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16. Abstract A managed lane facility is one that increases freeway efficiency by packaging various operational and design actions. Operating agencies may adjust lane management operations at any time to better match regional goals. However, as a new concept in operating freeways, managed lanes has a limited experience base, creating a knowledge vacuum in emerging key areas that are critical for effective implementation. The potential complexities associated with user groups and operational options will require agencies to have an appropriate number of qualified staff to ensure adequate oversight of operations and to ensure satisfactory customer service to the users. Thus, the task documented in this report identifies those staffing needs related to operational options and training that might be required to ensure those staff are fully prepared to perform their duties to the satisfaction of both the agency and the customer. Other issues addressed are the roles of job positions within the framework of managed lanes, the competencies required of those positions, and accessibility to appropriate training, education, and technical assistance to ensure these needs are met.					
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STAFFING AND TRAINING NEEDS FOR MANAGED LANES FACILITIES

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DISCLAIMER

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. This project was conducted in cooperation with the Texas Department of Transportation (TxDOT) and the U.S. Department of Transportation, Federal Highway Administration (FHWA). The contents do not necessarily reflect the official view or policies of the Federal Highway Administration or the Texas Department of Transportation. The report does not constitute a standard, specification, or regulation. The engineer in charge of the project was Beverly T. Kuhn (Texas P.E. #80308).

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CHAPTER 1: INTRODUCTION

The increasing population in Texas has placed enormous demands on the transportation infrastructure, particularly the freeway systems. There is a growing realization that the construction of sufficient freeway lane capacity to provide free-flow conditions during peak travel periods cannot be accomplished in developed urban corridors due to cost, land consumption, neighborhood impacts, environmental concerns, and other factors. To meet this growing demand, the Texas Department of Transportation (TxDOT) has begun looking at operational strategies offered by managed lane facilities.

A managed lane facility is one that increases freeway efficiency by packaging various operational and design actions. Operating agencies may adjust lane management operations at any time to better match regional goals. Managed lanes are intended to provide peak period free-flow travel to certain user groups.

However, as a new concept in operating freeways, managed lanes has a limited experience base, creating a knowledge vacuum in emerging key areas that are critical for effective implementation. Complicating the effort is the rapid progress of several freeway improvement projects in Texas in which managed lane operations are proposed. The operational experience both in Texas and nationally for managed lanes is minimal, particularly for extensive freeway reconstruction projects.

Managed lane facilities present many new challenges to the agency or agencies responsible for their operation. The potential complexities associated with user groups and operational options will require agencies to have an appropriate number of qualified staff members to ensure adequate oversight of operations and to ensure satisfactory customer service to the users. Thus, the task documented in this report was to identify those staffing needs related to operational options and specific training that might be required to ensure those staff members are fully prepared to perform their duties to the satisfaction of both the agency and the customer. Other issues addressed in this report are the roles of job positions within the framework of managed lanes, the competencies required of those positions, and accessibility to appropriate training, education, and technical assistance to ensure these needs are met.

CHAPTER 2: BACKGROUND

Successful implementation of an operational strategy should result in decreased congestion, increased average travel speeds, increased safety, and reduced travel time (1, 2). Appropriate staffing and training of staff is of great concern when considering the success of managed lane strategies. This section identifies the different operational strategies for managed lanes of facilities and other relevant issues to this topic to assist in understanding the staffing and training issues that may occur for each.

A review of literature concerning operational strategies for managed lanes revealed that agencies are conducting numerous studies and testing various strategies in an attempt to improve freeway efficiency. Different terms and acronyms are being used interchangeably to describe a particular action or variation of a design without strict adherence to definitions. For example, what may be described by one jurisdiction or study as a high-occupancy toll (HOT) lane is described by another jurisdiction as a value express lane. Meanwhile, a third entity uses the term value express lane for a totally different strategy. An effort has been made to distinguish the various strategies. However, in some instances definitions by authors of reports reviewed may seem to conflict traditional definitions of a particular strategy.

Managed lane operational strategies include high-occupancy vehicle (HOV) lanes, value-priced lanes or HOT lanes, exclusive-use lanes such as bus or truck lanes, separation and bypass lanes, dual-use lanes, and lane restrictions. HOV lanes are by far the best documented of the managed lane strategies. Managed lanes support increased efficiency of traffic on existing roadways and generally meet the following transportation systems management goals outlined in the *Guide for the Design of High Occupancy Vehicle Facilities* (3), which were originally developed for HOV lanes:

- improve operating level of service for high-occupancy vehicles, both public and private, thereby maximizing person-moving capacity of roadway facilities;
- provide fuel conservation;
- improve air quality by reducing pollution caused by delay and congestion; and
- increase overall accessibility while reducing vehicular congestion (3).

HIGH-OCCUPANCY VEHICLE LANES

HOV lanes, first implemented in the Washington, D.C., and northern Virginia area in 1969, are designed to increase the person-moving capacity of the existing infrastructure (4). HOV lanes, simply put, are separate lanes that are restricted to vehicles with a specified occupancy and may include carpools, vanpools, and buses (5). Most HOV facilities require that vehicles have two or more (2+) occupants to legally use the facility; however, some facilities require three or more (3+) occupants during peak travel times (6). Implementation of HOV lanes is possible on either arterials or freeways. When implemented on freeways, the following three types of facilities are used—separated

roadway, concurrent flow lanes, and contraflow lanes (3). Additionally, the separated roadway facility may be either a two-way or reversible-flow facility.

