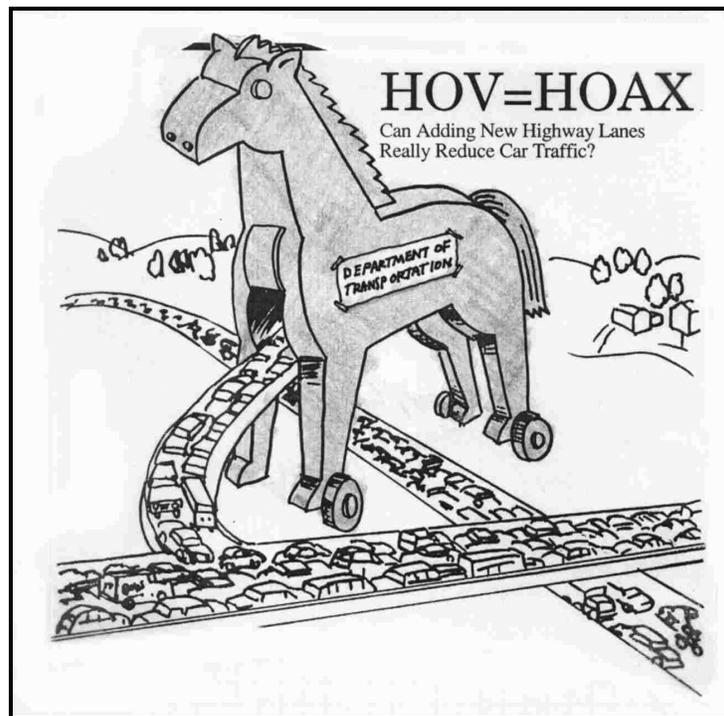




Thursday / *Donnerstag*, 14.30-16.00

Workshop 4 — Efficient vehicle use / *Effiziente Fahrzeugnutzung*



TROJAN HOVs: **US experience with HOV/HOT lanes**

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INTRODUCTION

This paper is not intended to be a historical, statistical summary or an exhaustive review of research regarding the use of HOV (High Occupancy Vehicle) and HOT (High Occupancy Toll) lanes/roads on freeways in the United States. The idea is to provide a glimpse at the current state of the praxis, from a progressive, sustainable transportation point of view. This includes social, economic and political criteria, as well as traffic engineering and planning.

DEFINITIONS

HOV lanes are lanes reserved for the exclusive use of buses, vans, and car-pools: vehicles with more than one person aboard. When HOV lanes were first introduced, the occupant requirement per vehicle was generally 4 or more (4+). Over the years that has fallen to 2 or more (2+).

Most highway construction in American is funded by the federal government's Federal Highway Administration (FHWA) through each state's Departments of Transportation (DOT). The federal government collects gas taxes and, combined with other revenues, fund road and rail projects at about 80%. ISTEA (the Interstate Transportation Enhancement Act) of 1991 and TEA-21 (the Transportation Equalization Act for the 21 Century) of 1998 are the names of the two latest federal transportation spending bills. Within ISTEA was the CMAQ program (Congestion Mitigation and Air Quality) which funded many HOV projects.

SHORT HISTORY

Carpool lanes have existed en masse in America since the mid-1970s. They were originally thought of as a way to get people to carpool, in an effort to reduce congestion and pollution, while still allowing people to drive and not rely on public transit.

Prior to that, the first dedicated HOV lane was a 2 km. long stretch of bus-only, peak-period lanes on Chicago's North Sheridan Road in 1939. The first dedicated HOV freeway lanes were on the San Francisco-Oakland Bay Bridge in 1962. The first freeway lane built solely for HOV was the Shirley Freeway Busway in 1969 outside Washington, DC. In 1970, a lane was dedicated to buses in the morning peak approaching the Lincoln Tunnel in New York.

The big push for new HOV lanes has come in this decade, through five policy changes:

1. In 1990, the FHWA issued a memo strongly supporting HOV lanes.
2. The Clear Air Act Amendments of 1990 listed HOV lanes as a pollution control measure, and forbade the Environmental Protection Agency (EPA) from preventing their construction.
3. The FHWA requires an Environmental Impact Statement for HOV lane conversions, but not for new HOV lanes.
4. The 1991 ISTEA legislation encouraged HOV lanes as part of CMAQ in areas with poor air quality (smog), and as part of the Interstate Maintenance Program where they were eligible for 90% funding (as opposed to the usual 80%).
5. ISTEA relaxed the rules for HOV lanes to 2+ (the driver plus one passenger).

