

**TRUCKLOAD TRANSPORTATION:
ECONOMICS, PRICING & ANALYSIS**

Leo J. Lazarus, M.B.A.

Copyright 2010 Leo J. Lazarus

TruckloadTransportation.com

Monument Press
Memphis, TN

TRUCKLOAD TRANSPORTATION: ECONOMICS, PRICING & ANALYSIS

CONTENTS

Section 1 Introduction to Truckload Transportation		
Chapter 1	Introduction to Truckload Transportation	1
Chapter 2	The Trucking Business Model	29
Section 2 One-Way Pricing and Network Analysis		
Chapter 3	Introduction to One-Way Pricing	51
Chapter 4	Core Concepts in One-Way Pricing	71
Chapter 5	Advanced Concepts in One-Way Pricing	97
Chapter 6	Network Management and Optimization	123
Chapter 7	Operations and Profitability Analysis	139
Section 3 Dedicated Fleet Pricing and Design		
Chapter 8	Introduction to Dedicated Fleet Pricing	169
Chapter 9	Dedicated Pricing and Cost Forecasting	193
Chapter 10	Establishing the Proper Profit Margin for a Dedicated Fleet	219
Chapter 11	Special Topics in Dedicated Pricing	263
Chapter 12	Semi-Dedicated Pricing and Design	291
Section 4 Bid Response and Analysis		
Chapter 13	Bid Analysis and Response	337
Chapter 14	Case Studies in Bid Response Analysis	377
Section 5 Key Concepts for Shippers		
Chapter 15	Key Concepts for Shippers	431

CONTENTS

TruckloadTransportation.com

Section 1: Introduction to Truckload Transportation

CHAPTER 1

Introduction to Truckload Transportation 1

Introduction	1
The Trucking Business Cycle	2
The Organizational Structure of a Truckload Carrier	4
Carrier Measurements and Key Performance Indicators	7
Mileage Measurements	7
Revenue Types and Measurements	9
Key Operating Measurements and Statistics	11
Types of Truckload Operations	13
Linehaul Operations	14
Regional Operations	15
Short Haul and Local Operations	16
Dedicated Fleets	17
Specialized Carriers and Trailer Equipment	18
Driver Turnover	20
Driver Hours of Service Regulations	21
Owner-Operators	22
Primary Truckload Operating Cost Components	23
Variable Costs	23
Fixed Costs	26

CHAPTER 2

The Trucking Business Model 29

Truckload Economics	29
Introduction	29
Individual Truck Business Model	30
Operating Ratio	32
Utilization Analysis	33
Loaded Revenue Per Mile Analysis	37
Empty Mile Percentage Analysis	39
Break-even Point Utilization	42
Primary Cost Drivers for Carriers	43
Total Cost Driver: Booking Loads	43
Total Cost Driver: Driving Miles	43
Total Cost Driver: Owning / Leasing Tractors and Trailers	44
Activity-Based Costing	45
Developing a Simple Activity-Based Cost Model	45
Application of the Activity-Based Costing Model	48
Revenue Per Day and Asset Productivity	50

CONTENTS

TruckloadTransportation.com

Section 2: One-Way Pricing and Network Analysis

CHAPTER 3

Introduction to One-Way Pricing 51

- Lanes 51
- Sample Contract 52
- Accessorial Charges 56
- The Pricing Matrix 66
 - Backup Matrix 66
 - Guideline Pricing Matrix 67
 - Pricing Regions 68

CHAPTER 4

Core Concepts in One-Way Pricing 71

- Cycle Time 72
 - Cycle Time Illustrations 74
 - Buffer Time 76
 - Dwell Time 79
- Length of Haul 80
 - Other Length of Haul Statistics 85
 - Empty Miles and Net Revenue Per Mile 88
- Assigning Empty Miles to Load Activity 90
- Profitability Optimization 91
 - Critical Profitability Factors 91
 - Business Models by Utilization Level 92
- Utilization Maximization 94
- Revenue Per Truck Per Week 96

CHAPTER 5

Advanced Concepts in One-Way Pricing 97

- The One-Way Pricing Process 97
 - Lane and Customer Analysis 97
 - The Preliminary One-Way Rate 100
 - Pricing Adjustments 102
- Network Capacity and Balance 103
 - Real-Time Capacity and Balance 103
 - Capacity and Balance and Pricing Strategy 104
- Headhaul and Backhaul Markets 106
 - Common Factors that Create Headhaul or Backhaul Markets 108
 - Theoretical Pricing from Market Type to Market Type 109
 - Demand Shifts and Market Pricing 110
 - Supply Shifts and Market Pricing 111
 - Case Study: The Florida Backhaul Market 112
 - Market Type and Length of Haul 114
- Seasonality 116
- Round Trip Pricing 121

CONTENTS

TruckloadTransportation.com

Section 2: One-Way Pricing and Network Analysis (cont'd)

