Federal Highway Administration Moves Toward Metric Units

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The International System of Units (SI), a modern version of the metric system of measurement, is being adopted throughout the world. Three nations have yet to convert to SI: Burma, Liberia, and the United States. Because of the rapid shift toward a global economy, the United States may need to convert to SI to remain competitive.

In the United States, the Metric Conversion Act of 1975 declared a national policy of coordinating the increasing use of the metric system and provided for a U.S. Metric Board to coordinate voluntary conversion to the metric system. "Voluntary" was the key word in the 1975 act, but it was purposely omitted from Section 5164 of the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100-418), which declares the metric system of measurement as the preferred system of weights and measures for U.S. trade and commerce.

The 1988 act provides that each agency of the federal government, by a date certain before the end of fiscal year 1992, use the metric system of measurement in its procurements, grants, and other business-related activities except to the extent that such use is impractical or is likely to cause significant inefficiencies or loss of markets to U.S firms. Agencies are required to report actions taken to implement the provisions of Section 5164 to Congress as part of their annual budget submissions.

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On May 8, 1990, the U.S. Department of Transportation issued Order 1020.1C, which established its policy and administrative procedures for orderly transition to the metric system. This order defined the metric system of measurement to be the SI as established by the General Conferences on Weights and Measures and as interpreted or modified for the United States by the Secretary of Commerce. The Department of Commerce has been identified as the lead agency for metric conversion.

DOT's policy is to pursue an orderly changeover to the SI system. To do so, it will undertake the following activities:

- DOT will develop plans for changeover to SI to the extent practical. Where the English system is used worldwide, such as in certain aerospace systems, DOT's conversion plans will maintain such usage consistent with international conventions. DOT will schedule changeovers and modifications of its procedures and regulations to minimize costs to industry.
- Plans are to specify dates for changeover to SI in procurement, grants, and other business-related activities of DOT. Activities and programs for which changeover is impractical or would cause significant inefficiencies or loss of markets to U.S. firms will also be designated by DOT. Such exclusions must be justified by analysis. Plans were submitted in April 1991.
- DOT will participate in the Interagency Committee on Metric Policy and, where appropriate, follow its guidelines and technical findings.

Federal Highway Administration

To develop a plan to implement DOT policy on metrication, the Federal Highway Administration has formed a Metric Work Group with members from each Associate Administrator's office as well as the Offices of Chief Counsel and Federal Lands Highway Program. The group is to develop a plan to contribute to DOT's comprehensive plan to ensure an orderly and timely transition to SI. All functional areas and programs for which FHWA has overall responsibility will be included.

The FHWA Metric Work Group has identified several problems in developing the plan and implementing the conversion to SI for the highway industry. These include:

- Estimates of the costs for proposed conversion activities and firm timetables for conversion, which must be included in the plan, will be extremely difficult to develop.
- Identifying, developing, and funding education and training activities for state

highway agency and FHWA personnel must be addressed early in the conversion process.

- Coordination of metric conversion plans and programs within the federal government could be troublesome. Although the Department of Commerce has ultimate responsibility for coordination, once the agency conversion plans have been completed, approved, and adopted, it will be too late to coordinate them. Better lines of communication appear to be needed.
- On the basis of the adverse public reaction to metric-only signing in 1975, a public information program involving the news media is considered necessary.

Program elements/activities		Target date
I.	Develop FHWA metric conversion plan	May 1991
II.	Initiate revision of pertinent laws and regulations that serve as barriers to metric conversion	May 1992
III.	Conversion of FHWA manuals, documents, and publications	May 1994
IV.	Data collection and reporting	May 1995
V.	Direct federal and federal-aid construction contracts	September 30, 1996

FIGURE 1 Proposed timetable for FHWA's metric conversion.

Actions Toward Conversion

At a meeting on December 8, 1990, FHWA briefed the American Association of State Highway and Transportation Officials Standing Committee on Highways (SCOH) on its metric conversion efforts. As a result, SCOH has recommended to the AASHTO Executive Committee that an AASHTO Task Force on Metrication be established for overall coordination between FHWA and AASHTO.

The Metric Work Group developed a proposal to obtain public- and private-sector comment on the agency's metric conversion plan through a Notice of Proposed Policy Making (NPPM) published in the April 5, 1991, *Federal Register*. The proposed timetable for FHWA's metric conversion efforts included in the NPPM is shown in Figure 1.

An amendment has been proposed to rescind Section 144 of the Surface Transportation Act of 1978, which prohibited the use of federal funds for highway signing using only the metric system.

Costs and Benefits of Metrication

During the mid-1970s, FHWA entered into a contract with the Ohio Department of Transportation to enumerate conversion problems, evaluate whether they are solvable, and develop a program of further

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NCHRP Addresses Metrication

Two NCHRP project panels are addressing the problems associated with the transition to the International System of Units (SI). The problems include determining what to change, whether hard or soft conversions are appropriate, coordinating with changes made in other references, and assessing the implications on design, construction, and maintenance practices.

Researchers working on NCHRP Project 22-7, Update of Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances, are developing recommendations for updated procedures for crash testing to certify the performance of roadside safety hardware. The team decided to prepare the update using just SI units, anticipating that the United States would make the transition and to permit the use of the procedures.

In updating the procedures, it was necessary to determine whether the conversions would be hard or soft—for example, a procedure calling for a crash test at 60 mph could be converted to one calling for a crash test at 96.56 km/hr (soft conversion) or 100 km/hr (hard conversion). The decision was made to use a hard conversion after assessing the differences in kinetic energy between soft and hard conversions of weight and speed parameters. Consequently, a test to assess the severity of impacts by small cars that under current procedures calls for testing a 1,800-pound vehicle at a speed of 60 mph would indicate testing a 820-kilogram vehicle at 100 km/hr.

Under NCHRP Project 22-10, Updated Materials for a Traffic Barrier Hardware Guide, researchers are updating design materials on roadside safety hardware to identify opportunities for standardization, and to adopt computer-aided design formats to facilitate use and updates of hardware details.

Hard conversion, in this case, poses problems in the maintenance of roadside hardware. For example, currently guardrail is manufactured in standard 12-foot 3-inch lengths. A hard conversion (to lengths of, say, 3.8 meters) would result in difficulties each time a damaged section would need to be repaired because the replacement pieces would be about 3 inches longer. The transition will also necessitate retraining field crews, providing new tools, and maintaining separate inventories of spare parts. The research team is addressing issues of this nature related to the metrication of roadside safety hardware designs.

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