In essence, new HOV lanes are not only the only lanes in town; they are almost free. Proof of this change is found in the recent spate of HOV construction.

In 1996 there were 2000 km. of HOV lanes on 60 freeways in the US. By the year 2000, 2000 more lane/km. will be added. By 2020, 99 more HOV projects are scheduled to be opened.

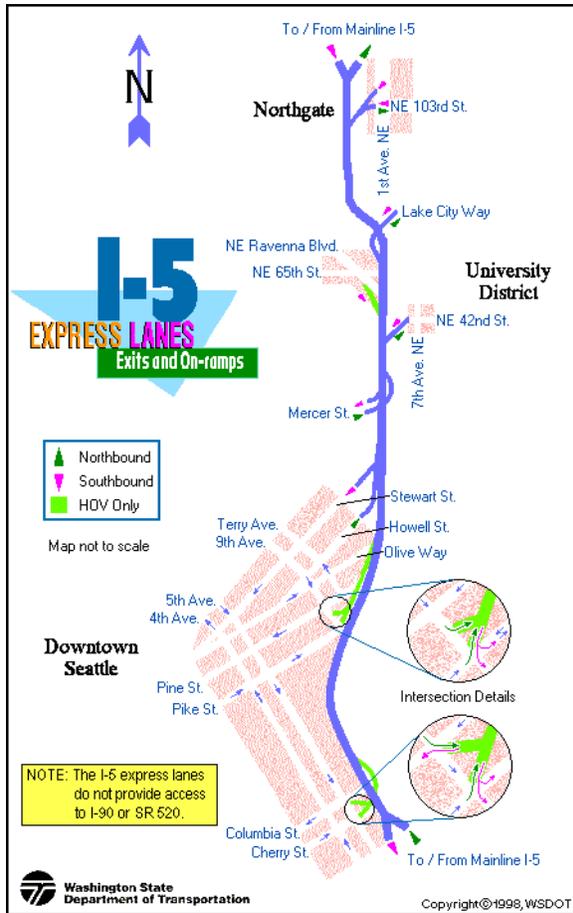
Some areas like Houston, Dallas/Ft. Worth and Los Angeles are circling their cities with HOV lanes. By 2001, 90% of Orange County's freeways will be HOV equipped. Other cities simply build HOV lanes at entry and exit ramps to give car-poolers priority at these critical junctures, or build HOV lanes at interchanges or bridges.



**Freeway HOV lane with left exit
Los Angeles, CA.**



**HOV only at bridge
Toledo, OH**



**HOV only at entry and exit lanes
Seattle, WA**



**Freeway HOV lane in median
Dallas, TX.**

city	HOV	HOT
Atlanta, GA	I-85 (now SOV)	
	I-75 (now SOV)	
Baltimore, MD		Chesapeake Bay Bridge (proposed)
		Harbor Crossings (proposed)
Boston, MA	Southeast Expressway (zipper)	
Dallas / Ft. Worth, TX	LBJ Freeway	LBJ Freeway (proposed)
Honolulu, HI	H-1 (zipper)	
Houston, TX	Katy Freeway (HOV/HOT)	Katy Freeway (HOV/HOT)
Los Angeles, CA	Ventura Freeway (now SOV)	Route 91
	Route 55 (bus & 3+)	
	Long Beach-Artesia Freeway (now SOV)	
	I-405 (bus & 3+)	
New York, NY	Loop 287 (NJ, now SOV)	
	Long Island Expressway (only on Long Island)	
	Lincoln Tunnel (bus only)	
	Gowanus (zipper, EZPass)	
Norfolk, VA		I-64 (proposed)
San Diego, CA		I-15
San Francisco, CA	Oakland Bay Bridge	
	I-580 (now SOV)	
Seattle, WA	I-5 (entry/exit only)	
Washington, DC	Shirley Freeway	Capital Beltway (proposed)
	Route 44 (now SOV)	
	Dulles Access Road (now SOV)	

Selected North American cities with Bus/HOV/HOT lanes

MAIN POINTS

ECONOMIC/PLANNING/SOCIAL SCHISM

There isn't any significant evidence that HOV lanes will produce much new ride sharing. Adding HOV lanes generally just sorts out existing traffic and opens up new space in the general lanes for new SOV (Single Occupancy Vehicle) traffic, especially if the HOV is only 2+. There is also the growing recognition that car-poolers are former transit riders, and that allowing carpools on former busways only serves to exacerbate this problem.

