EXPEDITING PRODUCT ACCEPTANCE IN HIGHWAY PROGRAMS

New Evaluation Centers Provide Opportunities for Industry

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Why is highway technology lagging behind technology in other areas of our economy and behind that of other advanced nations in the world? Part of the answer to that question is that we as a nation have become too comfortable with things as they are. According to George Heilmeier, recipient of the National Academy of Engineering's 1992 Founders Award (*1*):

> History seems to indicate that breakthroughs are usually the result of a small group of capable people fending off a larger group of equally capable people with a stake in the status quo. If one subscribes to this theory, it is not surprising that the Polaroid process was not pioneered by the largest photographic company in the world, that most U.S. vacuum tube companies did not succeed in the transistor business, that office copiers were not pioneered by the giants in the office equipment business, and that jet engines were not pioneered by the piston engine makers.

Another part of the answer to our lack of innovation is that perhaps we in the highway community have not offered market incentives and opportunities such as those available to the electronic calculator manufacturer or the cellular telephone company. According to a 1987 American Association of State Highway and Transportation Officials' (AASHTO) Task Force Report, research programs in the private organizations that serve the highway industry follow a different pattern from that seen in the public arena (*2*):

> (W)hen private sector organizations do fund research and development activities to develop products for the highway market, they face several marketing difficulties even if the research is successful:
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> 1. Product performance documentation from the private sector often is not sufficient to win acceptance by a public agency. . . .
> 2. For many prospective new products, particularly those to be incorporated in pavements or structures, the public agency cannot risk failure on the in-service highway system because of safety, liability, publicity, or political sensitivity of the failures—even though the product was used on an experimental basis. . . .
> 3. Acceptance of new products must be won on a state-by-state, agency-by-agency basis. This is a time-consuming, costly, and an uncertain process that serves as a deterrent to many industries.
> 4. Proprietary products are difficult to market in the public arena when specification-controlled, low-bid procurement processes are employed.
> 5. Accelerated testing procedures simulating in-service performance, which would permit the use of performance specifications and thereby invite new and proprietary products to compete for the highway market, have not been developed for many highway products. . . .
> 6. First costs rather than service-life costs are frequently the basis for public agency purchases for highway products.

That is quite an indictment of the business-as-usual approach to private research and development in highway technologies. Unfortunately it has been an accurate reflection of some real challenges to the private entrepreneur or corporate executive considering investments in potential products for the highway market. However, that picture is changing.

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Highway Innovative Technology Evaluation Center

One positive step toward strengthening industry's role in highway technology is the recently initiated creation of the Highway Innovative Technology Evaluation Center (HITEC).

In response to a growing concern for removing the barriers to innovation expressed by the Transportation Research Board's Task Force on Highway Research in Industry, the Federal Highway Administration (FHWA) conducted a study in late 1991 to develop "A Conceptual Plan for the Organization and Operation of a National Service Center for Evaluation of Innovative Highway Technology." A subsequent workshop, jointly sponsored by FHWA, AASHTO, TRB, and the Civil Engineering Research Foundation (CERF), was held in 1992 in McLean, Virginia, to review and refine the conceptual plan for the operation of HITEC. Early in 1993 a contract with FHWA was signed by CERF to establish and operate HITEC. The planning, staffing, and organizing of HITEC is well under way, with an expected starting date set for early 1994 for receiving applications and operating the center.

HITEC's primary objectives are to

- Enhance the incentives in private industry to invest in highway-oriented research and development;
- Improve the opportunities for bringing new technologies to the marketplace in a timely and efficient manner; and
- Provide prompt, efficient, nationally recognized, impartial evaluations of new technologies developed by the private sector (and public agencies) for use on the nation's state and local highways.

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HITEC will provide a single initial screening and evaluation of innovations. HITEC evaluations can save substantial time and expense for industry innovators and the state and local agencies that would otherwise conduct evaluations individually. Through the concentration of resources, HITEC can also provide more comprehensive and reliable evaluations than could likely be afforded by industry or public agencies on an agency-by-agency basis.

