

Traveling Safer and More Sustainably in San Jose

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Abstract. Surface transportation in America is the engine that drives the economy. However, the vehicles on our roads are the second largest contributor to poor air quality, behind electrical energy production. As congestion increases, and the nation's infrastructure ages, the impacts on the environment grow as does the cost to replace or repair failing infrastructure.

San Jose is making serious efforts to change the way it does business in planning, designing, operating and maintaining its transportation systems. San Jose is leading by example, by changing its standards and policies to drive change from within, to demonstrate to the community and private industry the positive environmental and fiscal impacts of safe and sustainable transportation investments.

INTRODUCTION

San Jose, California is the 10th largest City in the nation, with a population over 974,000 residents. Through sound practices in land-use planning, transportation design, operations, maintenance, education and enforcement, San Jose continues to be a national leader in its low rate of traffic injury crashes. Table 1 depicts San Jose's impressive safety record for its more than 2,300 miles of roadway. With an annual injury crash rate of just 3.0 crashes per 1,000 residents in 2007, it is well below half of what it was in 1990, and significantly below today's national average of 5.9.

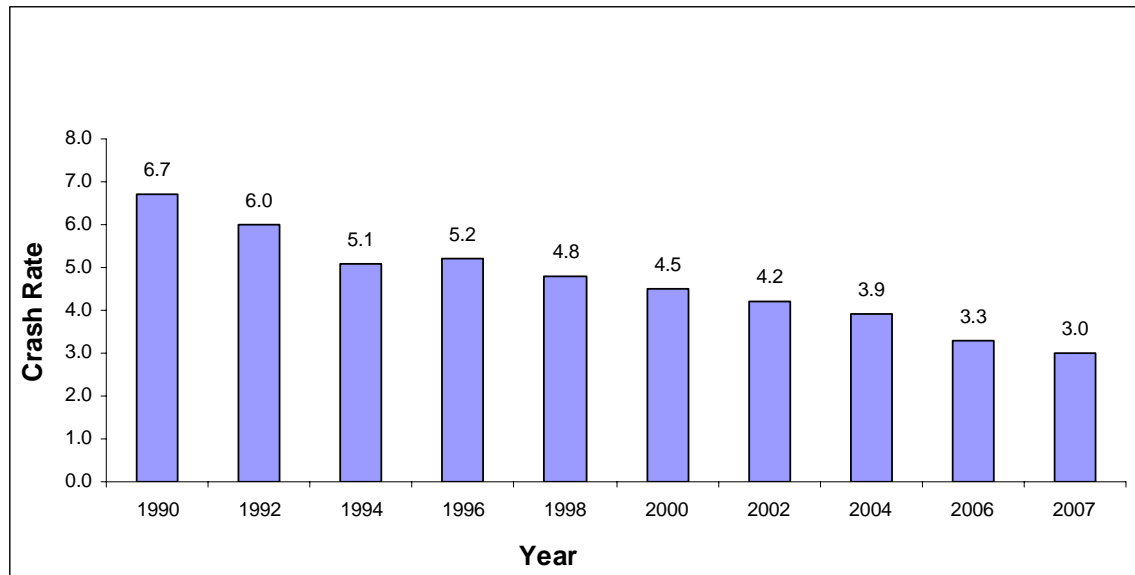


Table 1 – Injury Crash Rate per 1,000 residents: San Jose, 1990-2007

The steady decline in the injury rate over the last 17 years equates to an avoidance of nearly 3,600 injury crashes when comparing the 1990 rate to that of 2007. Table 2 illustrates the decline of the total number of injury crashes against the rising population since 1990. Each year, a rigorous review of development and crash patterns is conducted by engineering, planning, maintenance and police personnel to determine where capital and operating investments should be made to lower the probability of crashes. The constant effort to reduce serious crashes, results in lives being saved, lower hospital and automotive expenses, and an improved quality of life. In addition, for every injury crash avoided, it eliminates an emergency response for police, fire and paramedic personnel.