There have been some studies that suggest that ride-sharing doesn't reduce overall car trips much, if at all, because it reduces the flexibility of each individual to take care of errands, etc. during the commute. Thus, some car-poolers get home just to jump in their own car in order to make local car trips. (Researchers in Washington, DC modeled a 'complete' 550 km. HOV system in the area and found more car-poolers, but the same vehicle miles traveled, and similar pollution.)

The Wall Street Journal, the nations most influential business newspaper explored in September 1998 how today's flexible work schedules, scattered work sites and the desire to drive alone has lead to vast under utilization of HOV lanes. One expert estimated that 60% of the HOV network was underutilized.

In spite of these developments, a recent traffic planning report in TRB's *Newsline* assembled research which showed that HOV lanes make more efficient use of existing roadway capacity by moving more people per vehicle trip while reducing vehicle trips and congestion. While this may be true in theory, practical and political experience show otherwise.

BACKSLIDING

Contained within FHWA policy is the opinion that HOV lanes are "low-risk." By this, it is reasoned that if a new HOV lane is unsuccessful, it can easily be turned into a regular lane. Comparatively, rail is high risk because it cannot be converted into a new road as easily.

When HOV lanes began, most were reserved for buses, vans and cars with 4+ riders. In the days of one-car families, big cars, and centralized places, this made sense. Yet American travel habits are slowly edging towards one person, one car, and the HOV lanes are keeping pace. Almost all HOV lanes are now 2+, even though they may have been originally planned and funded as bus, 4+ or 3+ only lanes. This raises the question, „is dinner and a movie HOV?“



In a case that represents the extreme, the HOV lanes on I-66 outside Washington were originally planned as bus/4+, but a federal law applying specifically to this highway reduced the minimum carpool size to 3+ and shortened the period of operation.

Not to be outdone, the HOV lane on the Southeast Expressway in Boston is limited to 3+, or 2+ with a valid sticker. The requirements for obtaining the sticker include no money, no explanations and no questions. Just simply mail in a form. But the sticker remains on the windshield, so if you sell your car, you have to get another sticker.

One exception to this rule is in transit-dependent urban areas. While suburban drivers and politicians clamor for relaxed access to the bus/3+ HOV lane on the Gowanus Expressway in New York, there is a sufficient mass of bus riders to counterbalance this demand.

HOV to SOV

As displayed in New Jersey in 1998, the Trojan horse effect is very much a danger. Drivers on a clearly failing circumferential HOV lane (I-287) and a marginally working radial HOV lane (I-80) responded massively to a yellow journalism campaign which captured the ire of drivers stuck in traffic next to free-flowing HOV lanes. In the end the Governor converted the entire HOV lane to a SOV lane.

The case in New Jersey is not an isolated phenomenon. The history of HOV to SOV lane conversions in the United States is replete with examples: Atlanta, San Francisco, Los Angeles, Seattle and Washington, DC. The Dulles Toll Road HOV lanes were open to general traffic in 1992 after only *one month* of operation.

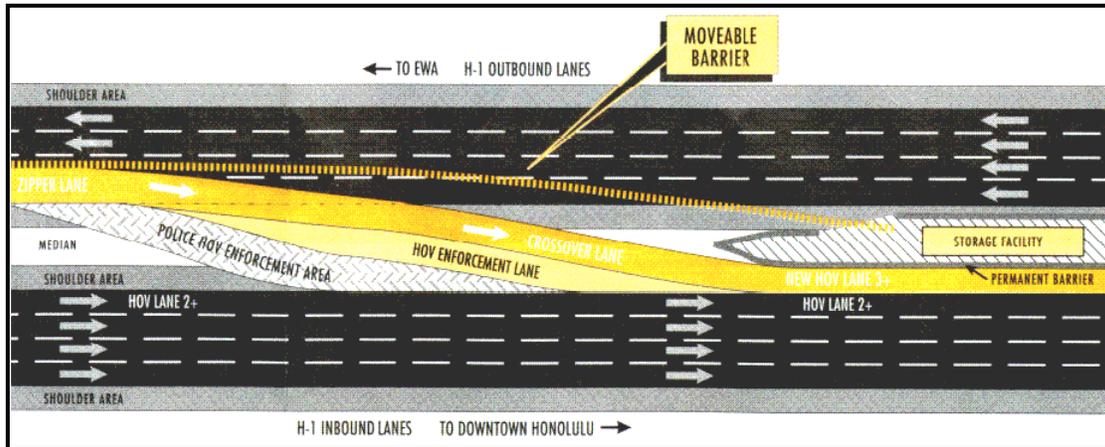
A serious question that arises from these types of situations is whether the HOV lanes were underutilized, or just appeared to be. Factoring such items as latent demand, land use, and parallel routes, some researchers argue that HOV lanes only work in severely congested areas. So as HOV lanes are supposed to reduce congestion, they ultimately lose attractiveness as they reduce congestion.

