

Statement of

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Transportation Research Priorities: Maximizing
Return on Investment of Taxpayer Dollars

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Subcommittee on Technology and Innovation

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The American Society of Civil Engineers (ASCE)¹ would like to thank the Technology and Innovation Subcommittee for holding a hearing today on how to maximize funding for transportation research priorities. The Society is pleased to present to the Subcommittee our views on investing in surface transportation research.

The Highway Trust Fund has been an essential source of funding for surface transportation research and technology (R&T) for decades. Research results have led to many benefits including: materials that improve the performance and durability of pavements and structures; design methods that reduce scour (and consequent threat of collapse) of bridges; intelligent transportation systems technologies that improve safety and reduce travel delay; methods and materials that radically improve our ability to keep roads safely open in severe winter weather; innovative management approaches that save time and money; analytical and design approaches that reduce environmental impacts that support sustainable development and improve the aesthetic and cultural aspects of transportation facilities. These benefits are provided through several major transportation research programs and have proven critical in developing a 21st Century surface transportation system.

However, while research has provided many benefits for the nation's surface transportation systems, in ASCE's 2009 *Report Card for America's Infrastructure* roads received a D-, bridges a C, and transit a D. Furthermore, to bring just these three categories of infrastructure into a state of good repair would require a 5 year investment of \$1.2 trillion from all levels of government. While an investment of this magnitude seems unlikely at a time of economic uncertainty, a number of targeted research programs could extend the life span and effectiveness of our built environment. In the long term, investment in research and development technologies and processes can help reduce the gap between the current transportation funds available and the \$1.2 trillion necessary for road, bridge, and transit repairs. Research funding will prove critical to achieving national transportation goals in safety, quality of life, economic health, environment impacts, sustainability, and security in the next surface transportation authorization bill.

ASCE supports several general principles in the reauthorization of research and technology programs in the nation's surface transportation legislation. Improvements resulting from research and technology are critical to achieve national transportation goals, therefore funding for these activities should be increased to levels that will continue to provide high returns on investment. Research programs should be conducted according to the highest scientific and engineering standards, from priority setting to the awarding of contracts and grants, to review and evaluation of research results for implementation.

ASCE supports the following actions regarding specific surface transportation R&T programs:

- The research and technology portion of the State Planning and Research (SPR) program should be maintained to help support state-specific activities while continuing to encourage the states to pool these resources to address matters of mutual interest.

¹ ASCE was founded in 1852 and is the country's oldest national civil engineering organization. It represents more than 140,000 civil engineers individually in private practice, government, industry, and academia who are dedicated to the advancement of the science and profession of civil engineering. ASCE is a non-profit educational and professional society organized under Part 1.501(c) (3) of the Internal Revenue Code.

- University research should continue to be supported through the University Transportation Centers (UTC) program using a competitive selection process that guarantees quality participants and fairness in the allocation of funds.
- The Federal Highway Administration's (FHWA) program should be strengthened by giving it sufficient funding and flexibility to implement the recommendations of Transportation Research Board (TRB) Special Report 261 The Federal Role In Highway Research and Technology: to focus on fundamental, long-term research; to perform research on emerging national issues and on areas not addressed by others; to engage stakeholders more consistently in their program; and to employ open competition, merit review, and systematic evaluation of outcomes.
- The recommendations of TRB Special Report 295 “The Federal Investment in Highway Research 2006-2009, Strengths and Weaknesses” should be implemented.
- The Strategic Highway Research Program (SHRP II) should be continued beyond the life of SAFETEA-LU, ensuring that critical research will be continued in key areas of surface transportation.
- Total Research and Technology funding for activities corresponding to Title V in SAFETEA-LU should be at least \$750 million per year.
- The Federal Transit Administration's (FTA) research program should be free of earmarks and allocations and given flexibility to work with its stakeholders to develop and pursue national transit research priorities. The Transit Cooperative Research Program should be funded at a minimum of \$20 million per year.
- The Research and Innovative Technology Administration (RITA) should have a well-defined scope and responsibility and appropriate funding, in addition to currently authorized research funding, so that it may supplement and support the R&T programs of the modal administrations.

University Transportation Centers

University research should continue to be supported through the University Transportation Centers (UTC) program. However, the program could be improved in several ways. The existing multiple levels of the program should be simplified and funds authorized for this program should be entirely subject to free and open competition. At this time there are approximately 80 to 100 different universities participating in the UTC program. Given this large number of entities, coordination of research activities, so that each institution's research efforts are complementary and not duplicative, is a significant challenge. Efforts have been made to improve coordination, but more still needs to be done.

The program needs to be competitive in order to award approximately forty UTCs through the research title and five to ten through the transit title. Additionally, the different types of UTCs should be eliminated, in order to allow all UTCs in the research title to fall into the same “tier” and therefore receive the same level of funding. The funding should amount to approximately \$2 million per center annually. This would provide enough critical funding for each center to develop significant, long-term research projects, rather than projects that only last one year. Transit title centers should be selected on a competitive basis as well and receive the same level of funding as those in the research title.

Currently the entire transportation research community focuses on short term, applied, problem solving research. By shifting primary research toward advanced, higher risk, longer term, multi-year projects, the surface transportation system that this nation will need in 40 years can begin to be developed. At this time very little high risk, long term research is occurring and the longer

we delay the necessary research, the longer the nation delays implementation of a true 21st Century surface transportation system.

Much of the technology necessary for a future surface transportation system already exists, however UTCs can properly apply that technology for the greatest benefit of the nation. Universities work well in high risk, long term research, which is why new legislation should emphasize their role and ensure that the best universities are selected through a competitive process.