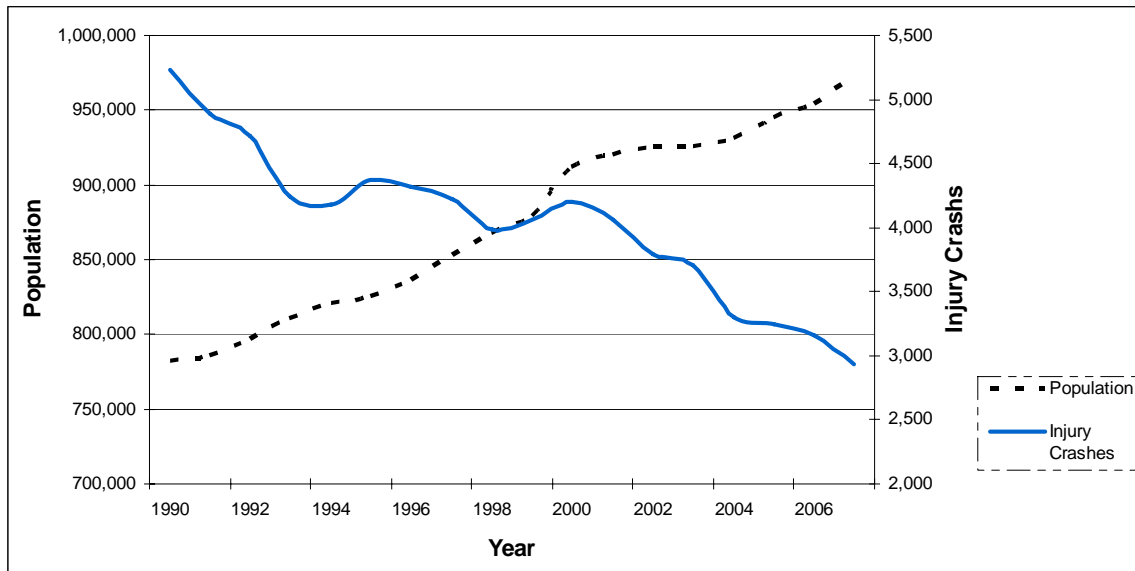


Table 2 – Comparison of Injury Crashes to Population, 1990-20070

Rightfully so, the number one goal of transportation engineers is safety. However, there is an extremely important factor today’s transportation professional must take into consideration before making operational or capital improvements, and that is sustainability and the environment. Coupling today’s climate crisis with an aging infrastructure makes it imperative that professionals make **safe** and **sustainable** transportation policy and improvements.

Vehicle emissions on our nation’s roadways are the nation’s second highest contributor to poor air quality, only behind the process of producing of electricity. In California, vehicle emissions in urban areas are the number one contributor to greenhouse gases. To lessen the impact surface transportation has on our fragile environment, public transportation professionals must first “walk their talk”. If we want to reduce single-occupant miles traveled, clean our air, and improve the quality of water runoff, public transportation professionals need look no further than their own operations. To have any reasonable chance to affect climate change on a large scale basis, every municipality must lead the way by changing internal policies, standards, procurement practices and work methods. By doing so, it will demonstrate to the broader the community that

sustainable transportation solutions can result in safer, cleaner and more efficient operations.

Transportation and civil engineers, planners and maintenance teams are responsible for developing and adopting standards, programs and policies for the design, construction and operations of transportation infrastructure. Their decisions and actions **MUST** be made in concert with educational, housing and economic goals for that respective region. Smart growth starts with the notion of linking housing and jobs. Thus, shortening commutes while expanding commute options can improve today's quality of life and help to preserve precious environmental resources for future generations. San Jose's 7,000 employees are becoming "early adopters" of new ways of doing business and acting as community ambassadors for change to improve transportation and the environment.

San Jose's Green Vision

The diverse environmental challenges facing the world today and tomorrow has positioned San Jose well to be a model City to expand its safety and sustainability efforts, and improve upon its long history of environmental leadership and economic innovation. As the Capital of Silicon Valley, San Jose has poised itself to work with its private and non-profit partners and educational institutions to create thousands of new "clean tech" jobs. These technology jobs will produce the types of energy, communications, transportation, lighting and other innovations that the world will need to help solve the energy and climate crisis that every nation faces. These innovations will help San Jose achieve its goal of reducing overall energy use per capita by 50% and receive 100% of all our electrical power from clean renewable sources within 15 years.