The number of operating HOV lanes being proposed and implemented throughout North America is steadily increasing. This indicates that HOV lanes are a widely accepted strategy for addressing traffic mobility in metropolitan areas. However, HOV facilities are not appropriate for all situations, and agencies need to evaluate and monitor each facility to ensure that it is meeting the goals and expectations of the community (7). Expectations and objectives for a successful HOV lane include moving people, benefiting transit, and improving overall roadway efficiency. Constraints that may affect the successful implementation of strategies involving HOV lanes include adverse impact on general-purpose lanes, cost-effectiveness, public acceptance, and the environmental impact of implementation (5).

Issues to be considered for HOV facilities include the type of vehicles allowed to use the facility, the vehicle-occupancy requirement, transit services provided, hours of operation, enforcement techniques, incident management, and ingress and egress points. Operational management strategies should also consider the operational impact of converting a mainlane to an HOV lane as well as consider the possibility of using priority-pricing strategies, truck use, intelligent transportation systems (ITS), conversion to a fixed-guideway transit system, and slow vehicles (4, 7). One important point is that incident detection and response are key to minimizing delays, and thereby the ultimate success of the operational strategy. In the *Guide for the Design of High Occupancy Vehicle Facilities*, the American Association of State Highway and Transportation Officials (AASHTO) cites operational planning, coordination, and cooperation among agencies as an important part of the operations management for HOV lanes (3). To address all of the key issues stated above within the facilities operations, there is a great need for the managed lanes staff to understand the goals of the managed lanes facility and to have the training required to effectively manage and operate the facility.

VALUE-PRICED LANES AND HIGH-OCCUPANCY TOLL LANES

The concept of the use of priority pricing was first suggested in 1959 as an operational strategy to solve urban congestion problems (8). A HOT lane is an HOV lane that allows vehicles with lower occupancy to have access to the lane by paying a toll. The idea behind HOT lanes is to improve HOV lane utilization and sell unused lane capacity (5). Variations of HOT lanes are value-priced, value express, and fast and intertwined regular (FAIR) lanes, which may or may not be occupancy driven depending on the region or state. In most cases, value lanes and FAIR lanes are toll lanes. However, some jurisdictions use these terms to describe strategies similar to a HOT lane.

In a study for the Colorado Department of Transportation (CDOT), Urban & Transportation Consulting et al. found that for a HOT lane to be successful, the following conditions should be present:

- HOT lanes should be incorporated with HOV lanes that are currently in existence or to be constructed.
- There must be recurring congestion where the HOT lanes could help drivers avoid congestion by paying a toll.
- HOT lanes cannot take away an existing mainlane in order to be created.
- HOT lanes are not self-supporting (9).

The issues faced in implementing a HOT lane facility are very similar to those specified above for HOV lanes. The key to success for HOT lanes is to manage the number of vehicles to maximize the use of the HOV lane without exceeding capacity and creating congestion. One way to manage a HOT lane is through the use of dynamic toll pricing. In dynamic toll pricing, the toll is variable, changing as often as every 5 minutes, with the price of the toll increasing with the level of congestion. As the toll increases, the numbers of motorists willing to pay the toll decreases, thereby managing lane use (10). Concerns regarding HOT lanes include legality, equity, societal issues, and public acceptance (11, 12). Also, operational issues agencies must consider for HOT lanes include pricing strategies, toll collection, enforcement, and the type of access provided (13). Again, many of these issues are addressed through hiring and training appropriate staff; in this case, customer service representatives become a key component of the system.

EXCLUSIVE LANES

The operational strategy of exclusive lanes provides certain vehicles, usually designated by vehicle type, an exclusive operational lane. The most common types of vehicles designated for this strategy are buses and large trucks. Exclusive lanes are given to buses to provide an incentive for riders by decreasing delay, whereas separating trucks is an attempt to decrease the effects of trucks on safety and reduce conflicts by the physical separation of truck traffic from passenger car traffic.

It should be noted that until recently, very few truly exclusive facilities existed and many of those facilities actually restricted trucks and/or buses to specified lanes and allowed other vehicles to use any lane (14). In recent years, various metropolitan areas have implemented a number of truly exclusive busways. These facilities are bus-only roadways that are separated from the rest of the traffic. In this type of case, the busway acts like a “surface subway,” allowing the buses to receive traffic signal preference, thus bypassing stoplights, or to cross over intersections on overpasses (1). Advantages of busways include flexibility, self-enforcement, incremental development, low construction costs, and implementation speed (15). Operational issues and considerations for the successful implementation of a busway include:

- integrating the system into existing transit plans in such a way that the busway provides a level of service comparable to private vehicles;
- providing passengers improvements in comfort, economy, travel time, and quality of service;
- providing express service for transit riders;

- designing the busway to define and control conflicts between the busway and adjacent road traffic; and
- providing riders with busway facilities that are comfortable, convenient, and safe (15).

To date, no exclusive truck facility has been implemented. Theoretically, truck facilities could have positive impacts on noise and air pollution, fuel consumption, and other environmental issues. Creating and maintaining an uninterrupted flow condition for diesel-powered trucks will result in a reduction of emissions and fuel consumption when compared to congested, stop-and-go conditions. However, the creation of a truck facility may also shift truck traffic from more congested parallel roadways, thereby shifting the environmental impacts. There may also be increases in non-truck traffic on automobile lanes due to latent demand (1).

