

Contents

Acknowledgments	ix
1. INTRODUCTION	1
1.1 Freight Transshipment	1
1.1.1 Reasons for Transshipment	2
1.1.2 Terminal Operations	3
1.2 Vehicle Transshipment	4
1.2.1 Vehicle Supply Chains	4
1.2.2 Transshipment Tasks	5
1.3 Book's Overview	6
2. AUTOMOBILE PRODUCTION AND DISTRIBUTION	9
2.1 Trends in Automobile Production	9
2.1.1 A Quick Glimpse to History	9
2.1.2 Shift Towards Emerging Markets	11
2.1.3 Multinational Configurations	13
2.2 Challenges for Outbound Logistics	15
2.2.1 Distribution Strategies	16
2.2.2 Hub and Spoke Distribution	17
2.2.3 Logistic System Leadership	19
2.3 Summary	20
3. INTERMODAL VEHICLE TRANSSHIPMENT	21
3.1 Vehicle Transport Market	22
3.1.1 Deep-Sea Segment	22
3.1.2 Short-Sea Segment	25
3.1.3 Second-Hand Automobile Segment	26
3.1.4 High and Heavy Segment	27

3.2	Competition Factors for Ports	28
3.2.1	Competitive Port Infrastructure	28
3.2.2	Ports of the North Range	30
3.2.3	Development of Transshipment Volume	32
3.2.4	Distribution of Transshipment Volume	34
3.3	Summary	38
4.	MANAGEMENT OF TERMINAL OPERATIONS	41
4.1	Transshipment Processes	41
4.1.1	Import Process	42
4.1.2	Export Process	45
4.1.3	Auxiliary Process	46
4.2	Management Decisions	46
4.2.1	Strategic Decisions	47
4.2.2	Tactical Decisions	48
4.2.3	Operational Decisions	56
4.3	Summary	59
5.	MODELING TERMINAL OPERATIONS	61
5.1	Vehicle Transshipment Planning	61
5.1.1	Allocation of Storage Space	62
5.1.2	Manpower Deployment	64
5.1.3	Goals for Terminal Operations	64
5.2	An Integrated Transshipment Model	66
5.2.1	Problem Resources	66
5.2.2	Decision Variables	68
5.2.3	Constraints	69
5.2.4	Objective Function	73
5.3	Problem Separation	74
5.3.1	Implications of the Integral Model	74
5.3.2	Hierarchical Problem Separation	76
5.4	Summary	82
6.	ALLOCATION OF STORAGE SPACE	83
6.1	Space Allocation Problems	83
6.1.1	Literature Overview	84
6.1.2	Problem Modeling	86
6.2	Problem Generation	90
6.2.1	Producing Solvable Test Problems	90

6.2.2	Parameterizing Test Problems	93
6.3	Construction Heuristic	93
6.3.1	Greedy Strategy	93
6.3.2	Generalized Procedure	95
6.3.3	Balancing Strategy	100
6.4	An Evolutionary Algorithm Approach	102
6.4.1	Evolutionary Algorithms	102
6.4.2	Parameter Optimization	105
6.4.3	Adaptive Strategy	106
6.5	Summary	107
7.	PERSONNEL DEPLOYMENT	109
7.1	The Gang Scheduling Problem	109
7.1.1	Literature Review	110
7.1.2	Problem Description	113
7.1.3	Problem Modeling	114
7.1.4	Generating Problem Instances	115
7.2	Tabu Search	117
7.2.1	Local-Search Framework	117
7.2.2	Guidance of Search by Tabu Moves	119
7.2.3	Setting of Generic Parameters	120
7.3	Algorithmic Design	121
7.3.1	Neighborhood and Tabu List	122
7.3.2	Building an Initial Solution	122
7.3.3	Performing a Move	123
7.3.4	Estimating the Costs of a Move	128
7.4	Computational Investigation	133
7.4.1	Experimental Setup	133
7.4.2	Hill-Climbing Algorithm	134
7.4.3	Tabu Search Algorithm	136
7.5	Summary	137
8.	IT-INTEGRATION OF PLANNING	139
8.1	Support for Terminal Operations	139
8.1.1	Functionality of ERP Systems	140
8.1.2	Control of Terminal Operations	141
8.2	Software Support for Planning	142
8.2.1	Terminal Viewer Module	143
8.2.2	Terminal Information System	145

8.3	Interplay of Execution and Planning	147
8.3.1	Requirements Definition	147
8.3.2	Design Specification	150
8.3.3	Implementation Description	154
8.4	Impact of Automated Planning	156
8.5	Summary	157
	Bibliography	159
	Index	173