Managed Lanes: An Overview

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Outline

- What are Managed Lanes?
- Types of Managed Lanes
- How are Tolls Collected
- Managed Lanes and Transit
- Managed Lane (Important but) Lesser Known Points

What are Managed Lanes?

- Managed lanes: Set of lanes in which access is controlled to meet a transportation policy goal (FHWA)
  - Vehicle restrictions, capacity restrictions, pricing
  - Pricing has proven most effective
- Different types of managed lanes
  - Bus-only lanes
  - High occupancy vehicle (HOV)
  - High occupancy toll (HOT)
  - Express toll lanes (ETL)

U.S. HOT and Express Toll Lanes (11 States)

Bus-only and HOV Lanes

- Bus-only lanes tried in 1970's and early 1980's
  - Challenging to justify lane for few buses per hour
- HOV lanes (formally bus lanes) occupancy of 4+, 3+, 2+
  - 3+ carpool formation (finding riders) challenging in most metro areas
    - Exceptions: Washington D.C., San Francisco
  - 2 person carpools mostly fampools
    - 50% 2-person carpools adult + child (not real carpool because children cannot drive)
    - 25% 2-person carpools are adults from same household
    - Only 25% real carpools
  - Most HOV lanes suffer from "Goldilocks phenomenon" too hot or too cold
    - Too hot, congested and no faster than general purpose lanes
    - Too cold, few vehicles use, other vehicles complain about empty lane syndrome

Trending Towards ETL and HOT Lanes

- Commuters are more sensitive to price than to occupancy requirements or societal goals
- Express toll lanes/HOT lanes use variable tolling to reduce congestion
- High Occupancy Toll (HOT) lanes price drivers of single-occupant vehicles, but allow carpools/special use vehicles to travel for free
  - HOT-2
  - HOT-3
  - Electric-vehicle exceptions
  - Government-vehicle exceptions
- Express Toll Lanes (ETL) price drivers of all vehicles except buses and vanpools
  - Vanpool is super carpool typically 7-15 people riding together

Tradeoffs Between ETL and HOT Lanes

- HOT lane advantages
  - Political constituency groups
    - Carpoolers, electric vehicle users
  - Low-volume corridors
    - I-35E in Minnesota
- ETL advantages
  - Provides more revenue to build/maintain/operate facility
    - More paying customers
  - Pricing is more effective
    - Lane operates more efficiently as more vehicles sensitive to pricing
- Example: Friday afternoon rush hour, 1000 vehicles but 800 of them don't pay toll so no incentive to move to GP lane when HOT lane congested. 1000 vehicles 100 of them don't pay toll, more leave HOT lane and it operates more efficiently


Managed Lanes are Different from Conventional Tollroads

- Priced managed lanes charge drivers in managed lane only
  - Tollroads charge drivers in all lanes
- Managed lane prices vary based on congestion
  - Tollroads charge the same price 24/7
- Tolls on managed lanes are used first to manage demand and second to raise revenue (Tolls will not be eliminated)
  - Tolls are used to raise revenue and occasionally for non-transportation purposes
- Managed lanes feature all electronic tolling (AET)
  - Tollroads have tollbooths due to staff costs, traffic accidents, lost time
- Managed lanes offer a choice of free lanes or toll lanes
  - Tollroads don't offer this choice

Managed Lanes Delivery Method

- Range from states build themselves through design-build (DB) to full public private partnership (P3)
  - Design-build not design-build-bid
  - Options in middle design-build-finance (P3 lite)
- Biggest advantage of P3 is risk transfer
  - Two types of P3s
    - Toll concessions: Tolling provides revenue
    - Availability payments: Revenue can be from any source
- P3s provide financing tools, tolls provide funding
- State DOTs give up some elements of control

How are Tolls Collected

- ETLs and HOT lanes charge motorists electronically
  - Use windshield transponders read by antennas on overhead gantries
  - No tollboothes
  - Motorists have prepaid accounts
    - Some systems allow collection via license plates with bill sent to motorist
    - Catches violators
  - Toll agencies nationwide are working towards interoperability
    - One transponder/account use all managed lanes in country
    - E-Zpass in Northeast, Midwest is largest interoperable system

Managed Lanes Performance Standards

- All managed lanes constructed with federal funds (including HOV lanes) must meet minimum performance standards
  - Must operate at 45 miles per hour or more 90 percent of the time
- Many HOV lanes fail these standards particularly in California
- Federal government could force states to repay all federal funds used to build those lanes
- One reason for conversion from HOV to HOT lanes

Managed Lanes and Transit

- Improved transit service is one of biggest beneficiaries
- Allow bus rapid transit and express bus to travel in uncongested right-of-way
  - Bus rapid transit
    - Premium bus service comparable to heavy-rail and light-rail
    - Priority running way, faster speeds (than traditional buses), technology, off-board fare collection, low-floor boarding
  - Express bus
    - Coach buses with stops at origin and destination comparable to commuter rail
    - Dedicated seats, technology


Managed Lanes and Transit

- Increases in bus ridership
  - Miami ridership in express buses increased 400 percent in past 5-years
  - Metro Atlanta, retimed bus routes due to reliability improvements from new express toll lanes
  - Suburban Washington DC biggest advantage of building I-270/I-495 managed lanes is transit service between suburban Maryland and suburban Virginia

Managed Lanes Can Form a Comprehensive System

- Many large metro areas have managed lane networks in their long-range transportation plan
  - Atlanta, Dallas, Denver, Los Angeles, Miami, Minneapolis, San Francisco, Seattle, and Washington DC
  - Washington DC region in development/construction: Managed lanes on all all freeway
- Started with poorly performing HOV lane network, converted to HOT/ETL lanes, built new lanes
- Some regions including connectors between managed lanes
  - Drivers are less willing to take managed lanes, if one freeway has MLs and another does not have MLs or if there is period in general lanes

Who Benefits from Managed Lanes

- Element of Choice
- Travelers in general purpose lanes
  - By shifting some cars to managed lanes, new managed lanes improve travel speeds in GP lanes 5-10%
- Emergency vehicles
  - Congestion-free travel option to reach hospital
- Taxpayers
  - Tolling provides revenue for new infrastructure without tax increase

Managed Lanes Lesser Known Points (1)

- Any metro area with significant traffic congestion can benefit from managed lanes
  - Smaller metro regions include Austin, Jacksonville, Orlando, Salt Lake City, Santa Barbara
- Managed lanes reduce greenhouse gas emissions
  - Some encourage carpooling
  - GHG emissions are u-shaped curve with highest amounts in stop and go traffic and at high speeds (80 mph or more)
    - Travel at 40-55 mph produces fewest GHGs

Managed Lanes Lesser Known Points (2)

- Managed lanes used by all income levels
  - Preferred more by lower- and middle-income groups than high-income groups
    - Valued to make work meeting or pick up child from daycare
  - Top five vehicle models in lanes: Ford F-150, Honda Accord, Honda Civic, Toyota Camry, Toyota Corolla
- Average bill $5-$15 per month
  - Dallas-Fort Worth
  - More than 67% of drivers in DFW region used MLs at least once per year