

LIST OF CONTENTS

| Title | Page No. |
|--|-----------|
| List of Figures | i |
| List of Tables | iv |
| List of Plates | xi |
| List of Photographs | xii |
| List of Symbols | xiii |
| List of Abbreviations | xxiv |
| Preface | xxv |
| CHAPTER 1 INTRODUCTION | 01 |
| 1.1 General | 01 |
| 1.2 Traffic condition | 01 |
| 1.3 Traffic Jam | 03 |
| 1.4 Noise Parameters | 04 |
| 1.4.1 Percentile Noise Level | 04 |
| 1.4.2 Equivalent Noise Level | 05 |
| 1.4.3 Noise Level Indices | 05 |
| 1.4.3.1 Traffic Noise Index (<i>TNI</i>) | 05 |
| 1.4.3.2 Noise Pollution Level (<i>NPL</i>) | 06 |
| 1.5 Objectives | 06 |
| 1.6 Scope and Limitations | 07 |
| 1.7 Organisation of the Thesis | 08 |
| CHAPTER 2 LITERATURE REVIEW | 09 |
| 2.1 General | 09 |

| | | |
|------------------|---|-----|
| 2.2 | Statutory Regulations | 11 |
| 2.3 | Mixed Traffic on Indian Roads | 12 |
| 2.4 | Congestion Characteristics of Interrupted Flow for Urban Roads | 13 |
| 2.4.1 | Interrupted traffic flow | 14 |
| 2.4.2 | Level of Service (LOS) based on congestion | 15 |
| 2.4.3 | Quantification of congestion | 16 |
| 2.5 | Effect of Traffic Composition on Road Noise | 17 |
| 2.6 | Traffic Noise Prediction Models | 19 |
| 2.6.1 | Early models | 23 |
| 2.6.2 | Models in recent use | 26 |
| 2.6.3 | Brief summary of models | 52 |
| 2.7 | Traffic Noise Model for Interrupted and Complex Flow | 54 |
| 2.8 | Urban Noise Assessment and Modeling | 66 |
| 2.9 | Noise Studies of City Enviroscape at Different Floor Levels | 69 |
| 2.10 | Research Gap | 75 |
| CHAPTER 3 | STUDY AREA | 77 |
| 3.1 | General | 77 |
| 3.2 | Study Location | 78 |
| 3.2 | Site Details of Study Location | 101 |
| CHAPTER 4 | METHODOLOGY | 108 |
| 4.1 | Arrangements at Data Collection Sites | 108 |
| 4.2 | Sound Level Meter | 110 |

| | | |
|------------------|---|-----|
| 4.3 | Methodology for Data Collection | 110 |
| 4.3.1 | Identification of Traffic Jam Sites and Its Timings | 111 |
| 4.3.2 | Finalization of Field Data Collection Programme & Duration | 112 |
| 4.3.3 | Training of Data Collection Party | 112 |
| 4.3.4 | Sound Level | 113 |
| 4.3.5 | Traffic Volume | 115 |
| 4.3.6 | Traffic Speed | 115 |
| 4.3.7 | Format for Data Collection | 115 |
| 4.3.8 | Format for Data Listing | 117 |
| CHAPTER 5 | FIELD DATA AND ANALYSIS | 120 |
| 5.1 | Data on Building Story and Location of Observer from Source | 120 |
| 5.2 | Data on Traffic Jam, Traffic Noise, Traffic Volume, Projected Area of Vehicles and %Area-Occupancy | 123 |
| 5.2.1 | PCU & PCNE Factors | 123 |
| 5.2.2 | Traffic Volume, Roadway Capacity and Level of Service | 128 |
| 5.2.3 | Traffic Density, Occupancy and Concentration | 129 |
| 5.2.4 | %Area-Occupancy Concept for Heterogeneous Traffic | 132 |
| 5.2.5 | Vehicular Area | 136 |
| 5.2.6 | Field Data on Traffic Jam, Traffic Noise, Traffic Volume, Projected Area of Vehicles and %Area- Occupancy | 136 |

| | | |
|------------------|--|-----|
| 5.2.7 | Discussion of Results | 138 |
| 5.2.7.1 | General | 138 |
| 5.2.7.2 | Equivalent noise level (L_{eq}) | 230 |
| 5.2.7.3 | TNI and NPL | 239 |
| 5.2.7.4 | Summary | 239 |
| CHAPTER 6 | MATHEMATICAL MODELING | 240 |
| 6.1 | Parameters and General Equation | 240 |
| 6.2 | Model Types | 241 |
| 6.3 | Analysis Tool | 242 |
| 6.4 | Procedure Adopted | 242 |
| 6.5 | Floor-Wise Leg Model | 244 |
| 6.6 | Floor-Wise Intersection Model | 248 |
| 6.7 | Floor-Wise City Model | 251 |
| 6.8 | Consolidated City Model | 253 |
| CHAPTER 7 | CONCLUSIONS, RECOMMENDATIONS AND SCOPE FOR FURTHER WORK | 303 |
| 7.1 | Conclusions | 303 |
| 7.2 | Recommendations | 308 |
| 7.3 | Scope for Further Work | 309 |
| | References | 310 |
| | List of Publications | 325 |