SEPARATION AND BYPASS LANES

A separation or bypass lane is a treatment for a specific section or segment of roadway. Several areas have successfully used this management strategy, which often addresses a roadway segment that has the following characteristics: a weaving area, a significant grade, a high percentage of truck traffic, and/or congestion. Weaving areas are segments of freeway formed when a diverge area closely follows a merge area. Operationally, weaving areas are of concern because the “crossing” of vehicles creates turbulence in the traffic streams. Trucks limit the visibility and maneuverability of smaller vehicles attempting to enter and exit the freeway system. An indication of the barrier effect is an over-involvement of trucks in weaving area crashes, rear-end collisions, and side collisions. Some studies have shown that this problem may be magnified when a differential speed limit is present (16, 17).

Several truck bypass facilities exist including a section of northbound Interstate 5 near Portland, Oregon, at the Tigard Street interchange and several sections of interstate in the Los Angeles, California, area. These different truck bypass facilities have similar operational strategies. The bypass lane near Portland requires trucks to stay in the right lane, exit onto a truck roadway, and reenter traffic downstream of the interchange. Management of this facility also allows passenger cars to use the bypass. One reason this facility is needed is a significant grade on the mainlanes of Interstate 5. Absence of the truck bypass would force larger vehicles to climb a grade and then weave across faster moving traffic that is entering the mainlanes from the right. The resulting speed differentials caused by trucks performing these maneuvers created operational as well as safety problems prior to the implementation of the bypass facility (18).

DUAL FACILITIES

Dual facilities are managed lane strategies that have physically separated inner and outer roadways in each direction. The inner roadway is reserved for light vehicles or cars only, while the outer roadway is open to all vehicles. Implementation of these facilities, referred to as dual-dual segments, relieve congestion (16).

LANE RESTRICTIONS

Lane restrictions are a management strategy that limits certain types of vehicles to specified lanes. The most common type of lane restriction addresses truck traffic. A large presence of trucks, both in rural and urban areas, can degrade the speed, comfort, and convenience experienced by passenger car drivers. Some states, to minimize these safety and operational effects, have implemented truck lane restrictions or have designated exclusive truck lane facilities. In 1986, the Federal Highway Administration (FHWA) asked its division offices to conduct a survey and report on experiences encountered by states with lane restrictions. This survey indicated a total of 26 states used lane restrictions. The most common reasons for implementing lane restrictions were:

- improvement of highway operations (14 states),
- reduction of accidents (8 states),
- pavement structural considerations (7 states), and
- restrictions in construction zones (7 states).

It should be noted that some states provided more than one reason for the restriction (19).

SOCIAL AND PUBLIC OPINION ISSUES

Societal and public opinion regarding the implementation of a managed lane strategy may be the single most important non-operational factor. Unfavorable public opinion can result in either the curtailment or cancellation of projects or provide a preconceived notion of the effectiveness of a strategy that may affect future projects. A marketing strategy and public education campaign are therefore paramount to successful implementation of any managed lane strategy. In order for such campaigns to effectively communicate the value of the facility to the public, the staff hired to address these issues must have appropriate levels of knowledge regarding the managed lane operational strategy and intended benefits, or training to that end.

HOV and HOT Lanes

Public involvement and a successful marketing program are critical to HOV projects and their success. In addition to helping the community and public understand the purpose of the project, a successful public education campaign increases utilization of the facility (4). Under the sponsorship of the FHWA, a comprehensive *High Occupancy Vehicle (HOV) Lane Marketing Manual* (20) was developed in 1994. The authors of this manual provide a comprehensive discussion and case studies of both successful and unsuccessful marketing attempts involving HOV lanes. Public involvement and a successful marketing strategy during the planning and implementation of an HOV facility will:

- heighten awareness of issues;
- obtain input on HOV alternatives during the implementation and design process;

- heighten public awareness of the selected HOV alternative;
- build constituencies, partnerships, and support for the selected alternative;
- increase public confidence in the HOV facility;
- develop accurate expectations for use of the HOV facility;
- promote and educate all groups on the use of the HOV facility;
- create awareness of support facilities and services;
- enhance support of future HOV initiatives; and
- meet federal, state, and local requirements (4).

Poorly thought out strategies combined with insufficient public education can lead to implementation problems. The Santa Monica Expressway demonstration project was the first switch of a preexisting mainlane to an HOV or preferential lane. In this project, it quickly became apparent that conventional marketing and public education strategies were insufficient. The reduction of an already busy expressway by one lane provoked an emotional and hostile reaction, which resulted in an eventual court order to halt the project. Although the California Department of Transportation (CALTRANS) was aware of the potential problems of reducing the capacity one of the busiest freeways in the United States, they implemented a conventional public education and marketing strategy. A different marketing strategy, in all likelihood, would not have prevented the negative opinions; however, it may have allowed the demonstration project to run its course (20).

The Hampton Roads/Route 44 HOV lane project in Virginia fell victim to delays within a broader system. Additionally, the time allotted to plan and execute a marketing campaign was minimal. The 5-mile stretch of newly built HOV facility lacked support facilities such as park and rideshare lots and fell prey to underutilization. Public awareness of this underutilized, highly visible facility created outrage and frustration. During the 4.5-year temporary rescission of the HOV strategy, the managing agency carefully planned and executed a marketing and public awareness campaign. Measures implemented that led to the eventual successful implementation of the facility included:

- formation of an HOV steering committee, which included local and regional public officials and representatives;
- development of a long-range marketing plan;
- design of several rideshare support facilities, such as computer ride matching, employer outreach programs, additional park and ride lots, promotion of rideshare lots, express bus service, and a program utilizing subsidized transit fares for participating employees; and
- redefinition of initial occupancy requirements from HOV-3 to HOV-2+ (20).

