

HOV Pooled Fund Study

HOV Lane Performance Monitoring, Evaluation, and Reporting Handbook



Presentation

- HOV Pooled Fund Study
- Handbook Objectives/Audiences
- Overview of Handbook Chapters
- HOV Performance Monitoring, Evaluation and Reporting
- Other Pooled Fund Study Projects



HOV Pooled Fund Study

Objectives

- Identify Issues Common Among Agencies
- Suggest Projects and Initiatives
- Select and Initiate Projects
- Disseminate Reports
- Assist in Solution Deployment
- Track Innovations and Practices



HOV Pooled Fund Study

Participating State Transportation Agencies

√ California

√ Georgia

√ Maryland

√ Massachusetts

√ Minnesota

√ New Jersey

√ New York

√ Tennessee

√ Virginia

√ Washington

Federal Highway Administration (FHWA)



Handbook Developer

Texas Transportation Institute

The Texas A&M University System

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Project Objectives

- Advance the State-of-the Practice in Monitoring, Evaluating, and Reporting on the Performance of HOV Facilities
- Communicate Benefits of Performance Monitoring and HOV Facilities



Project Deliverables

- HOV Performance Monitoring, Evaluation, and Reporting Handbook
- Outreach Material – Project Fact Sheets, Brochure, Primer, Frequently Asked Questions, PowerPoint Presentations



Audiences

- Handbook – Transportation Professionals Responsible for HOV Facilities
- Outreach Material – Agency Management Personnel and Policy Makers

HOVpfs

High Occupancy Vehicle Pooled Fund Study

HOV Performance Monitoring,
Evaluation, and Reporting
Handbook



Handbook Chapters

- Chapter One – Introduction
- Chapter Two – Executive Summary
- Chapter Three – Developing HOV Performance Monitoring Programs
- Chapter Four – HOV System Objectives, Measures of Effectiveness, and Data Requirements



Handbook Chapters

- Chapter Five – HOV Data Collection
- Chapter Six – Data Reduction and Analysis Techniques
- Chapter Seven – Conducting Ongoing HOV Performance Monitoring Programs
- Chapter Eight – HOV Performance Reporting
- Chapter Nine – Case Studies



Handbook Appendices

- Appendix A – References and Additional Resources
- Appendix B – Glossary of Terms
- Appendix C – List of Abbreviations
- Appendix D – Agency Contacts



