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How will law enforcement address gridlock in the year 2015; a fast look at a slow moving issue

Dave Faulkner

Command College Class #41

Lieutenant Dave Faulkner
The Fontana Police Department

How will law enforcement address gridlock in the year 2015?

"A fast look at a slow moving issue"

Introduction

California, like many states, is continuing to experience record growth. The California Department of Finance projects California will increase at an average rate of 22.3% between the years 2000-2015. Moving from place to place in Southern California is becoming increasingly difficult with each passing day. Traffic congestion is not new to most California residents. The time of day and day of the week can dramatically affect our commute. When one thinks of a commuting, most people draw from their experience traversing the state's vast freeway system. The truth of the matter is these commutes take place on local streets in the same manner as those forced to travel the freeways. The volume and frequency of traffic on both local roadways and our freeways can have a dramatic affect on the state's economy. In addition to the monetary considerations, our behavior is likewise affected by this issue.

To gain a better understanding of this issue, this article examines gridlock technology as an option to the traditional law enforcement traffic response. The following questions will serve as a point of discussion for this topic:

Lieutenant Dave Faulkner
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- Technology is continuing to evolve, therefore is technology the real answer to reducing congestion and gridlock?
- Should civic leaders look more toward the reduction of traffic congestion on a regional level rather than embracing a local punitive approach?
- Is the development and infrastructure supporting transportation technology worth the long term investment both financially and politically?

Modifying driving behavior can be a daunting task; however, it appears now is the time to act thus avoiding the *"If it isn't broke why fix it"* philosophy. Congestion leading to gridlock is caused by a number of factors aside from our rush to shave a few minutes from our commute. Closed highways, traffic collisions, and a simple interest in an incident also known as *"Spectator slowing"* can all contribute to congestion and gridlock. The Free dictionary defines gridlock as a traffic jam in which no vehicular movement is possible, especially one caused by the blockage of key intersections within a grid of streets. (The Free Dictionary, 2007, 1)

The scope of the issue

Southern California is not alone in the struggle to reduce gridlock on a regional scale. Cities on the eastern seaboard have been playing catch-up for many years with respect to gridlock. In a recent study the Texas Transportation Institute suggested between 1980 and 1999 newly constructed highway miles increased by 1.5 percent while miles traveled by the average American driver increased by 76 percent (U.S. Department of Transportation Federal Highway Administration [USDTFHA], 09/02/06). The 2005 Urban Mobility Report suggested the loss to the national economy was estimated at 63 million dollars annually in terms of lost productivity.

The National Transportation Safety Board predicts that delays caused by congestion will increase by 5.6 billion hours resulting in 7.3 billion gallons of wasted fuel.

In 2005, the population of California was estimated at 36,132,147 with an average increase estimated to exceed 6.7% annually (U.S. Department of Transportation Federal Highway Administration [USDTFHA], 2006, 1). Los Angeles County alone is responsible for 7,514,243 of the vehicles registered in the State of California (U.S. Department of Transportation Federal Highway Administration [USDTFHA], 2006, 1). 20.7% of the vehicles registered in California reside in Los Angeles County thus contributing to local congestion. Los Angeles County is flanked by Orange, San Diego, and Riverside counties, which are the most populated counties per capita in California. The increasing population in each of these areas combined with the number of drivers in California is quickly outpacing our ability to expand the necessary infrastructure.

Political battles over how and where tax money is spent can stall a proposed project before it gets

off the ground. Los Angeles, for example, is recognized as one of the most impacted cities in America in terms of gridlock. Light rail systems are slow to develop in this region, due in part to opposition to routes and infrastructure costs (Jennings, 2002, 1-2). Light rail systems continue to be seen as a viable option to reduce gridlock and congestion regionally. Huntington Beach California referred to as *"Surf City"* is one of 34

cities in Orange County eligible for $100,000.00 each in support of light rail exploration. Huntington Beach Councilwoman Cathy Green commented *"We're so isolated from transit here and so dependent on our cars"* while discussing options to congestion and gridlock (Light Rail Now! NewsLog [LRNNL], 2006, 7-8). Changing the political climate may be one way to generate support for using technology, money, and resources to help solve this growing problem.

Traffic congestion appears to be a way of life for most Americans unless you reside in a rural part of the country. We take for granted our ability to move from place to place. In our hurry to save time, many of us utilize *"a secret short cut"* if you will that can make the difference on busy commute days. Commuters, in their desperate attempt to save time by driving quickly to avoid congestion, often by their very driving actions contribute to the very condition they hoped to avoid. The truth of the matter is most drivers are not patient enough to wait in traffic and will frequently exhibit their inner personalities behind the wheel of a motor vehicle (The Virginia Department of Motor Vehicles, 2007, 4). Studies have shown people who make long commutes are more prone to high blood pressure, sleep deprivation, and depression than the average American (Longman, 2001, 2).