In some instances, public relations campaigns and marketing strategies do not work. One of the main issues that led to the removal of the HOV facility on Interstate 287 in New Jersey was poor public opinion due to underutilization. The New Jersey Department of Transportation completed construction on 20.2 miles of concurrent HOV lanes on Interstate 287 in January 1998. The lanes were open to two or more occupants during rush hours and to all vehicles during non-rush periods. Consumers underutilized the HOV lanes due to a variety of factors, and public opinion of the lanes plummeted

(21). Despite an aggressive public relations campaign and marketing strategy, the task of increasing carpooling on Interstate 287 HOV lanes failed. In addition to the resistance to carpooling, an aggressive public relations campaign against the HOV lanes was waged (22). On November 30, 1998, less than 1 year after completion, Governor Christie Todd Whitman opened the HOV lanes to all traffic. The governor noted that the HOV lanes failed to meet their original goals and added to congestion, poor air quality, and safety problems (23).

HOT lanes also pose some potential public relations challenges, even though they improve utilization of existing HOV lanes. The Maryland DOT Value Pricing Study found that public acceptance depends on the type of pricing implemented and the quality of the alternatives available. When drivers have an on-the-road choice of travel options and routes and new innovative alternatives expand the public's choice, public opinion of HOT or value-priced lanes increases (12).

In 1999 and 2000, Urban & Transportation Consulting conducted a series of commuter focus groups to explore public acceptance of the implementation of value express lanes (HOT lanes) in the Denver metropolitan area. The focus groups consisted of commuters who utilize US 36, Interstate 25, and E-470 (24, 25, 26). These in-depth group sessions produced the following findings:

- Most participants accept the concept of value pricing as a means of better utilizing existing HOV facilities.
- Fewer participants accept the concept of applying value pricing to a new or proposed HOV facility.
- Many participants recognize value pricing as a temporary strategy that “will go away” as congestion increases.
- The most effective marketing strategy or method of selling the concept of value pricing is through real examples.
- The least effective marketing strategy or method of selling the concept of value pricing is through theory on managing demand.
- Most participants could imagine a reason for utilizing a value-priced lane if it was available.
- There were a number of “hot” or sensitive issues regarding value pricing including double taxation, limited capacity, and the short-term value of the lanes.
- The potential use of the funds varied among the participants.
- Although opinions were mixed regarding whether operation of the value-priced lanes should be operated by a public or private organization, just over two-thirds preferred public management (25, 26).

In May 2001, the final reports of the *Colorado Value Express Lane Feasibility Study* were published (27, 28). The researchers found that value express lanes were technically feasible and publicly acceptable for the Interstate 25 and US 36 HOV facilities in the Denver metropolitan area. However, the study conclusions urged the

implementation of a plan for public education on value pricing and its concepts to forestall any misconceptions about the strategy (27, 28).

Stockton et al. reported in *Feasibility of Priority Lane Pricing on the Katy HOV Lane: Feasibility Assessment* (29) that the critical steps to achieving public acceptance to HOT lanes were:

- understanding historic public feedback nationally,
- understanding local opinion,
- developing a public education/information campaign, and
- developing support among public officials.

Exclusive Lanes and Lane Restrictions

The most significant obstacle to exclusive truck facilities may be public opinion. In the reserved capacity feasibility study by Trowbridge et al., an attitudinal study of motorists and the general public examined opinions regarding the use of HOV lanes by trucks. The response by the general public indicated considerable resistance to any strategy perceived to be a special benefit to truck traffic. However, it should be noted that the general public was favorable to truck lane restrictions. Individual comments included responses (19 percent) that trucks were unable to maintain constant speed or traveled at different speeds. Some individuals (13 percent) viewed trucks as dangerous or unsafe (30).

The Organization for Economic Co-operation and Development (OECD) report on truck roads (31) verified that exclusive truck lanes would be unpopular with the general public. Public acceptance of a facility depends on whether individuals find the facility useful. In the case of an exclusive truck road, people living near the facility do not perceive a direct benefit and may oppose the facility. Once again, although public opinion is negative toward exclusive facilities, the public generally favors restricting trucks to specific lanes (31). This acceptance of restrictions is consistent with public input on the Capital Beltway truck lane restrictions. In this specific case, public opinion was so favorable that lane restrictions were maintained even though there was no indication of improved traffic operations or a reduction in crashes (31, 32, 33).

CHAPTER 3: STUDY APPROACH

This report documents the task of identifying staffing needs related to operational options related to managed lanes and specific training that might be required to ensure those staff members are fully prepared to perform their duties to the satisfaction of both the managing agency and the customer. Researchers also reviewed the current accessibility to appropriate training, education, and technical assistance to ensure training needs are met.

Researchers approached this task from two different directions. The first was to identify current training opportunities that could be relevant to managed lanes operations. To achieve this approach, researchers reviewed current course listings to catalog current course titles and their main objectives or topic areas. The bulk of this approach was accomplished through an Internet search of currently known administrators of transportation-related training and outreach.

