Highways for LIFE

National studies show that many motorists in some of our nation's largest urban areas are spending the equivalent of one whole workweek -- 40 hours -- simply stuck in traffic. This is a significant waste of time and money, costing the average motorist over $1,000 each year. The wasted fuel from millions of idling vehicles also contributes to the pollution of our air. Ironically, building more roads and bridges to reduce such congestion often has the opposite effect -- of making congestion worse while construction is underway.

What if road crews could find ways to accelerate their work, causing fewer motorist delays, while at the same time building new roads and bridges of such superior quality they would last twice as long as today's typical highway project?

This vision is not unattainable; it is happening right now. When a disaster has required extraordinary effort to get a major transportation facility back in service, the owners and industry have risen to the occasion. For example:

- Loma Prieta Earthquake – CA
- I-40 Bridge Collapse at Webbers Falls – OK
- Queen Isabella Causeway Collapse – TX

These and other exceptional efforts have demonstrated the tremendous potential of the highway community, and the technology and practices available to us. Accelerated construction techniques can dramatically reduce the time the public has to spend driving through work zones. Use of manufacturing processes or prefabricated components will expedite the on-site phase of construction, improve the quality of the end product, and reduce the exposure of both the construction forces and the traveling public to the hazards of the work zone. Innovative contracting approaches can streamline the front-end efforts and promote quality in the end product of the construction process. Collectively, these advances can greatly improve the economic return on the investment we make in highway infrastructure. However, a higher level of standards, expectations, and leadership are needed to drive widespread adoption of these innovations and technologies.

Highways for LIFE[1] is an integrated approach to the construction process with three strategic goals:

- Reduced congestion due to construction
- Improved Safety
- Improved Quality

Funding for Highways for LIFE is included in the Administration's $247 billion reauthorization proposal. A $1 billion dollar investment over the life of the new bill is proposed as part of spending down the balance of the highway trust fund.

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[1] LIFE is an acronym for **L**ong lasting highways using **I**nnovative technologies and practices to accomplish **F**ast construction of **E**fficient and safe pavements and bridges.

Congestion. A Texas Transportation Institute study estimated the cost of congestion in the Nation's 75 largest urban areas at $67.5 billion in 2000, which was the value of 3.6 billion hours of delay and 5.7 billion gallons of excess fuel consumed. Work zones contribute to such congestion. In 2001, highway construction work zones resulted in an average of 2.6 hours of delay per driver. Accelerated construction techniques can dramatically reduce the time the public has to spend driving through work zones, and improved quality can ensure that work zones will be employed less frequently.

A 2001 Federal Highway Administration report describing surveys of the driving public concluded that "Improvements in traffic flow, pavement conditions, and work zones may result in the greatest rise in traveler satisfaction. Work zones are especially critical as travelers view road repairs as a major reason for traffic delays."

Safety. Work zones are dangerous places. In the five years from 1997 to 2001, the number of people killed annually in motor vehicle crashes in work zones soared from 693 to 1,079. Eighty-five percent of those are drivers or occupants of vehicles. Also, each year, substandard roadway conditions, obsolete designs or roadside hazards are a factor in approximately 15,000 highway fatalities. Highways for LIFE technologies and practices will minimize the on-site phase of construction, thereby reducing the exposure of both the construction forces and the traveling public to the hazards of work zones.

Quality. Historically, pavements that last for 35 years or more, and bridges that remain safe and serviceable for 100 years, happen only occasionally. Because the original design life of many of our highway facilities has long been surpassed, 11,000 miles of the National Highway System are now in poor condition, and more than 24,000 of its bridges are classified as "deficient." Highways for LIFE will raise the quality of the Nation's highways by driving the adoption of best practices, technologies and procedures that will provide a longer-lasting, better-performing highway system.

Highways for LIFE represents a smarter, more efficient and effective method of highway construction. Because higher levels of quality will be built into highways and bridges, maintenance, repairs, and rehabilitation will be less frequent. This reduced need for intervention translates directly to reduced life-cycle costs, and a higher return on the initial investment. As Highways for LIFE technologies and approaches become more standardized, the highway construction industry will achieve greater productivity, and initial costs will decrease. This decrease in costs will translate into more highway projects from the same investment levels.

The Highways for LIFE goals will be achieved through demonstration projects built under high standards for quality and performance, technology transfer activities and industry partnerships. Highways for LIFE will accelerate the evolutionary changes taking place in the highway industry so that the advanced technologies and innovative approaches that are now used on a sporadic basis become the standard way of doing business much sooner.

Some examples of how Highways for LIFE technologies and innovations are being used…

Mitchell Gulch Bridge, Denver, Colorado		
	Conventional Construction	**Highways for LIFE**
Technology	• Cast-in-place • Assembled on site	• **Prefabricated** • **Pre-assembled**
Process	Design-bid-build	**Value engineering**
Time of Construction	60 days (estimated)	**2 days (actual)**
Summary	• *Time of construction reduced 97%* • *Initial construction cost savings of a "couple of thousand dollars"*	

1.7-mile segment of Interstate 10, Pomona, California		
	Conventional Construction	**Highways for LIFE**
Technology	4-hour strength concrete	**4 hour strength concrete**
Process	• Design-bid-build • Limited outreach	• **Incentives/disincentives** • **Extensive outreach to inform public of closure**
Time of Construction	16 night-time closures of 7-10 hours (estimated)	**One 55-hour weekend closure (actual)**
Summary	• *Time of closure reduced 51% to 66%* • *Duration of construction reduced 81%*	

Expansion of 120 miles of New Mexico 44 from two to four lanes		
	Conventional Construction	**Highways for LIFE**
Process	Design-bid-build	**Design-build**
Time of Construction	27 years (estimated)	**3 years (actual)**
Cost of Construction	$261 million (estimated)	**$252 million (actual)**
20-yr. maintenance cost	$151 million (estimated)	**$62 million (warranteed)**
Summary	• Time of construction reduced 89% (24 years!) • Cost savings of $98 million over first 20 years of service	

I-95 Bridges over the James River ~~Bridges~~, Richmond, Virginia (Superstructure replacement and substructure rehabilitation of twin 4,184' bridges)		
	Conventional Construction	**Highways for LIFE**
Technology	• Cast-in-place construction • Typical concrete	• **Prefabricated and assembled composite units** • **High-performance concrete**
Process	Design-bid-build	**A + B contracting with incentive/disincentive**
Time of Construction	36 Months (estimated)	**7 Months (actual)**
Cost of Construction	$43.7 M (estimated)	**$38.6 M (estimated)**
Summary	• *Time of construction reduced 81% (29 months)* • *Initial construction cost savings of 12% ($5.1 million)*	