What exactly is gridlock?

Gridlock can occur on a highway, computer network, or even while leaving a sporting venue. People, products, and vehicles are competing for the same space at the same time in a rush to get from one place to another. This definition was put to the test in March of 2003 when thousands of war protesters poured into San Francisco in an effort to disrupt life in the city. Protesters occupied intersections, blocked buildings and attempted to shut down the Bay Bridge

(SFGate.Com, 2003, 1). Although several hundred protestors were arrested in the event, they did succeed in their goal of creating gridlock on a regional scale. The demonstration in San Francisco illustrates how a sudden surge of pedestrians introduced into an environment primarily reserved for vehicles brought movement to a halt.

The term gridlock is also used to describe higher than normal levels of traffic congestion whether or not gridlock in fact occurs.

Gridlock is often associated with congestion and is one of the conditions which bring traffic to a halt during rush hour commutes. As vehicles approach a bottleneck, they brake quickly sending a shock wave rearward toward approaching vehicles. As vehicles begin to move forward, the shock travels back *"upstream"* resulting in stop and go movements (Budiansky, 2005, 2-3). Newton's third law of motion describes how actions and/or forces have an equal and opposite affect on one another (National Science Teachers Association [NSTA], 1999-2006, 1).

German physicists and mathematicians studying gridlock understand these theories well. They concluded the algorithms identified in mathematical computer models indicate traffic congestion and gridlock are the result of bottlenecks (merging lanes, bad curves, and accidents). While searching for answers, German scientists' found gas molecules acted similarly to vehicles under

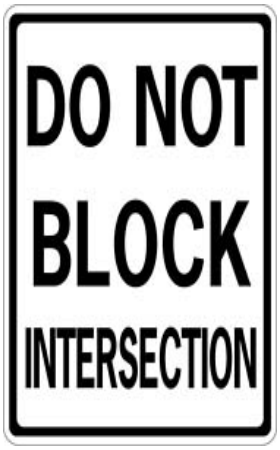
the same conditions; the difference being gases did not react to impending hazards. (Budiansky, 2005, 2). Gases collide with one another as they attempt to navigate the restriction. The increased pressure [net force] causes gas molecules to accelerate under Newton's second law [*F=ma*] which defines how force *"F"* is equal to the mass *"m"* multiplied by the acceleration *"a"* (The Physics Classroom [TPC], 1996-2004, 1-2). The physics and mathematics of gridlock does help us better understand congestion, but does not serve to solve the bigger problem of what to do about it and how it affects our economy.

<u>One thing affects another</u>:

Gridlock costs Americans time and money with each passing minute while waiting in traffic. The average driver is estimated to spend the equivalent of nearly two full work weeks each year [93 hours if not more] in their vehicle commuting to and from work (Urganda, 2006, 1). You would be hard pressed in California not to find a mid size city somewhat impacted by gridlock and/or traffic congestion. People are now more than ever making their decisions about where to live and work based in part on the number of hours spent behind the wheel of a vehicle. People frequently choose to earn less money per year in trade for working closer to home. In turn, businesses are examining relocation as a means of moving closer to their potential work force. The Lusk Center for Real Estate predicts the Inland Empire will continue to be California's fastest growing area. Lusk estimated the Inland Empire will grow by 10,000 people each year forcing companies to examine the concept of using satellite offices to avoid losing employees to competitors (San Diego Source [SDS], 2006, 1).

Pressure is often brought to bear on State and local leaders to resolve this issue. Traffic concerns are often voiced during council and community meetings. Police departments in turn respond with high visibility enforcement as means of temporarily addressing the problem. In most cases, the sheer number of violators overwhelms the effort of the traffic unit working the intersection. To the general public, gridlock laws are vague and ambiguous. California law identifies gridlock as a parking issue rather than a moving violation. For this reason, traffic signs posted above intersections prohibit *"blocking the intersection."* Drivers blocking intersections are in violation of California Vehicle code section 21461(a) which states in part *"it is unlawful for any driver of a vehicle to fail to obey any sign or signal erected or maintained…"* The question of driver identification is then resolved.

Confusion often leads to additional frustration on the part of drivers already challenged by the systems in place that control traffic flow. Drivers make conscious decisions each day to violate traffic laws in an effort to save time. The few seconds saved by one driver blocking an intersection affects more than the individual making this decision. How then can law enforcement address this issue from a broader perspective?