Enforcement rates also call into question the success of HOV lanes. In Florida, violation rates on the HOV lanes in Miami and Orlando range from 40 to 75%. With this number of SOV drivers using the lanes, it is somewhat farcical to call them HOV. In that the police generally enforce what the people (through their politicians) want, it would seem that they are voting against HOV lanes.



**The ZIPPER truck making an HOV lane on the Southeast Expressway
Boston, MA**

One way to eliminate the enforcement issue is to design HOV lanes with movable barriers or with very wide buffer zones. The former is very innovative and effectively utilizes existing right-of-way via 'zipper' machine, which moves a semi-permanent barrier from one side of the lane to another. The latter can be seen as getting two lanes for the price of one. Nevertheless, it is easy to see, if the lanes were converted back to SOV, how the buffer could easily become another lane.



**Using Existing Lanes/Median for HOV
Honolulu, Hawaii**

Now, Massachusetts air pollution regulations specifically forbid new HOV lanes, opting instead for conversions and medians. Others are starting to see the folly of spending scarce transportation dollars on HOV lanes, when more people could be served better through investments in real public transit.

RECENT EVENTS

POLITICAL OPPOSITION

Some people clearly are beginning to understand the Trojan horse problem -- In suburban New York, Westchester public opinion rejected the widening of I-287 in 1997. Eastern Queens successfully rebelled against the Long Island Expressway widening west of the Nassau/Queens line the following year. (Official figures showed 21% more total cars eastbound and 3% more westbound three years after the carpool lane opened.)

Road to Ruin, a report developed by Taxpayers for Common Sense, et. al. called a planned HOV lane on I-287 in suburban NYC a 500 million-dollar boondoggle. Further research showed the state highway department was so bent on building this lane that they inflated user projections and rejected alternatives without fully investigating their impact. Ultimately the Governor, who recognized the political folly of the HOV lane, stopped this project. He opted instead for a \$150M rehabilitation of the existing road, which will eliminate problem sections (bottlenecks, weaving, acceleration lanes) and improve capacity in much the same way that the HOV lane may have.

Across the country, political opposition to HOV lanes is growing. In Virginia, new carpool lanes (re) opened in December 1998 on the toll road to Dulles Airport are already coming under fire. The new Governor of Minnesota pledged during his campaign to abolish all HOV lanes in the state. On Long Island, legislators are calling for a trial opening of HOV lanes to all vehicles. California legislators are considering a law that would prohibit construction or designation of any new HOV lanes unless a cost-benefit analysis shows that it is the most efficient of four options: HOV, HOT, mixed-flow, no-build. (Note that this bill also would prohibit designating an existing lane as an HOV lane.)

LIE/HOV Alert



Who would you rather have as neighbors for the next seven years?



May 14, 1998 at 5:30 PM

**at the southwest service road
of the Long Island Expressway**

The State Department of Transportation wants to expand the Long Island Expressway to 4 lanes in each direction. More highway lanes mean more cars, congestion and pollution. The project will also destroy parts of Alley Pond Park, decrease property values and close stores.

Civic groups and elected officials have united to stop the highway widening. Help us to tell Governor Pataki to cancel the new lanes. Please join with us on May 14.

JOIN THE RALLY

Help us to preserve the Little Neck,
Douglaston and Bayside communities!

Anti-HOV Rally Poster
New York, NY

HOT LANES

HOT lanes are increasingly seen as a way to effectively utilize underutilized HOV lanes. While this treads on the politically sensitive territory of double taxation, the notion that streets and highways should be rationed in the same way as other public goods (water, electricity) is gaining currency.