Handbook Features



Highlights Chapter at-a-Glance



Highlights Good Ideas



Handbook Features



Highlights Keys to Successful Practices

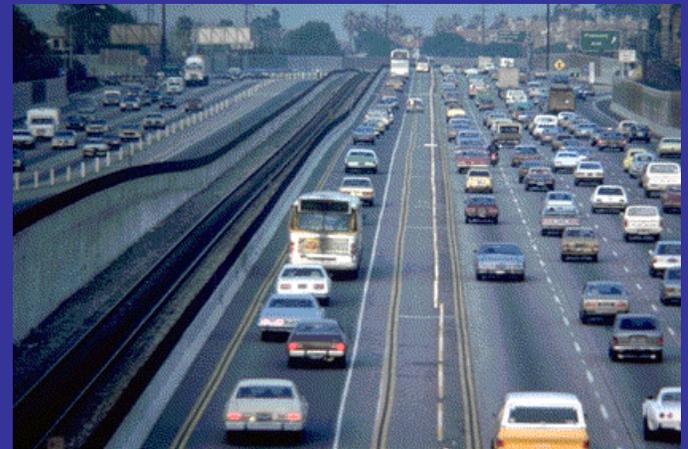


Highlights Case Study Examples



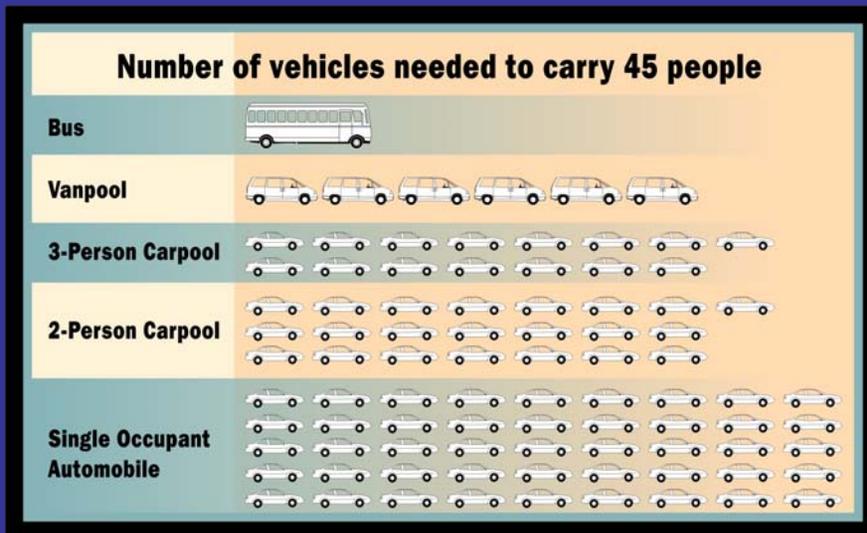
Chapter One – Introduction

- Welcome
- Handbook Features
- Chapters-at-a-Glance



Chapter Two – Executive Summary

- Defining HOV Facilities
- Key Points of Each Chapter



Chapter Three – Developing HOV Performance Monitoring Programs

- Federal Interest in HOV Performance Monitoring
- Uses and Benefits of HOV Performance Monitoring
- Transportation Plans and HOV Systems
- Agencies Involved
- HOV Performance Monitoring Process



Federal Interest in HOV Performance Monitoring

- Maintain Federal Investments
- Promote Efficient Use of HOV Lanes
- Source of Funds
- SAFETEA-LU Provisions
- FHWA HOV Program Guidance



HOV Performance Monitoring Benefits and Uses

- Operating Decisions
- Determine if Goals/Objectives Met
- Communicate with Public/Policy Makers
- Planning for Future Projects
- Meet Requirements



Transportation Plans and HOV Systems

State Department
of
Transportation

Metropolitan
Planning
Organization

Public
Transportation
Transit Agency

HOV Performance Monitoring
Goals and Objectives



Agencies Involved

- State Agencies – Department of Transportation, Environmental Agency
- Public Transportation Agency
- Metropolitan Planning Organization (MPO)
- Cities and Counties
- State and Local Law Enforcement
- Federal Agencies – FHWA, FTA, EPA



Performance Monitoring Process



Chapter Four – HOV System Objectives, Measures of Effectiveness, and Data Requirements

- HOV Objectives and Measures of Effectiveness (MOEs)
- HOV Performance Data Requirements



Example of Objective and MOEs

Objective – The HOV lane should improve the capacity or person throughput of a congested corridor.

MOE – Increase in carpools, vanpools, and bus riders.

MOE – Increase in average vehicle occupancy (AVO).



Data Requirements

- Vehicle Volumes/Vehicle Classifications
- Vehicle Occupancy
- Travel Times and Speeds
- Crashes
- Violations
- User/Non-User Characteristics and Perceptions



Chapter Five – HOV Data Collection

- HOV Facility Inventory
- Vehicle and Vehicle-Occupancy Counts
- Travel Time and Travel Speed
- Bus Routes and Ridership
- Park-and-Ride and Park-and-Pool Lot Use
- Violation Data
- User and Non-User Surveys
- Crash Data
- Emissions and Air Quality
- Cost-Benefit Data



HOV Facility Inventory

- List and Map of All HOV Lanes
- Type
- Length
- Operating Characteristics
- Access



Vehicle Volumes and Classification

- Field Surveys
- Advanced Transportation Management Systems (ATMS)