The Traditional Approach

The current approach embraced by police agencies is to seek compliance through enforcement. Traffic volume is affected by a number of issues. These include the time of day, roadway conditions, and sheer volume of vehicles trying to occupy the same space at the same time. Governor Schwarzenegger was quoted recently speech in Riverside *"For to many people,*

gridlock has become a way of life." (Office of the Governor [OG], 2005, 1) Gridlock occurs not just on the highway, but in venues where the pipeline [roadway] is not wide enough to accommodate the load that is being asked to pass through or on it. What or who is really to blame then for traffic jams? The depressing answer to this question is may be *"nothing at all."* No hard fast evidence points toward one cause for traffic jams. Take a moment the next time you are caught in the middle of a traffic jam and try to account for the problem using a common sense approach. Find the reason for the bottleneck and traffic will once again flow on the roadways. You might take each of the aforementioned factors into consideration before answering the question.

Drivers contribute to congestion by perceiving and reacting to what they feel is a hazard even if the hazard is located in the opposing lanes of the roadway (Faulkner, 1996-1999, 1). Random slowing can affect traffic flow for many hours after the initial action takes place. It is easier to start a traffic jam than to stop one (Budiansky, 2005, 4). As traffic begins to slow, aggressive driver's change from one lane to another. Their decision to shave a few moments from their commute has a rippling effect on the vehicles following behind them. Brake lights become visible as the approaching drivers react to the shortened distance now present between vehicles. As each person reacts to both slowing and eventually starting, the time and distance of the congestion is increased. Perception and reaction time has a dramatic affect on traffic flow. Can emerging technology work toward reducing or eliminating perception and/or reaction time thus reducing collisions?

Turning to technology:

Cities across the United States have turned to technology to reduce broadside and rear-end collisions at intersections. Widely-used red light camera technology captures the image of the driver running the red light from several different directions. A sworn officer verifies the violation and issues a citation, which is then mailed to the registered owner containing a photo of the driver. The enforcement aspect of this approach delays the impact to the driver until the citation is received by mail. Libertarians argue a person's right to privacy is violated with photos taken in this manner. After examining data obtained by the Insurance Institute concerning intersection accident rates, the National branch of the ACLU opted to support camera technology provided the information is used solely for traffic enforcement (American Civil Liberties Union [ACLU], 2000, 1).

Camera technology is receiving mixed reviews from both law enforcement and civic leaders. Boulder Colorado recently published its five year study of red light camera technology claiming collisions were reduced in 2001 by up to 34% in comparison the same period in 1998 (Cowen, 2001, 2). In contrast, The Washington Post conducted their independent study of camera enforcement in the D.C region and found red light cameras failed to reduce accidents. Red light cameras generated 500,000 violations and $32 million dollars in fines over six years in Washington D.C. In D.C., civic leaders failed to acknowledge the Washington Post study and stood by their use of this technology

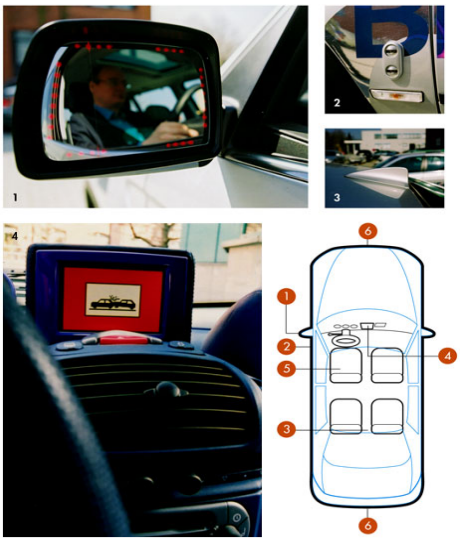
(Weber & Willis, 2005, 1). To address this argument, technology as it relates to gridlock enforcement should not focus solely on collision prevention or enforcement, but rather toward reducing congestion and gridlock.

While researching this issue, the author learned enforcement and/or technology alone may not necessarily be the best answer. Although effective in most traffic related scenarios, enforcement does not always work to reduce congestion on a broad scale. Instead, it can contribute to it. Enforcement stops conducted by uniformed officers tends to create a noteworthy distraction for drivers creating a phenomenon known as *"spectator slowing."* Spectator slowing often occurs when drivers show interest in an activity in or around traffic lanes adding to congestion already present. Photo enforcement is far less intrusive which may help reduce the number of blocked intersections, but fails to resolve gridlock on a regional level.

