methods Study to Improve Present Procedures	249
		Ergonomics	256
		Summary	262
Chapter	8	Quality Assurance and Control	266
		What Properties Should Be Measured?	270
		Quality Control and Inspection	276
		Quality Assurance	289
Chapter	9	Procurement Management	295
•		Organization ,	296
		What to Buy	300
		When to Buy	310
		How Much to Ruy	216
	•		310
Section	<i> </i>	Management of Production Projects Stimulate innovative changes in the environment for routine production	323
Chapter	10°	Product and Process Design	330
•		What Product Is to Be Made?	332
		Where Can the Product Be Improved?	348
		How to Make the Product	354
		Why Do It that Way?	360
Chapter	11	R & D for New Products [♣]	364
		Forecasts of the Need for New Products	367
		The Scientists and Engineers	374
		The Scientific Method	377
	,	Choice of Research and Development Projects	383
		Administration of Research and Development	390
	,	The Transition from R & D to Production	394
Chapter	12	Plant Modernization and Maintenance	398
		Plant and Warehouse Location	401
		Plant Layout	409
		Equipment Replacement	419
		Maintenance	427
		Appendix: Truck Routes to Replenish Warehouse	
		Stocks	432
o		D: 11 (44	
Section	IV	Principles of Management Decisions	441
		General principles of attack on decision problems, including the necessary information for planning,	
		measurement, and control	
Chapter	13	Managing Production Operations	446
p		People in Organizations	448
		Organizations of People	452
		Leadership and Membership	455
		Information Flow	462
		The Management of Change	469

Chapter 14	Management Information Systems	477
	Information Connects an Organization	480
	Information Flow Is Analogous to Production	497
	The Computer as a Production Tool	503
Chapter 15	Decision Analysis	513
	Decision Analysis	514
	The Principles of the Decision Analyst	522
	The Encoding of Subjective Information	524
	A Decision-analysis Example	528
	Conclusion	531
Section V	The Decision Analyst's Kitbag	535
	Formal techniques used in constructing and manipulat-	
	ing decision models	
Chapter 16	Linear Programming	541
	Simplex Method of Solution,	547
	Duality	553
	Extensions	558
	Problem Formulation	561
Chapter 17	Network Analysis	564
	Fewest Steps through a Network	568
	Cheapest Routes	571
	Dynamic Programming	575
, ,	Critical Path Scheduling	581
	Summary	587
Chapter 18	Decisions under Uncertainty	590
	Bayes Rule	592
	Illustrations	594
	Decision Analysis	598
	Decisions	604
	Game Theory	605
Chapter 19	Waiting Lines	610
	Basic Queueing Model	612
•	Cost Balance	615
	Methods of Improving Service	618
Chapter 20	Simulation	621
	Purposes and Types of Simulation	623
	Systems Models for Simulation	627
	Monte Carlo Simulations	632
	Commentary on APL as a Language	640
Bibliography and Reading Guide		
Indev		673