

HOV Lanes $\frac{3}{4}$ Their Time Has Expired

When HOV restricted lanes ("High-Occupancy", "Carpool Lanes", or "Diamond Lanes") were first proposed in the mid-'70s it seemed like a pretty reasonable idea. Restricting a lane to carpools, would reduce congestion in that lane and offer an incentive for people to form more carpools. This would reduce the number of vehicles on the road, thereby reducing overall congestion, polluting emissions and fuel consumption. Orange County set forth to lead the nation in HOV lanes, with over 200 lane-miles currently operational or planned.

But now, 20 years later, there still has been *no proof, here or elsewhere*, that HOV lanes accomplish any of those fundamental objectives. And the simple rationale above, neglects adverse effects on the other lanes which may well outweigh the obvious benefits to the HOV lane occupants.

It may seem that it would be simple to measure before- and after- conditions to determine how much congestion and air quality are improved by the lanes. But, in practice, this has not happened. In fact, making such a measurement validly may be impossible. The reason for this is that it takes a long time - several years for whatever carpooling might be motivated by the lane incentive to fully develop. In the meantime, population growth, business and housing expansion, and economic conditions are almost certain to cause changes that mask the much smaller effects of an HOV lane.

Census statistics show that whatever additional carpooling the lanes may have caused, has not been enough to have any measurable impact on the long-term downtrend of fraction of persons carpooling.

Lacking any such direct proof, HOV lane advocates have put forth several misleading half-truth arguments such as "The HOV lane is carrying twice as many people as a regular lane and doing so in fewer cars." A little thought will show that such arguments: 1) measure only the separation of HOV and non-HOV vehicles among the lanes; itself a provably *adverse* effect on overall congestion; 2) fail to consider the adverse occupancy and congestion effects on the other lanes; and 3) misleadingly suggest, but in no way prove HOV lane benefits.

So how can we know? Fortunately we no longer have to guess. In the last twenty years, significant advances have been made in our quantitative understanding of the basic effects that govern HOV lane success or failure including:

- the amount of additional carpooling motivated by given time-savings;
- the effect of changes in traffic volume on travel-time; and
- the effect of changes in traffic volume and congestion on polluting emissions.

Comprehensive computerized Traffic Planning Models ("TPM"s) take all this accumulated understanding of the fundamentals into account objectively. Most

major cities in the US, and Southern California, and Orange County have developed and proven the effectiveness of such TPM models in studying the relative benefits of various transportation system physical or operational changes on congestion and emissions.

Almost unanimously, the verdict of such models is that unrestricted lane operation is far superior to HOV operation in every congestion, air-quality, and energy consumption measure. The reason is simple if not obvious. In choosing to operate a lane as HOV, the adverse effect of extra traffic imposed on the other lanes almost always far outweighs the beneficial effect on the HOV lane. Immutable laws of traffic engineering dictate that this is so.

Last year the Orange County Transportation authority completed a \$3.1 million dollar "Major Investment Study" using their "OCTAM" TPM model. Comparing Mixed flow to physically comparable HOV lanes, Mixed Flow was found to provide

- 7 times more total travel time reduction
- 2.5 times more freeway decongestion
- 2 times more arterial decongestion, and
- 12 times more reduction of Carbon Monoxide emissions,

all at 1/2 the total net cost of HOV lanes.

This year the Southern California Association of Governments ("SCAG") in their Draft 1998 Regional Transportation Plan found mixed flow lane additions would provide more than three times the total benefit of comparable HOV lane additions. Similar results have been found in fundamental studies at UC Berkeley, and in environmental studies for the SR-55, SR-57, and SR-91 freeway expansions in Orange County.

My own studies of the SR-55 on several different data-sets, with three different analytic approaches have all shown that HOV operation wastes typically half the potential lane person-carrying capacity. Orange County HOV lanes are wasting the equivalent of 100 lane-miles of new freeway, (\$800 million in replacement cost), and directly responsible for County -wide congestion of some 50 million person-hours (\$500 million per year in hidden costs to County residents). That's serious waste, even in Orange County.

OCTA, staff and directors have invested a great deal of money, and political capital in the nation's foremost HOV network. They are understandably reluctant to abandon this course without strong evidence. But that evidence now exists, much of it produced by OCTA themselves. But OCTA ignores that best evidence.

In the face of a serious looming capacity shortfall, congestion, and irrefutable evidence of HOV wasted capacity and unnecessary pollution, and energy consumption, it is well past time to correct this misuse of our freeways.

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