The first experiment with variable road pricing occurred on 16 km. of Route 91 through the Los Angeles area in 1995. Four HOT lanes were constructed in the median of the existing eight lane Riverside Freeway. The road was privately financed and built; ownership will revert to the state in the year 2030. The tolls vary with the time of day and day of week and reflect the travel time saved compared to the adjacent freeway. Currently the tolls follow a published schedule (\$0.60 - \$2.95), but the possibility exists for them to vary dynamically. The tolls are collected by the Automatic Vehicle Identification (AVI) system, called FasTrak, which is coordinated with other toll roads in the region. Vehicles with 3+ occupants travel for free.

<i>Dollars</i>	<i>WESTBOUND</i>						<i>EASTBOUND</i>							
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
10 PM - 4 AM				0.60										
4-5 AM	0.60			1.60							0.60			
5-6 AM														
6-7 AM				2.85										
7-8 AM				2.95		2.85		0.60		0.85		0.85		0.60
8-9 AM				2.85			0.60							
9-10 AM	0.60			1.60							0.75			
10-11 AM				1.10										
11AM-NOON														
NOON-1 PM											0.85		1.10	
1-2 PM											1.10		1.95	
2-3 PM											1.95			
3-4 PM											2.85			
4-5 PM								1.10						1.10
5-6 PM	1.10			0.85			1.10		2.85		2.95		2.95	
6-7 PM											2.85			
7-8 PM											1.60		2.85	
8-9 PM											1.10		1.60	
9-10 PM				0.60									1.10	

**SR 91 HOT Lanes Toll Schedule
Orange County, CA**

3+ numbers have been growing, probably because they see a clear monetary benefit to car-pooling. Congestion on the adjacent freeway was at first relieved, but now has returned to normal as drivers have shifted their patterns to take advantage of the new lanes.

In 1996, 13 km of HOV lanes on I-15 outside San Diego were converted to HOT lanes. Using FasTrak, the program allows 2+ users free access to the lanes and solo drivers paid access. The cost varies (\$0.50 -\$4) and is based on the speed of the trip. Overall traffic on the road has not decreased, but speeds and reliability have. Carpool rates have increase 11% to 10,000.

In Houston, 2+ vehicles on the HOV lane of the Katy Freeway (known as the state's most crowded freeway) were so great that they raised the standard to 3+ in 1988. Yet this resulted in low usage. A compromise solution named QuickRide was implemented, where 2+ vehicles are permitted to 'buy in' to the 3+ HOV lanes during rush hours.

Both Los Angeles and Phoenix are considering changing their underutilized HOV lanes to HOT lanes, modeled after the San Diego program.

The FHWA has an \$11M/year *value-pricing* program (part of TEA-21) which singles out HOT lane projects worthy of federal study and start-up funds. The state of Maryland was recently awarded one of the 15 slots available to either introduce HOT lanes on the Washington Beltway (converting an existing lane or building a new lane), or introduce time-variable tolls on the Baltimore Harbor crossings or the Chesapeake Bay Bridge. The state of Virginia was awarded one slot in 1998 to convert all underutilized HOV lanes on I-64 in Norfolk-Richmond-Charlottesville to HOT lanes.

The New York Times, the nations leading newspaper opined in favor of HOT lanes in November 1998.

CONCLUSIONS

Taking all these factors into consideration, *new* HOV lanes in the US (those that are built as HOV lanes) simply mean new highway construction. They are under constant political attack to be opened to all traffic, with the result being a larger road, that was paid for with „congestion mitigation“ dollars intended to improve air quality. As a tool to make better use of the existing highway and transit infrastructure, *converted* HOV lanes (where an existing lane was reclassified), and HOV lanes at critical junctures (entry/exit, tunnels) have found limited success. The latest craze is HOT lanes, where drivers pay various rates according to the speed of their trip and/or number of people in the car. These could lead to public acceptance of road pricing in general, with the tolls sometimes supporting public transport. As such, HOT is supported by the sustainable transport crowd.

As one economist at a road pricing forum said „We would not be surprised at all if (the grocery store) decided to give away tomatoes, and every time we went there were no tomatoes.“

LESSONS TO LEARN

- ◆ Building new HOV lanes = new lanes.
- ◆ HOV ≠ carpooling ≠ reduced trips or pollution.
- ◆ HOV redistributes existing traffic.
- ◆ Carpooling steals from transit.
- ◆ HOT ⇒ Road Pricing.

ENDNOTES

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HOV=HOAX drawing courtesy George Haikalis.