## Intercity Transport

## Engineering and Planning

## TOM RALLIS

Technical University of Denmark, Copenhagen



## Contents

Preface	ix
Introduction	xi
1 TRANSPORT EVOLUTION	1
<ul> <li>1.1 Transport before 1500</li> <li>1.2 Transport after 1500</li> <li>1.2.1 Land transport</li> <li>1.2.2 Sea and air transport</li> <li>1.3 Transport systems</li> <li>1.3.1 The intercontinental network</li> <li>1.3.2 European network</li> <li>1.3.3 The American network</li> <li>1.3.4 The Tokaido corridor in Japan</li> <li>1.4 General observations</li> <li>References</li> </ul>	1 5 5 12 25 25 28 36 40 41 42
2 ENVIRONMENTAL FACTORS IN INTERCITY TRANSPORT	43
<ul> <li>2.1 Accidents</li> <li>2.1.1 Safety at sea</li> <li>2.1.2 Safety on railways</li> <li>2.1.3 Safety on roads</li> <li>2.1.4 Air safety</li> <li>2.2 Noise</li> <li>2.2.1 Railway traffic noise and sea traffic noise</li> <li>2.2.2 Road traffic noise</li> <li>2.2.3 Air traffic noise</li> <li>2.3 Air pollution</li> <li>References</li> </ul>	43 44 48 52 55 69 69 71 73 80 84

and a second associated, they pairs of this includenting may	87
3.1.1 Seaways	87
3.1.2 Ports	88
3.2 Rail transport	95
3.2.1 Through tracks	95
3.2.2 Passenger handling stations	96
3.2.3 Goods handling stations	97
3.3 Road transport	99
3.3.1 Highways, motorways	99
3.3.2 Bus stations	101
3.3.3 Road haulage centres	101
3.3.4 Parking areas	101
3.3:5 Toll booths	101
3.4 Air transport	102
3.4.1 Airways and runways	102
3.4.2 Air-ground communications	103
3.4.3 Apron	112
3.5 Passenger and freight transport	114
3.5.1 Passenger and freight capacity	115
3.5.2 Transport mileage capacity	121
References	122
4 TRANSPORT ECONOMY, POLICY AND LOCATION	124
4.1 Economy and transport	124
4.2 Costs and investments	125
4.2.1 Capital costs	125
4.2.2 Fuel costs	127
4.2.3 Sea transport	130
4.2.4 Rail transport	134
4.2.5 Road transport	136
4.2.6 Air transport	138
4.2.7 Indirect costs of transport systems	139
4.3 Prices, fares and charges	142
4.3.1 Ship's charges	144
4.3.2 Railway charges	144
4.3.3 Road charges versus rail charges	145
4.3.4 Investment in infrastructure; subsidies and discrimination	146
4.3.5 Taxation	147

4.3./ Passenger transport lares	149
4.3.8 Budgets	150
4.4 Location theory and transport networks	152
4.5 Scheduling and location	166
References	171
5 TRANSPORT DEMAND AND PLANNING	174
5.1 Forecasting growth curves	174
5.1.1 Arithmetical forecast (extrapolation)	174
5.1.2 Geometrical forecast (exponential extrapolation)	174
5.1.3 Logistic forecast (gradually declining increase)	175
5.2 Forecasting growth formulae for passenger traffic	177
5.2.1 Estimation of passenger traffic volume between cities	177
5.2.2 Distribution of traffic between modes	178
5.2.3 Network flow	178
5.3 Forecasting models for passenger transport	179
5.3.1 Sequential models	179
5.3.2 Transport system models	180
5.4 Estimation of freight traffic volumes between cities	183
5.4.1 The inventory model	185
5.4.2 The behavioural model	187
5.5 Evaluation procedures	187
5.5.1 Transport systems and cost-benefit analysis	187
5.6 Some transport plans	189
5.6.1 Reshaping British Rail	189
5.6.2 The Channel tunnel	190
5.6.3 British air and sea links	195
5.6.4 Intercity transport in Europe 1970–2000	201
5.6.5 Transport in the north-east corridor of the United States	214
References	224
Glossary of terms	226
Closery of terms	220
Index	229