Second, researchers contacted agencies who currently operate managed lanes facilities. This effort was undertaken to identify:

- current and future staffing levels and positions within their agencies, and
- training undertaken by the agency prior to opening their facility to current operations.

Often times, agencies alter managed lanes facilities from previous strategies, such as HOV lanes converted to HOT lanes. Researchers also queried the agencies regarding their activities related to staffing and training for these facilities prior to these changes.

Researchers gathered this information from the agencies through the use of e-mail and phone interviews. The questions used as the starting point for the information gathering effort are contained in the [appendix](#).

CHAPTER 4: RESULTS

Researchers used a two-fold approach to identify the current state-of-the-practice regarding training and staffing for managed lanes facilities. The first approach was to catalog available courses that may relate to the operations or management of this type of facility. Second, researchers contacted several different agencies currently operating managed lanes facilities, or soon opening such facilities, to determine their current practices with regarding to staffing and training.

AVAILABLE COURSES

A review of current course listings available was conducted by researchers in an effort to catalog availability of different training opportunities. Most of this work was done through an Internet search of currently known administrators of transportation-related training and outreach. Below is a list of courses identified during this search.

Researchers began their search by identifying training courses or events related to HOV lane facilities. The following two courses or events were identified under this topic.

Title: High Occupancy Vehicle (HOV) Facilities
Length: 3 days
Description: The HOV facilities training course will provide participants with a general appreciation and understanding of the key policies, technical, and other issues to consider in the planning, design, implementation, management, operation, and marketing of HOV facilities. HOV facilities are a strategy to assist public agencies and transportation services providers to address the identified mobility, safety, productivity, environmental, and quality of life needs in metropolitan areas.
Audience: Traffic engineers, transportation planners, roadway design engineers, transportation managers/supervisors, transit planners, transit managers/supervisors, and public information specialists who are involved in the planning, design, management, operations, and marketing of an HOV system.
http://www.nhi.fhwa.dot.gov/coursedescript.asp?courseenum=91

Title: 12th International HOV Systems Conference
Date: April 18-20, 2005
Description: Improving Mobility and Accessibility with Managed Lanes, Pricing, and Bus Rapid Transit
Audience: N/A
http://www.hovworld.com/Houston05/index.html

Additionally, researchers looked for training courses or events with elements that related to the functions of managed lanes (e.g., congestion mitigation). To this end,

researchers identified five courses or events that would be of value to professionals looking to gain more information regarding managed lanes topics. These training events are listed below.

Title: Corridor Management
Length: 12 hours
<p>Description:</p> <p>The widespread, widely embraced ITS movement has emphasized the benefits of integrated systems elements. This course focuses on ramp control, HOV treatments, and control centers as a way to manage corridors using integrated systems elements.</p>
<p>Audience:</p> <p>Public-sector transportation professionals including U.S. Department of Transportation (USDOT) engineers, planners, project managers, and field staff, Federal Transit Administration (FTA) regional staff, ITS specialists, and others as appropriate. Transportation professionals from state, regional, and local agencies would also benefit from participation in the course.</p>
http://www.citeconsortium.org/courses/1mod9.html

Title: Strategies for Urban Traffic Congestion Workshop
Length: 5 days
<p>Description:</p> <p>Traffic congestion has traditionally been associated with the “central city” part of an urban area. In recent years, the entire metropolitan region has experienced changes in development patterns and growth. Office development in the suburbs, for example, has been increasing in size and density. With these changes come shifts in travel patterns and, in turn, traffic congestion. In fact, public opinion polls rate traffic problems very high on the list of “city” concerns, in some cases higher than crime, housing issues, and pollution. As a result, there is mounting pressure to mitigate the negative effects of traffic congestion on air quality, fuel consumption, economic vitality, and the quality of life in our metropolitan and developing areas.</p> <p>Transportation analysts need to be aware of techniques and programs that are designed to address the growing problem of traffic congestion. The Strategies for Urban Traffic Congestion Workshop is designed to meet these needs of the transportation analyst. The objective of the workshop is to enable participants to gain an understanding of the methods and tools available to assist in evaluating traffic conditions and in testing alternative strategies to better manage congestion. Strategies to alleviate congestion-related problems on the freeway, arterial, and residential street systems, as well as throughout the transportation network, are identified. Attention is also given to organizational programs as another tool for congestion management.</p>
<p>Audience:</p> <p>The workshop is intended for traffic engineers and planners from government agencies, planning organizations, and private firms, and those with responsibilities for congestion reduction measures.</p>
http://server.traffic.northwestern.edu/course/course_more.asp?id=683

Title: Context Sensitive Solutions
Length: 2 days
<p>Description: Context Sensitive Solutions (CSS) is an emerging approach to project development and management that asks more from transportation professionals than ever before. CSS methods use more inclusive processes to find elegant solutions for highly complex problems and achieve more than the usual “safe and efficient movement of people, goods, and services.” Recent federal legislation places greater emphasis on applying CSS principles to transportation projects.</p> <p>This two-day workshop will help you become an effective participant in the art of Context Sensitive Solutions. Through lecture and class discussions, you will learn essential CSS methods for rural, suburban, and urban settings. Individual and small group exercises allow you to practice the tools and techniques. Illustrative case studies and hypothetical scenarios make the material interesting, relevant and lively.</p> <p>The course will also increase your understanding of public involvement processes, collaborative problem solving, and decision-making systems.</p>
<p>Audience: Planners, engineers, designers, project managers, and administrators from government agencies and private firms will find these important CSS tools useful in a variety of professional situations.</p>
http://www.ite.org/education/clearinghouse/