Vehicle-Occupancy Counts

- Field Observation



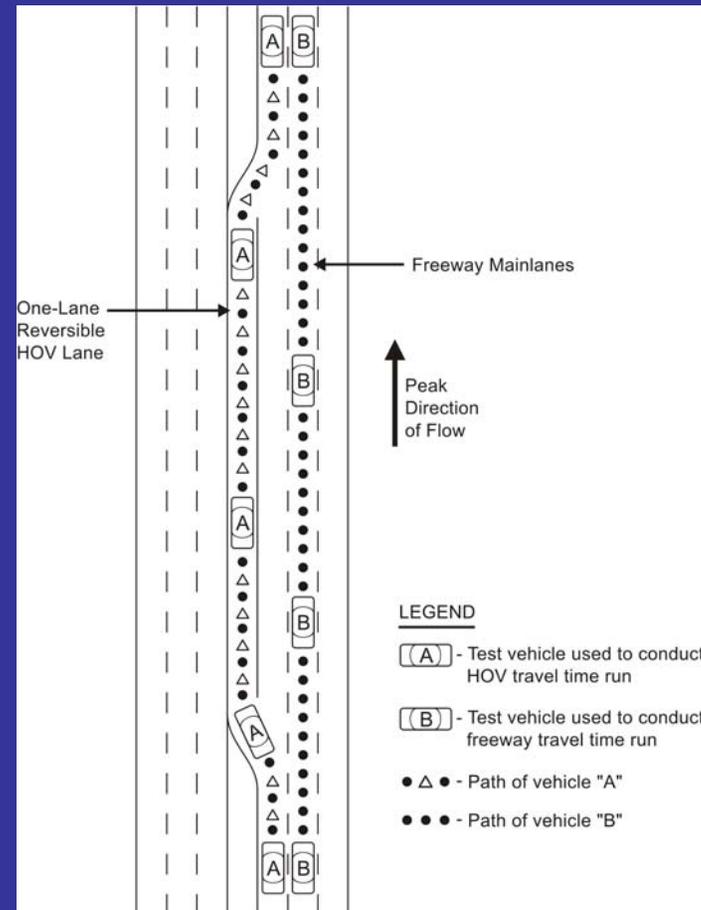
Exempt Vehicle Counts

- HOT Vehicles
- Low-Emission/Energy-Efficient Vehicles
- Buses



Travel Time and Speed

- Test Vehicle
- ATMS



Bus Routes and Ridership

- Transit Agency
- Bus Operators
- Vehicle Counts



Park-and-Ride/Park-and-Pool Lots

- Count Parked Vehicles
During Mid-Day



Violation Data

- Vehicle-Occupancy Counts
- Citations Issued
- Peer Enforcement
- Toll Collectors



Information and Perceptions of Users and Non-Users

- Surveys of Carpoolers, Vanpoolers, Bus Riders, and Motorists
- Surveys of General Public
- Focus Groups
- Interviews with Stakeholders
- Internet Surveys



Other Data

- Crashes
- Emissions and Air Quality
- Cost-Benefit Data



Chapter Six – HOV Data Reduction and Analysis Techniques

- Data Reduction, Storage, and Management
- Analysis Techniques



Data Reduction, Storage and Management

- Establish Lead Agency
- Develop Process
- Quality Control
- Procedures to Access/Use



Quality Control

- Check Downloaded/Re-entered Data
- Check for Suspect/Invalid Data
- Check Field Crew Comments/Data Logs
- Check Problems at Data Collection Sites



Data Analysis Techniques

- Vehicle Volumes
- Vehicles Per Lane Per Hour (vplph)
- Person Volumes/Person Throughput
- Persons Per Hour Per Lane (pphpl)
- AVO



Data Analysis Techniques

- Travel Times/Travel Time Savings
- Travel Time Index
- Buffer Index



Travel Time Index

- Compares travel time in the peak period with the freeflow period.

$$\text{Travel Time Index} = \frac{\text{Average Peak Period Travel Time}}{\text{Average Off - Peak Travel Time}}$$



Buffer Index

- Measure of Trip Reliability
- Amount of extra time or buffer needed to be on-time for 95 percent of trips during certain times.

$$\text{Buffer Index} = \frac{\text{95th Percentile Travel Time} - \text{Average Travel Time}}{\text{Average Travel Time}}$$



Data Analysis Techniques

- Bus Riders
- Park-and-Ride
- Park-and-Pool Lots



Data Analysis Techniques

- Occupancy-Violation Rate
- Number of Citations
- Operating Regulation Violations
- Peer Enforcement
- Toll Violations



Data Analysis Techniques

- Crash Data
- Emissions/Air Quality
- Cost-Benefit Ratio



Chapter Seven – Conducting Ongoing HOV Performance Programs

- Developing a Data Collection Program
- Frequency of Data Collection
- Potential Funding Sources
- Staffing and Resources



HOV Data Collection Program

- Identify Data Needs
- Establish/Maintain Procedures
- Identify Agency Roles and Responsibilities
- Identify Funding



Frequency of Data Collection

- Collect and Analyze Before Data
- Initial Operating Phase
- Early Years
- Ongoing Program



Potential Funding Sources

- Federal Programs – Metropolitan Planning, Statewide Planning, Transit Programs
- State Funding
- Local Funding



Staffing and Resources

- Type/Number of HOV Lanes
- Data Collection and Analysis Methods
- Equipment
- Training
- Frequency



Chapter Eight – HOV Performance Reporting

- Stakeholder Information Needs and Reporting Methods
- HOV Performance Reporting Methods