To help facilitate a more competitive selection process adjusting the current match would be beneficial. The current match required for centers funded through the research title is dollar for dollar, however the match should be changed to 80% federal UTC program funding and 20% match from the centers. The revised match system would allow for centers to break away from using state department of transportation dollars as the primary matching source, therefore allowing UTCs to delve into advanced research, instead of focusing on state departments of transportation (DOT) problems. In general, state DOT's are more focused on short-term solutions rather than long-term, high risk research endeavors. With UTCs relying on state DOT funding, this limited focus is carried over into the research programs at the centers. ASCE believes that the revised match would not inhibit centers that are already very aggressive from securing more than a 20% match, but there will be some centers that can only raise the minimum revenue necessary.

Technology Transfer

Technology transfer activities are critical to the successful implementation of research results. The transfer of technology from the research stage to the application stage must be emphasized among all participants in surface transportation research. The application of improved or new technologies is the ultimate goal, and must be emphasized to the point of being supported by research funding. However, while the Federal Highway Administration research program, the National Cooperative Highway Research Program, the Strategic Highway Research Program, and state DOT research funded by State Planning and Research funding each has a mechanism in place for technology transfer, many research programs do not have a similar system in place.

While there are some research and publication successes like the Accelerated Bridge Construction program being undertaken at the Utah Department of Transportation, many other programs do not have proper channels for assuming ownership of the technology transfer process. Many times research reports from universities are sent to a funding agency, such as a state DOT, but the application of the research outcomes are not implemented. Instead, as part of a research project there needs to be an implementation plan worked out with the funding agency during the proposal and contract process. After the research a follow up report on the implementation successes or failures should then be prepared. Adding this step to the process will increase the actual implementation of research and will provide the primary federal research administration with evidence of research implementation, which is currently lacking.

It should be understood that high risk, advanced research does not always have an implementable outcome. Since UTCs are currently unable to push state DOTs to implement applied research, this provides another example as to why UTCs should instead focus on higher risk projects that do not necessarily require an implementation process.

Improving Transportation Research Programs in a Reauthorization

As originally passed, the Surface Transportation Research, Deployment and Development and the University Transportation Research sections in SAFETEA-LU were both completely programmed or earmarked and over-authorized, creating a difficult environment within which the Federal Highway Administration and the Research and Innovative Technology Administration (RITA) had to allocate funds. An additional effect was that the Federal Highway Administration had no discretionary funds to maintain certain core research programs, which meant that such critical efforts as the biannual Conditions and Performance Report struggled for funding. These problems were partially relieved by the SAFETEA-LU Technical Corrections Bill in 2008. However, the research programs continue to be adversely impacted by the level of programming and earmarking. This speaks to the need for minimal earmarking and free and open competition among non-federal entities performing research utilizing federal funding.

Specifically ASCE would better define a UTC program with approximately 40 centers funded at \$2 million annually, which focus on long term, advanced research. Additionally, there needs to be a larger Exploratory Advanced Research Program, funded with at least \$20 million annually. The exploratory advanced research program should then fund only large, multi-year, high risk projects.

Furthermore, the Long Term Bridge Performance Program, a planned 20- year research program, should be continued in the authorization bill. There is a need to study long term bridge life to develop a better understanding of how bridges age and deteriorate. This allows engineers to better predict and model bridge behavior and could lead to improved maintenance practices and better bridge management. The FHWA's Long-Term Bridge Performance Program should lead the way in this effort.

Bridge maintenance is based on the funding available and which bridge is most in need of repair. That usually means deck repair, not the structure of the bridge. When the public notices problems, such as potholes, these get attention. The public rarely notices severe structural problems unless concrete is falling from the bottom of an overpass bridge. Obviously, to properly maintain bridges, more funds are needed, and more of those funds need to go into the maintenance of the structure, not just the deck. It is ASCE's hope that the Long-Term Bridge Performance Program will help to provide answers as to how to properly channel our nation's bridge maintenance funds.

Finally, the Intelligent Transportation Systems (ITS) section must be more long term in nature, rather than looking at five year horizons. A transportation system for the 21st Century will be developed in part by ITS research and therefore must have a long term outlook. Intelligent Transportation Systems are a cost-effective means of addressing rising demand by increasing the efficient utilization of our transportation systems. The technology revolution in transportation will require a wide range of independent yet coordinated actions by public and private sector interests, which must be sustained by a major federal commitment. The federal government should provide the leadership and commitment to direct the complete deployment of ITS for consumers of passenger and freight transportation across the nation.

At a minimum Congress should maintain the funding that is currently in place for surface transportation research in the new authorization. By investing in smarter, more efficient transportation systems now, operations and maintenance costs in the future could be significantly reduced. In order, to acquire these efficient systems in the nation must invest in research programs today.

Conclusion

Surface transportation infrastructure is a critical engine of the nation's economy. It is the thread which knits our nation together. To compete in the global economy, improve our quality of life and raise our standard of living, we must successfully rebuild America's public infrastructure. Faced with that task, the nation must begin with a significantly improved and expanded surface transportation system. A surface transportation authorization must be founded on a new paradigm; instead of focusing on the movement of cars and trucks from place to place, it must be based on moving people, goods, and services across the economy. Beyond simply building new roads or transit systems, an intermodal approach must be taken to create a new vision for the future.

The nation's economic competitiveness will be tied to the ability to reduce congestion, reduce use of fossil fuels, and reduce the production of greenhouse gases. This work can only be done through high risk, advanced, long-term research. The transportation research title in the new surface transportation authorization bill, must emphasize this need and therefore should focus on the UTC program, the ITS section, the surface transportation research section that supports the Federal Highway Administration, and the Exploratory Advanced Research Program.

ASCE looks forward to working with the Congress as it develops robust surface transportation authorization legislation which is founded on a strong national vision, adequate funding and new technology and research, and creates an integrated, multi-modal national transportation system.