Title: USDOT Road Pricing Seminar
Date: January 13, 2005
<p>Description: The purpose of the seminar was to provide a briefing on innovative road pricing projects in the United States and internationally.</p>
<p>Audience: N/A</p>
http://knowledge.fhwa.dot.gov/cops/hcx.nsf/aa5aec9f63be385c852568cc0055ea16/08bd19aa1c6a68f785256fb80052305b?OpenDocument

Title: Electronic Payment Systems (EPS)
Length: 4 hours
<p>Description:</p> <p>This overview of electronic payment systems is focused on the areas of applications, EPS architecture and components, and electronic media characteristics. Public transit, road tolling, parking, and multipurpose applications are discussed in the first section, followed by a brief review of the most important security criteria relevant to EPS. The next segment, on EPS architecture and components, addresses the topics of cards and their characteristics, reader types and functions, open and closed networks, and the major functions of the host system, and introduces the concept of the clearinghouse. The major types of electronic media are described in detail in the following section. Finally, two examples of EPS deployments are discussed with emphasis on the technologies used and effectiveness in reaching their respective objectives.</p>
<p>Audience:</p> <p>Public-sector transportation professionals including USDOT engineers, planners, project managers, and field staff, FTA regional staff, ITS specialists, and others as appropriate. Transportation professionals from state, regional, and local agencies would also benefit from participation in the course.</p>
http://www.citeconsortium.org/courses/2mod2.html

The first of these courses relates to corridor management and speaks directly to HOV lane topics. The second and third do not specifically state that they relate to either managed lanes or HOV facilities; however, the topics, “Strategies for Urban Traffic Congestion” and “Context Sensitive Solutions,” both pertain to new or alternative solutions for management of traffic flow in urban areas. These ideas could be directly related to the use of managed lanes strategies to meet the objectives for mobility and safety.

Finally, the last two courses relate to road pricing and tolling technologies. Both of these courses have direct relevance to an agency planning to implement a HOT operational strategy for their managed lanes. Through this type of training, agencies can gain knowledge of the new challenges created through the implementation of a toll system.

Overall, decision makers compose the primary audiences identified for the training courses, as listed with the course descriptions above. The courses specify that they would benefit transportation professionals in the positions of engineers, planners, or other management or supervisory roles. This consistency emphasizes the idea that the topics covered do not relate to day-to-day operations of the facilities but are associated with decision making regarding how, when, or where to implement different strategies and how to identify the appropriate conditions for those strategies. One exception to this is the course on electronic payment systems, which specifically identifies field staff as a possible audience for the topic. This course is based to a greater extent upon the understanding of applications and technologies related to this topic.

CURRENT PRACTICES PHONE INTERVIEWS

As outlined in the study design, researchers contacted representatives from several different agencies currently operating, or planning to soon open, managed lanes facilities. Due to the limited number of areas where specific managed lanes schemes have been implemented, researchers hand-picked a limited number of areas to contact to identify those agencies that are most familiar with these types of operations. Primarily, researchers conducted the interviews through telephone conversations with the identified representatives. During this task, they attempted to contact agencies in five different areas to gather information. However, researchers were only able to gather responses from three of these agencies: Minnesota Department of Transportation (MnDOT), Colorado Department of Transportation (CDOT), and San Diego Association of Governments (SANDAG).

Researchers initially gathered information regarding the types of managed lanes facilities in the areas of interest to be able to more effectively communicate with the agency representatives regarding their experiences. All three of the contacted areas are operating HOT lane facilities converted from traditional HOV lanes. Each is at a different stage in the development of their system: one system has been in place for numerous years, one opened their facility within the last year, and one is still in the construction phase with planned opening by the end of this year.

As is typical for HOT lane operations, the systems charge a variable toll for single-occupancy vehicles based on time of day and congestion levels and allow HOVs to use the lanes at no charge. These systems implemented the change from HOV to HOT lanes as a means to more effectively use the capacity available in existing HOV lanes.

The information gathering effort addressed several topic areas. The primary two interest areas were staffing positions and training efforts. Each interest area is addressed individually in the following sections.

Staffing

The first topic area of the phone interviews was to identify current staffing levels and positions as they relate to the managed lanes facility. Through these interviews researchers learned that since CDOT is still in the construction phases of their managed lanes facility, staffing issues are still under consideration. However, it was noted that the back-office operations for the tolling procedures will be facilitated through contract work.

For the HOT lane system in Minneapolis, MnDOT currently has one person who has responsibility for the management of contracts for operations on the HOT lanes. Additionally, this person is involved with public outreach to promote the system along with the established public relations personnel for MnDOT. This is one area where they feel that there could be growth through adding dedicated marketing and/or public relations personnel for the system. Customer relations for this system is outsourced at this

time, and this therefore limits the number of personnel required within MnDOT. In support roles for the HOT system are the traffic management center (TMC) floor operations personnel who are responsible for monitoring the area for incidents and notifying the company in charge of customer service of the event. Based on information provided by the TMC floor operations personnel, the customer service provider reevaluates the current toll being charged on the facility. A limited number of MnDOT field personnel are involved with the necessary gate changeover activities for the reversible lanes operation.