HITEC will not be a center for standard product testing, nor will it be an approval agency or a specifier. It will address new technologies for which standard tests or specifications may not be applicable. It will evaluate these technologies, document the results, and in cases in which the evaluations prove successful, provide this information for the consideration of user agencies.

Although start-up costs and initial guidance are being provided by FHWA, the operation of HITEC under a cooperative agreement by CERF, the research arm of the American Society of Civil Engineers (ASCE), will encourage industry-wide participation. External assistance and expertise will be obtained for the operation of the program using experts from the private professional engineering community, private industry, universities, state departments of transportation, FHWA, and other federal agencies to form panels for screening, planning, evaluation, and assessment of results. Contract services of university and consulting researchers and laboratories will also be used as required.

An evaluation process will be designed for each example of innovative technology presented, using staff and contract experts under the guidance of user representatives on the project panels. Both the panel and the applicant for each innovative technology example must approve the evaluation plan before it is implemented.

No new laboratories or equipment are to be acquired for HITEC. The existing laboratories, test tracks, and other facilities at the Turner Fairbank Highway Research Center will serve some evaluation requirements. Facilities owned by other federal or state agencies (including field installations on highway systems) will be used where available and appropriate. Contracts for private laboratories and services will be arranged where needed.

National Transportation Product Evaluation Program

As a parallel effort to HITEC, in recognition of the costly duplication that is represented by individual state transportation agencies performing standard material and other product testing, AASHTO has adopted a plan to establish a National Transportation Product Evaluation Program (NTPEP). NTPEP will provide a single testing program within each climatic region set by AASHTO for most standard products used in highway programs. NTPEP will use existing facilities, equipment, personnel, and expertise found in the various state highway agencies. Participation will be at the discretion of each individual state. The program will be implemented and administered by a permanent AASHTO oversight committee with full-time staff support provided by an AASHTO staff member designated as Coordinator of NTPEP.

Conclusion

The highway community is thus moving on two fronts to improve and expedite the processes through which products are accepted and included in the highway program:

1. Innovative new products for which no standard tests have been established can receive custom-designed evaluations and, if successful, national recognition through HITEC.
2. Standard products for which standard tests have been established can be tested in a single facility serving a full climatic region of the country and, if approved, win acceptance without further testing by participating state departments of transportation through NTPEP.

References

1. G. H. Heilmeier. Some Reflections on Innovation and Invention. *The Bridge*, Vol. 22, No. 4, National Academy of Engineering, National Research Council, Washington, D.C., 1992, pp. 12–16.
2. *Assessment of National Programs of Highway Research*. American Association of State Highway and Transportation Officials, Washington, D.C., July 1987.

IDEA PROGRAMS AND HITEC

Since January 1993, the TRB has been managing the Innovations Deserving Exploratory Analysis (IDEA) programs for highway (NCHRP-IDEA), intelligent vehicle highway systems (IVHS-IDEA), and transit research (TRANSIT-IDEA). The program is an outgrowth of the highly successful IDEA program completed for the Strategic Highway Research Program (SHRP-IDEA).

The IDEA program is designed to assess the feasibility of innovative concepts and products that show potential to markedly affect practice in the nation's highway, transit, and intermodal transportation systems.

IDEA projects seek

- Engineering and scientific innovations that offer promise for significant breakthroughs and large payoffs to transportation practice,
- Promising and practical concepts from other high-technology developments that have not been tried or used for highways, and
- Advanced methods tested or used in overseas practice but as yet not tested or used in U.S. practice.

It is foreseeable that successful IDEA products may need to undergo product evaluation by the Highway Innovation Technology Evaluation Center (HITEC) for implementation in highway practice. IDEA programs and HITEC will thus complement one another in accelerating the development and application of breakthrough technologies for surface transportation in the United States.