San Jose adopted its Green Vision in October of 2007. It is a comprehensive strategy to become more energy efficient, create green buildings, divert waste from landfills, create greener street systems, deliver more recycled water and greatly reduce greenhouse gas emissions. The Green Vision and its ten bold goals can be accessed on the internet at: www.sanjoseca.gov/pdf/SanJoseGreenVision.pdf.

The City's Green Vision combined with its General Plan, along with State and federal environmental, energy and transportation regulations will be San Jose's guide to reduce our dependence on fossil fuels, develop and utilize more sustainable roadway and transit infrastructure and control devices, and advance the use of alternative fuel vehicles and plug-in hybrid vehicles. The Green Vision is a comprehensive strategy that will show the developed world how environmental responsibility makes social and financial sense and stimulates economic opportunity.

Walking Our Talk

To initiate change in safe and sustainable transportation systems, it all begins with the way we plan, design and build transportation infrastructure. Guiding policies, such as the General Plan or local development plans serve as blueprints of "where" to build improvements. However, changing construction standards and specifications dictates

“how” we build the street infrastructure. It is these very standards and details that drive change in the materials we procure, construction practices and maintenance activities.

San Jose has initiated a comprehensive re-write of its Standard Specifications and Standard Details. Six committees have been formed to review and update all construction standards and details. A seventh committee serves as a “sustainability” oversight committee, to ensure to the extent possible that materials and practices are “green” and environmentally friendly. For example the percent of recycled aggregate in roadway base layers, or the percent of fly ash allowed in a concrete mix are ways in which San Jose will preserve native materials. An important goal of the new specifications will be to reduce quarry operations, transport of raw materials and drive in the local construction industry.

Conversion to Light Emission Diode (LED) traffic signal heads not only saved millions of kilowatt-hours of electricity in the City’s approximate 900 traffic signals, the extended lamp life has reduced the need for maintenance crews to re-lamp the old incandescent bulb once per year. Why this is important, is that the reduction in greenhouse gas emissions from driving diesel lift trucks to intersections every work day of the year has greatly reduced vehicle fuel consumption and harmful air emissions, but also reduced the need to block travel lanes that results in more congestion. Another benefit of using long-life LED signal heads has been worker safety, as maintenance teams spend much less time in moving traffic.

Converting pedestrian signal heads to LED countdown heads had a similar impact on energy and labor savings, but also a substantial impact on safety. The benefit of pedestrians knowing the amount of remaining time to cross a street was studied and determined to result in more informed and much safer decisions by pedestrians. The universal application of count-down pedestrian signals could be considered as one of the most significant pedestrian improvements the City has implemented in decades, particularly in high-use downtown and school-area traffic signals. Countdown heads demonstrate the win-win-win scenario of replacing costly, aging infrastructure, with energy-efficient devices that in turn, improve safety. Table 3 illustrates energy and cost savings related to the conversion of the 52,000+ vehicle and pedestrian signal heads in the City’s entire traffic signal system.

Traffic Signal Energy Consumption and Cost Savings		
	Annual Energy Consumption	Annual Energy Cost
Incandescent Light Source	15,100,000 KWh	\$1,850,000
LED Light Source	1,300,000 KWh	\$160,000
Total Savings	13,800,000 KWh	\$1,690,000

Table 3- Energy and Cost Savings of LED Traffic Signal Head Conversion

Greening our Fleet

San Jose's fleet consists of over 2,700 vehicles and heavy pieces of equipment. The Green Vision calls for 100% of public fleet vehicles to run on alternative fuel by 2022. A near term target is to reduce vehicle emissions by 25% in five years. This goal not only results in cleaner air, it will stimulate the local market for alternative fuels and vehicles and advance the development of businesses and technologies in this sector. Currently, 34% of the fleet runs on some form of alternative fuel, with the majority of that being diesel vehicles and equipment running on Biodiesel-10 (10% recycled oil additive). By the end of calendar year 2008, B-20 will become the standard for all diesel equipment.