SANDAG also outsources the customer service aspect of their HOT lane operation. The contractor staff for this task is approximately five people, including a project manager, a customer service manager, and three customer service representatives. The customer service aspect of the HOT lanes strategy is expected to continue to increase in scope and number of transactions as the facility and regional facilities continue to grow (the San Diego region has plans for 75+ miles of managed or HOT lanes by 2030). As the operation expands, SANDAG will consider the decision to continue outsourcing such services versus bringing them in-house based on benefit-cost analyses and other considerations. Also included in the outsourcing contract is the hiring of technical support staff and field maintenance and operations personnel as necessary for the smooth continuation of operations.

Within the agency, there are several personnel who spend a portion of their time working on management of the HOT lanes. These staff include the department director, principal planner, and project manager (who holds an associate planner position). Currently, CALTRANS has responsibility for roadway maintenance, traffic operations, incident management, etc., with regard to the lane operations, eliminating the need for SANDAG to employ staff who have expertise in TMC floor personnel responsibilities.

Training

Second, researchers asked each of the agencies what training efforts they had undertaken with regard to implementation of their managed lanes operational strategies. Again, since the CDOT system is still in the construction phase and staffing issues are under consideration, the plans for training personnel have not yet been established. The CDOT contact did note that they believe the training required for the operation of their HOT lane facility will need to be much more comprehensive than the on-the-job approach currently employed for their HOV lane facility. This emphasizes the point that in the current state-of-the-practice, training of personnel is a final step or even an afterthought in the planning and implementation of managed lanes systems.

Minimal amounts of training were undertaken by MnDOT to facilitate the change in operations from an HOV lane to an HOT lane. Primarily this training consisted of a 2-hour group training seminar for the TMC floor personnel to ensure that they were aware of their responsibilities with regard to contacting the customer service contractor and their responsibility to override the HOT system in rare instances of severe incidents. MnDOT has also incorporated this information into the training required of new

personnel when they are hired to work for the TMC as floor personnel. The MnDOT representative did note that had MnDOT decided to keep the customer service aspect of this project in-house, there would have been much greater staffing and training needs for this operation.

SANDAG resolved some of their training issues with respect to the outsourced customer service work through the development of an operations plan by the initial contract operator that specified policy considerations and their outcomes, customer service staff guidance for handling a variety of transactional and service-related questions, etc. This plan also provides guidance on the use of a proprietary software application developed to host account and transactional data.

During the conversion from HOV lane operation to HOT lane operation, none of the SANDAG staff obtained specific training, as their responsibilities focused primarily on project or system oversight. This type of facility is not “typical operations” for regional planning agencies. It was believed that training related to proper transaction processing and account management expertise, effective customer service, financial and marketing training, and in-lane system management and maintenance would be a benefit only if these services were going to be done in-house and not through contractors who are experienced in such operations (i.e., toll contractors).

CHAPTER 5: CONCLUSIONS

A managed lane facility is one that increases freeway efficiency by packaging various operational and design actions. Operating agencies may adjust lane management operations at any time to better match regional goals. Managed lanes are intended to provide peak period free-flow travel to certain user groups. However, as a new concept in operating freeways, managed lanes has a limited experience base, creating a knowledge vacuum in emerging key areas that are critical for effective implementation. One of these areas is the adequate training of staff involved in the day-to-day operations of the facility. Ensuring that the staff have received appropriate levels of knowledge with regard to their responsibilities and the operational strategies of the managed lane can be a large factor in the success of the project.

AVAILABLE COURSES

The initial task undertaken was to identify training opportunities available to transportation professionals with regard to managed lanes operational strategies. Researchers accomplished this through an Internet search of known training providers and informational sources related to transportation issues. Through this effort, there were five courses and two seminars/conferences identified as having aspects or topics related to managed lanes. The five courses identified were:

- High Occupancy Vehicle (HOV) Facilities (Provider: National Highway Institute),
- Corridor Management (Provider: Consortium for ITS Training and Education),
- Strategies for Urban Congestion Workshop (Provider: Northwestern University Center for Public Safety),
- Context Sensitive Solutions (Provider: Northwestern University Center for Public Safety), and
- Electronic Payment Systems (Provider: Consortium for ITS Training and Education).

The two seminars/conferences identified as related to managed lanes were:

- 12th International HOV Systems Conference and
- USDOT Road Pricing Seminar.

Overall, the decision makers composed the audiences identified for the training courses. Primarily, the courses specified that transportation professionals in the positions of engineers, planners, or other management or supervisory roles would benefit from the courses. This solidifies the idea that the topics covered are not necessarily related to day-to-day operations of the facilities but rather apply to decisions regarding how, when, or where to implement different strategies and how to identify the appropriate conditions for those strategies. One exception to this is the course on electronic payment systems, which

specifies field staff as a possible audience for the topic. The basis of this course is more focused upon the understanding of applications and technologies related to the topic.

CURRENT PRACTICES INTERVIEWS

Researchers contacted representatives from several different agencies currently operating, or planning to soon open, managed lanes facilities. Due to the limited number of areas where specific managed lanes schemes have been implemented, researchers selected a limited number of agencies to contact during this task. Researchers identified the agencies contacted as those that are most familiar with managed lanes facilities. Through these interviews, researchers garnered valuable insights into the current staffing and training approaches utilized for the facilities. From these conversations, researchers gathered information from two systems that are currently in active operations of a managed lanes facility and one that is planning to open their facility by the end of the year.