Traffic signals for the most part cycle through a given time. Drivers facing a red signal first see the changing light, and then react to the vehicle in front of them moving forward before taking action themselves. In short, a line of (10) vehicles stopped behind a limit line will all react differently consuming upward of six seconds [1.5 seconds each] while perceiving and reacting to a *"green"* signal. Often the light changes back to *"red"* before we can move our vehicle forward. Imagine a time in the future when all vehicles would move forward in unison rather than in the previous scenario. The additional [15] seconds would allow many more vehicles to pass through the same intersection (Faulkner, 1996-1999, 140). Can traffic signals and vehicle movement somehow be linked to reduce perception and reaction times?

Looking toward the future:

The primary goal of intelligent transportation systems is to move traffic through a given intersection more efficiently reducing the time drivers perceive and react to the changing traffic controls. To accomplish this, the driving public will need to relinquish at least some control to a vehicle's on board computer which will make these and many more decisions for them. Current satellite tracking systems help drivers locate their destinations far more quickly with turn by turn directions. Taking this concept one step further, could vehicle and traffic control devices integrate with one another in an effort to reduce accidents through the advent of collision avoidance? Longitudinal and lateral collision avoidance systems serve to warn a driver of an impending collision, partially control the vehicle [driver assistance], or completely control the vehicle through automation (ITS Decisions [ITSD], 2007, 1).



Adaptive cruise control and forward collision warning systems work with the driver helping to identify potential hazards before they become a significant threat to the safety of the occupant. Infrastructure based systems make intersection control decisions once vehicles are detected by in-ground sensors. Intelligent transportation systems incorporate vehicle warning technology and ground based control systems to reduce collisions and move traffic more effectively (ITSD, 2007, 1). Intelligent transportation systems require a heavy investment both publicly and privately to be truly successful (Puentas, 2001, 1). Smart

transportation advocates argue efficient traffic systems result in travel time improvements ranging from 15% - 25% (Atkinson, 2001, 3).

Vehicle manufactures are moving toward integrating automobiles with traffic control devices. Our first foray into this area is the advent of vehicles that park themselves [2007 Volvo]. The knowledge gained from this endeavor will no doubt lead to further advances in this area. Once developed, smart transportation systems and the vehicles that utilize them will serve to reduce but not completely eliminate gridlock and congestion. The marriage of technology and vehicle development is encouraging, however in the short term commuters will need to accept delays unless they seek alternative transportation i.e. mass transit.

If the aforementioned partnership of technology and telecommuting alone is not the answer; then what other part of the puzzle is missing in the solution? The government must assume a leadership role providing grants that stimulate development of smart transportation technology. They should support transportation systems which provide options for commuters. I'm not suggesting government be solely responsible for solving this problem, however they are a major stake holder in the solution.

Looking toward the future – An expert panel weighs in

On November 2nd, 2006 a panel of experts was assembled in Fontana California in an effort to identify trends and events as well examining alternatives to current approaches used by law enforcement to reduce gridlock and congestion. The panel included a city councilmember, an assistant to the city manager, a traffic engineering manager, a traffic sergeant, a traffic officer

specializing in red light technology, an accident reconstructionist, an cycle enthusiast, an ACLU attorney, and a camera technology specialist. The panel was tasked with assessing possible avenues of action focusing on the question “Should you be interested in reducing gridlock and congestion in your area, research supports you take what steps?” Their considered conclusions were to:

- Create a committee comprising of civic leaders who are interested in addressing congestion and gridlock on a regional scale.
- Convince local leaders not directly affected by congestion through an educational campaign to address gridlock now rather than waiting for development which may surface in a more public forum.
- Motivate technology providers by supporting research for a product on the municipal front as Beta test sites.
- Convince state and federal legislators to fund smart transportation technology by creating incentives to technology providers.
- Approach law enforcement from a solution based perspective rather than mandating enforcement.

The panel saw these recommendations as a spring board toward generating interest in gridlock reduction. Collectively they realized these recommendations were just that; and based on their very nature, did not mandate a plan of action on any one entity. They did, however, understand their individual roles in bringing these issues back to the larger group for a balanced discussion on a broader scale thus moving them forward toward an intended action status. A regional

solution offers hope in developing working relationships toward the common goal of reducing gridlock and congestion that will be viewed positively by all involved.

Conclusion

Arguments abound for and against commuting and the effect(s) it has on the environment. Fossil fuels will continue to create smog in southern California. Only strong encouragement will place this issue on the radar screens of our legislators. Expensive infrastructure improvements are not the answer to this growing concern. Widening a roadway under these conditions is analogous to purchasing a larger belt for someone facing obesity. Commuters are tired of waiting in long lines of traffic and demand action rather than more of the same. Commuters are caught in the middle between two agendas. The first being advocates who feel gridlock will force people to use mass transportation and those who push for technology options as a future relief to our current situation. One thing for certain is gridlock and congestion is firmly on the radar screen of traffic engineers and law enforcement leaders alike for many years in the future.

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