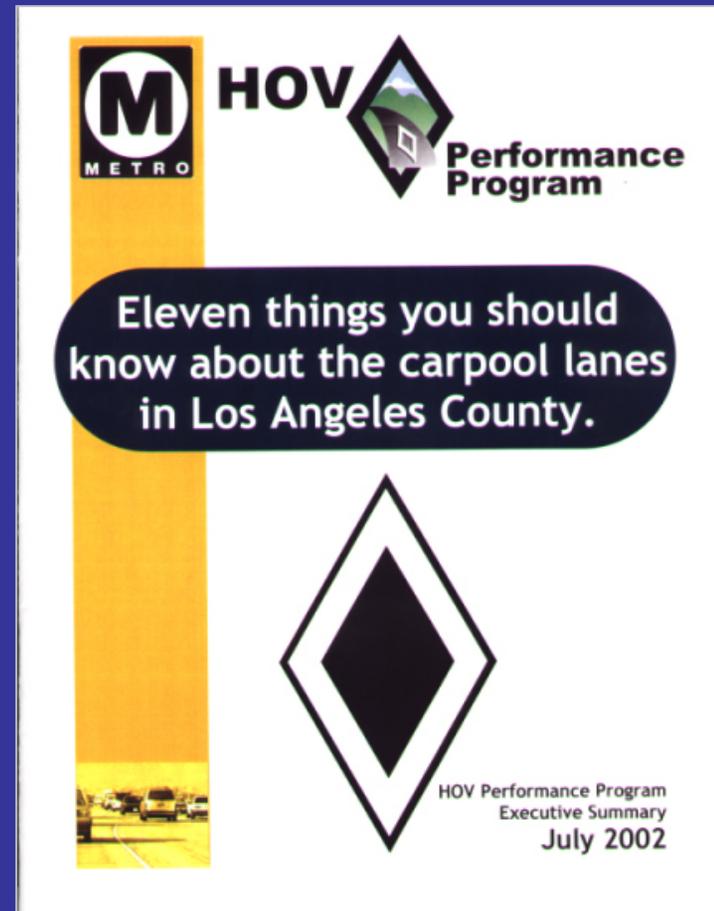
Stakeholder Groups

- Agency Staff
- Agency Management Personnel
- Policy Makers
- Federal Agency Staff/Other Agencies
- Media
- Public and Interest Groups



Reporting Methods

- Online Data
- Technical Reports
- Fact Sheets
- Brochures
- PowerPoint
- Internet
- Video/DVD



Stakeholder Groups and Reporting Methods

- Focus on Key Performance Measures
- Match Method/Content to Group
- Maintain Consistency
- Use Graphics



Stakeholder Groups and Reporting Methods

Stakeholder Groups

Reporting Methods	Local Technical Staff	National Technical Staff/ Researchers	Agency Management Personnel	Elected/ Appointed Officials	Media	Public/ Interest Groups
On-Line Data	●	●				
Technical Reports/ Summaries	●	●				
Fact Sheets	●	●	●	●	●	●
Brochures			●	●	●	●
PowerPoint		●	●	●	●	●
Internet	●	●	●	●	●	●
Video/DVD			●	●	●	●

● – Primary Audiences



Chapter Nine – Case Studies

- Puget Sound Region
- Los Angeles
- Northern Virginia
- Houston
- Minneapolis
- San Diego



Puget Sound HOV Facilities

- Ongoing Monitoring Program
- WSDOT and TRAC
- Evolution of Techniques
- Internet Use



Los Angeles HOV Lanes

- Evaluation of El Monte Busway
- Periodic Monitoring
- Performance Monitoring Program



I-395/Shirley Highway HOV Lane

- Evaluation of Initial Demonstration Project
- Periodic Assessments
- Ongoing Monitoring by WASCOG
- Monitoring Virginia Special Clean Fuel License Plates



Houston HOV Lanes

- Evaluation of I-45 North Contraflow Demonstration
- Ongoing Monitoring Program – TxDOT, METRO, TTI
- Evolution of Techniques
- HOT Project Monitoring



Minneapolis I-394 HOV Lane

- Before/After Evaluation
- Ongoing Quarterly Monitoring
- Downtown Parking Garages
- HOT Project Monitoring



San Diego I-15 HOV Lanes

- HOV Monitoring
- HOT Project Monitoring



Other HOV Pooled Fund Study Projects

- HOV Eligibility Requirements and Operating Hours Handbook
- HOV Lane Safety Considerations Handbook
- HOV Lane Enforcement Handbook
- HOV Inventory



HOV Pooled Fund Study

Project Website

<http://hovpfs.ops.fhwa.dot.gov/index.cfm>

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