The Transportation Department (DOT) has a sizeable portion of the City's fleet, since DOT is responsible for all street, and storm/sanitary sewer maintenance and operations activities. DOT is also responsible for on-street parking enforcement. This fleet of approximately 25 vehicles is also being converted to hybrid-electric, and bicycle.

To encourage safe driving and parking activities near San Jose's nearly 200 K-12 schools, the Parking & Traffic Control Officers (PTCOs) have regular patrols in school zones during drop-off and pick-up times. Using hybrids that run on the electric motor at low speeds, results in lower emissions and cleaner air near our schools. If the PTCO parks the vehicle and patrols on foot, the LED speed display board mounted on the back of the vehicle, can be activated to remind motorists of their speeds, and to slow in school zones. Again, replacing aging vehicles with more energy efficient ones, and providing two core services, parking compliance as well as traffic safety, reduces the City's overall carbon footprint while achieving its neighborhood traffic calming goals.

With nearly 1,800 employees in City Hall located in San Jose's downtown, parking can be a challenge, particularly during mid-day. To help offset our carbon footprint for short business trips, and encourage healthy life style, six bicycles have been added to the vehicle fleet, equipped with carrying bags and safety lights. Bicycle safety training is provided by the City's Bicycle Coordinator. As demand grows for more use, bicycles can easily be added.

Green Mobility

San Jose has made great strides over the years implementing smart growth, transit-oriented development and sustainable urban design form. The highway, arterial and local roadways systems are almost entirely built out, however the bikeway and trail systems are only about 50% complete, and transit systems at about 70% complete. A major goal of the City's Green Vision is to create 100 miles of new interconnected trails and to complete the on-street bikeway system within 15 years. In addition, the Bay Area Rapid Transit (BART) expansion to San Jose is under design, and is expected to be complete in 2016. An Airport People Mover (APM) is also being planned to connect BART and other rail systems to the Mineta San Jose International Airport. A High Speed Rail

system is planned for the California voters in November, and if approved and funded, it would serve San Jose between San Francisco and Los Angeles.

The City's Green Vision establishes a goal to "green" the City streets by planting 100,000 new street trees over the next 10 years, and to convert all roadway lighting to energy neutral by 2022. San Jose currently has over 250,000 street trees and 60,000 streetlights sharing space on its 4,500 mile system of sidewalks. The City is in the process of rewriting City Council guiding policies for both street trees as well as streetlights. The policy on trees will discuss the significance of a healthy urban forest and the benefits trees have on the climate, reduction of light reflection, cooling, aesthetics and property value. The policy on lights will focus on safety, the need to minimize sky glow, maximization of efficiency and the need to expand the functionality of lights to wired/wireless nodes for communications and monitoring purposes. The City has issued a Request for Information (RFI) seeking best practices on solar-powered lighting systems, advanced LED streetlight intelligence, electric vehicle plug-in stations on streetlight poles, and automated metering/monitoring systems. Advancements in the solar, communications and lighting industries will be monitored closely as San Jose strives to have a zero-emission lighting system.

Will risk-taking and creativity be required to achieve San Jose's Green Vision and Green Mobility goals? Certainly. Today's transportation stewards must lead the way to achieve 21st century solutions to solve major challenges facing us in population impacts, climate change and shrinking fiscal and natural resources. To help San Jose's Department of Transportation achieve our vision, we have created a transportation/environment specialist position to serve as the Department's Sustainability Officer. This position reports to the Director, and provides leadership, management, outreach and analysis to minimize the impact of DOT activities on the environment. The position researches, develops and implements strategies (including performance measures and annual reporting) to address environmental challenges and regulations. Most importantly, the position will help the Department to integrate sustainable and environmentally-friendly practices into all DOT operations and systems.

CONCLUSION

San Jose, California is positioning itself to be a leader in ensuring that policies and practices within the Transportation Department minimize impacts to the quality of life in the San Jose metropolitan area, and that maximum safety and sustainability benefits are gained from investments in transportation assets, such as lighting, street trees, signal systems, asphalt products and concrete mixes. Working with private and non-profit partners, utility companies and educational institutions, San Jose, the heart of Silicon Valley, continues to drive technological innovation and convergence of compatible technologies and assets to maximize the effectiveness and efficiency of all transportation investments and to spur the local and national economy.

REFERENCES

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