CHAPTER 6

Network Management and Optimization 123

- Network Capacity and Balance 123
 - Freight Solicitation 124
 - Truck Repositioning 125
- Exchanging Loads from One Driver to Another 126
 - Carrier Reasons for Load Swaps 126
 - Shipper Reasons for Load Swaps 128
 - Other Swap Considerations 129
- Customer Diversification and the Portfolio Concept 130
- The Tractor and Load Assignment Problem 132
 - The Optimization Model 133
 - The Optimization Solution 135

CHAPTER 7

Operations and Profitability Analysis 139

- Carrier Analysis Reports 139
 - Fleet Level Analysis 140
 - Customer Level Analysis 144
 - Market Level Analysis 152
 - Lane Level Analysis 157
- Other Analysis and Reporting Considerations 160
 - Carrier Income Statements 160
 - On-time Service Reporting 163
 - Operating Reports 165

CONTENTS

TruckloadTransportation.com

Section 3: Dedicated Fleet Pricing and Design

CHAPTER 8

Introduction to Dedicated Fleet Pricing 169

- Common Types of Dedicated Fleets 169
 - Multi-Stop Retail Distribution 169
 - Short Haul Regional Distribution 170
 - Over-the-Road High Utilization 171
- Common Dedicated Contract Structures 172
 - Utilization Scale Pricing 173
 - Over-Under Pricing 175
 - Fixed-Variable Pricing 178
 - Backhaul Revenue Sharing 180
- Dedicated Fleet Contract 182
- Dedicated Fleet Invoice 183
- The Steps in Dedicated Pricing 184
 - Step 1: Define the Operating Characteristics of the Fleet 184
 - Step 2: Estimate Costs for the Operation 188
 - Step 3: Determine the Pricing and Margin for the Fleet 190
 - The Pro-forma Income Statement 191

CHAPTER 9

Dedicated Pricing and Cost Forecasting 193

- Basic Cost Assumptions 193
- Basic Dedicated Fleet Example 195
 - Carrier Decision Variables for Dedicated Pricing 196
 - Revenue and Cost Calculations and Line Items 201
- Basic Dedicated Fleet Pricing Example 204
 - Fixed-Variable Pricing Format 207
 - Over-Under Pricing Format 210
 - Utilization Scale Pricing Format 213
- Revenue Validation and Consistency by Contract Type 215
- Handling On-site Costs and Other Fixed Overhead 216

CHAPTER 10

Establishing the Proper Profit Margin for a Dedicated Fleet 219

- The Risks of Operating Ratio Based Pricing 219
 - The Hidden Weakness of Operating Ratio 221
 - Utilization and Trailer Ratio Scenario Analysis 228
- Investment Analysis Approach to Dedicated Pricing 239
 - Review of Capital Budgeting (NPV and IRR) 239
- Cash Flow / Investment Analysis Pricing Techniques 241
 - The Steps in Investment Analysis Dedicated Fleet Pricing 241
 - Additional Considerations for Investment-Based Pricing 255
- Pricing for Lease Equipment or Owner-Operators 258

CONTENTS

TruckloadTransportation.com

Section 3: Dedicated Fleet Pricing and Design (cont'd)

CHAPTER 11

Special Topics in Dedicated Pricing 263

- Estimating Backhaul Revenues 263
 - Backhaul Revenue by Destination 263
 - Secondary Backhaul Considerations 266
 - Other Backhaul Revenue Share Considerations 267
 - Partially Completed Backhaul Loads 269
 - The Backhaul Funnel 271
- Customizing the Driver Compensation Program 271
 - Fixed Weekly Salary 274
 - Hourly Pay 275
 - Per Mile Pay 277
 - Activity-Based Pay 278
 - Modified Mileage Pay 280
- Matching the Driver Pay Program to Revenues 281
- Measuring the Efficiency of Dedicated Fleets 286
 - Fleet Design and Actual Performance 286
 - Tractor Utilization Charts 288

CHAPTER 12

Semi-Dedicated Pricing and Design 291

- Short Haul Dedicated Fleets 292
- Shuttle / Extreme Short Haul Pricing 294
 - Slip-Seat Fleet 296
 - Example Inbound Automotive Parts Fleet 297
- Mileage Band Pricing Contracts 299
 - Determining the Mileage Band Rates 300
 - Shipper Network Operating Characteristics 302
 - Basic Fleet Size Model Operating Assumptions 303
 - Basic Short Haul Fleet Size Model 304
 - Applying Dedicated Pricing to the Mileage Band Rates 309
 - Sensitivity Analysis – Dedicated Pricing 311
 - Allocation of Dedicated Revenues to Mileage Bands 312
 - Mileage Bands with Secondary Coverage 316
 - Advanced Simulation and Fleet Size Sensitivity Analysis 323

CONTENTS

TruckloadTransportation.com

Section 4: Bid Response and Analysis

CHAPTER 13

Bid Analysis and Response 337

- Request for Proposal (RFP) 337
- RFP and Bid Contents 339
- Sample Bid Analysis 340
 - Before Pricing the Bid 341
 - Summary Analysis of Bid Contents 344
 - Developing a Strategy and Pricing the Bid 348
 - Bid Strategy by Carrier 348
- Bid Optimization Tools and Strategies 351
 - Decision Variables for the Carrier 351
 - Decision Variables for the Shipper 355
- “Packaged” Bid Responses 357
 - Bid Strategy and Packaged Bids 358
 - Packaged Bid Strategy: Additional Considerations 364
- Shipper Network Data in RFPs 365
 - Summary Load Volumes 365
 - Discrete Shipment History 367
 - Shipment Data for Multi-Stop Designs 368