Representatives from the active managed lanes facilities indicated that the primary responsibility of the managing agency was to oversee contract management for the managed lanes. Also, they utilized their existing public relations and marketing personnel to assist with the public outreach aspect of the managed lanes. With regard to the customer service aspect of managed lanes operations, both of the agencies outsource this work and do not have a direct hand in the day-to-day customer service for the facility. One agency provided information that their outsource contractor has five employees who work exclusively on the operations of the managed lane customer service. Two of these staff are in management roles, and the other three are customer service representatives handling relations with the customers.

Training for the customer service staff of the managed lanes facilities was not a primary responsibility of the managing agencies, as this work is outsourced to different contractors. However, one agency did cite that an operations plan developed by the initial contract operator outlines the policy considerations and their outcomes and customer service staff guidance for handling a variety of transactional and service-related questions for the responsible personnel. This plan also provides guidance on the use of a proprietary software application that was developed to host the account and transactional data.

There were differences within the agencies spoken to in handling of traffic operations and incident management for the managed lane facilities. One of the agencies did this work within their organization and had done a limited amount of training to ensure that the personnel working in the local TMC were familiar with the managed lanes operation and their role in that operation. This training consisted of a 2-hour group seminar to review procedures. This agency also incorporated the information into their training of new TMC personnel. The second agency that has an active and mature HOT system does not have responsibility for local traffic operations and incident management, as the operation of the area TMC is not within their jurisdiction. It was noted by this agency that if this arrangement was ever to shift and these roles became the responsibility

of the agency, extensive training would be required to ensure that the personnel charged with these duties gained the expertise required for these positions.

The information gathered through these interviews shows that although training practices are currently limited with regard to managed lanes facilities, there are specific skill sets or knowledge bases that must be filled to ensure smooth operations of the facility. The different skill sets identified were:

- contract management and supervision,
- customer service relations,
- accounts handling,
- traffic operations management,
- incident management, and
- public relations and marketing.

For each of these areas, agencies either identified skilled personnel within their current staff group and provided limited training at the startup of operations, or contracted skilled personnel through outsourcing of work. This implies that each of these areas was considered critical to the success of the managed lanes facilities.

OTHER ISSUES

As discussed in the “[Background](#)” chapter of this report, public opinion of a managed lanes facility can have a significant influence on the success or failure of the project. Training and staffing can have a great impact on how this aspect of the project is undertaken through the direct training of public relations or marketing personnel at the responsible agency (either dedicated personnel for the project or overall personnel for the agency). Raising the knowledge level of these staff members, either through training or hiring of appropriately knowledgeable personnel, increases the effectiveness of communications with the general public as to the value of a managed lanes project.

Studies have also indicated that enforcement is equally important to the proper function of an HOV facility as other operational considerations. The importance of enforcement cannot be overemphasized (*1*). A Texas Transportation Institute (TTI) study regarding enforcement found the following:

- The level of enforcement is dependent upon the type of facility, and concurrent flow facilities require more enforcement.
- An officer must have a safe and convenient place to issue citations that is within view of the facility.
- A visible enforcement presence must be maintained.
- On limited-access facilities, diversion of potential violators prior to traversing some part of the facility may be safer and more efficient than after the fact.
- Enforcement personnel should be located at terminal points (*22, 1*).

These findings imply that the inclusion of law enforcement personnel in training activities related to the anticipated operational strategies for a new managed lanes facility would benefit both the function of the system and the officers' ability to enforce the planned managed lane approach.

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APPENDIX: PHONE INTERVIEW QUESTIONS

Managed Lanes Phone Interviews Staffing Needs and Training

Introduction:

The Texas Transportation Institute is conducting research to identify staffing needs related to the operation of different types of managed lanes facilities and the specific training that might be required or beneficial to ensure that staff members are prepared for their duties with regards to this type of facility.

For the purposes of this project, managed lanes have been defined as follows: “A managed lane facility is one that increases freeway efficiency by packaging various operational and design actions. Lane management operations may be adjusted at any time to better match regional goals.”

Questions:

The following list of questions is a starting point for gathering this information. Depending on the responses provided to these questions, there may be a need to follow up on particular points for clarity and understanding of different activities.

1. Do you have staff members that are specifically responsible for the day-to-day operations of your _____ facility?
 - a. If yes,
 - i. What positions do these people hold and what are their responsibilities?
2. Where do you see the staffing needs changing or expanding based on the development of your _____ facility?
 - a. Do you envision any specific training requirements or needs based on this projection?
3. When you opened your _____ facility, did you do any training specific to the operation of this facility?
 - a. If yes,
 - i. What training was done?
 - ii. Were the materials used in the training original to your organization or a standard course offered by another agency/company?
4. If the facility was previously a designated HOV lane or other type of managed lane facility, did you do any training specific to that type of operation either when it opened or in subsequent years?
 - a. If yes,
 - i. What training was done?
 - ii. Were the materials used in the training original to your organization or a standard course offered by another agency/company?

- b. Based on this experience, is there any training that you would recommend that should be conducted prior to opening such a facility?
- 5. If the facility was changed from previous types of operations (e.g., HOV converted to HOT), is there any training you did regarding the change in operations?
 - a. If yes,
 - i. What training was done?
 - ii. Were the materials used in the training original to your organization or a standard course offered by another agency/company?
 - b. If no,
 - i. Based on your experience, is there any training that you would recommend that should be conducted prior converting such a facility?

Thank you for your time and assistance. If you have any questions regarding this information, please feel free to contact me:

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