CHAPTER 14

Case Studies in Bid Response Analysis 377

- Case 1: Traditional One-Way Bid 377
 - The Case 377
 - Carrier Analysis 378
 - Carrier Solution Design 380
 - Carrier Pricing and Proposal 385
- Case 2: One-Way Bid with Packaging and Optimization 386
 - The Case 386
 - Carrier Analysis 388
 - Carrier Solution Design 391
 - Carrier Pricing and Proposal 403
- Case 3: Regional Distribution Bid 405
 - The Case 405
 - Carrier Analysis 406
 - Carrier Solution Design 408
 - Carrier Pricing and Proposal 413
- Case 4: Dedicated Fleet with Fixed-Variable Pricing 417
 - The Case 417
 - Carrier Analysis 419
 - Carrier Solution Design 421
 - Carrier Pricing and Proposal 429

CONTENTS

TruckloadTransportation.com

Section 5: Key Concepts for Shippers

CHAPTER 15

Key Concepts for Shippers 431

- Shipper Transportation Cost Measurements 431
 - Cost Per Mile 432
 - Cost Per Unit of Product 435
- Flexible Budgeting and Transportation Cost Analysis 440
- Transportation Cost Allocations 445
 - Cost Allocation Models 445
 - Applying Cost Allocations 448
- Dedicated Fleets and Marginal Cost Analysis 450
- Shipper Cost Strategies for Short Haul Pricing 452
 - Time-of-Day Information 452
 - Seasonal Shipping Patterns 454
 - Mileage Band Destinations 455
- Diseconomies of Scale in One Way Pricing 457
- Volume-based One-Way Pricing 461
- Outsourcing Private Fleets to Dedicated Carriers 462
- Summary 464

! Technical Tips

- Matrix Rate “Look Up” Spreadsheet Design (VLOOKUP) 70
- Linear Programming (Solver) Spreadsheet Feature 138
- Creating Basic Reports with Microsoft Access 166
- Calculations with Date and Time Information 168
- Net Present Value (NPV) and Internal Rate of Return (IRR) Spreadsheet Functions 261
- Monte Carlo Simulation Spreadsheet Design 329
- Sensitivity Analysis and the “Table” Spreadsheet Feature 334
- Using Spreadsheet “Pivot” Tables 371
- Spreadsheet Text Tips and Techniques 375

How To Use This Book

Truckload transportation pricing is a complex topic with many variables and considerations. This book is organized so that a novice can learn the basics of truckload transportation then move into the more advanced concepts involved with one-way pricing, dedicated pricing, and bid response analysis. However, it is highly recommended that even experienced readers start from the beginning of the book. A sound understanding and review of the basic principles of truckload transportation provides the necessary foundation for fully comprehending the more advanced concepts that are presented later in the book.

While the book is written primarily for the benefit of truckload carriers, shippers and related parties will also gain valuable insight into truckload transportation by reading the entire book. While Chapter 15 focuses specifically on shipper issues, it is important that shippers read the entire book to get the maximum benefit from this chapter. The topics covered throughout the book will provide shippers with a much deeper understanding of the truckload carrier's business model, cost structure, and operating strategy. By having a greater understanding of the needs of their carriers, shippers can become better partners and potentially enjoy improved service and lower transportation costs as a result.

Throughout this book, readers will see operating cost information and specific rates and prices. While most costs and rates are historically accurate for the time this book was written, this information is shown for illustration purposes only. Truckload rates and operating costs change over time based on market conditions, fuel prices, driver wage expectations, equipment costs, and many other factors. Unless otherwise indicated, consider all cost and price figures shown in this book as only examples and not specific facts or pricing recommendations.

In some circumstances, there will be real-world exceptions to the general concepts in this book. However, a thorough understanding of the concepts presented in this book will provide the ability to identify and interpret any exceptions to the general rule. While this book cannot possibly address every unique situation a carrier or shipper will face, it does provide a solid foundation of general theory and specific analytical techniques to properly approach almost any pricing and analysis challenge.

Technical Tips

The book includes a number of "Technical Tips" that provide detailed explanations of the application of spreadsheet and database software to several of the analysis examples presented in the book. The tips provide no new information about a particular topic other than the programming details around the solution. Unless the reader has a specific interest in the technical details of a particular topic, these "Technical Tips" can safely be disregarded.

On-line Resources

Certain lengthy technical tips are not covered in complete detail within the book but are available for download online at no cost. Please visit www.TruckloadTransportation.com to access these expanded technical tips. In addition, the full spreadsheet models for many of the analysis and pricing techniques presented in this book are available for purchase at the website, including the full dedicated fleet pricing model.