Facts About Metric in Construction

You may have heard about federal construction "going metric." Here are the facts

Information provided by the construction Metrication Council of the National Institute of Building Sciences, Washington, D.C.

Metric is the Law

In 1988, federal law mandated the metric system as the preferred system of measurement in the United States and required that metric be used in all federal procurement, grants, and business related activities to the extent feasible by September 30, 1992. The intent of the law is to make the United States more competitive in international trade by bringing its measurement systems into line with that of the rest of the world, which now is virtually all metric.

Last July, President Bush signed Executive Order 12770, *Metric Usage in Federal Government Programs,* which requires federal agencies to develop specific timetables and milestones for the transition to metric.

Federal agencies involved in construction generally have agreed to institute the use of metric in the design of all federal construction by January 1994.

Federal construction represents a big chunk of thenations's $400 billion-a-year construction industry. According to *EngineeringNews-Record,* 1992 federal appropriations for construction (including grants and aid to states) total about $35 billion.

To date, over $600 million in federal metric work is being readied for design award or is in the design stage now.

Federal Metric Projects

A number of federal projects with a total estimated cost of over $600 million are being readied for design award or are in the design stage now.

General Services Administration ($300-400 million) — A variety of new and rehabilitation projects:

Arizona — Border station;
Colorado — Federal warehouse, Denver,
District of Columbia — GSA headquarters, Southeast Federal Center;
Florida — Federal courthouse, Tampa;
Maryland — Social Security Administration operations building, Woodlawn; appraisers store, Baltimore
New Jersey — U.S. courthouse, Trenton
Pennsylvania — Department of Veterans Affairs-regional headquarters, Philadelphia; Byrne/Green Federal Complex, Philadelphia; mechanical/electrical upgrade project, Philadelphia; federal building, Harrisburg
Vermont — Border station
Virginia — Federal building in Richmond, U.S. court house, Richmond; Federal Executive Institute, Charlottesville
West Virginia— Federal building, Beckley

Department of State ($200 million) — Various foreign embassy projects
National Institute of Standards and Technology (up to $50 million) — Various projects at NIST facilities in Gaithersburg, Maryland, and Denver, Colorado
Army Corps of Engineers ($30-40 million) — Eight projects in Arizona, Arkansas, Kentucky, Louisiana, Maryland, New York, and Virginia
National Aeronautics and Space Administration ($10 million) — Various NASA projects throughout the United States
Office of Secretary of Defense (up to $1 million) — Various projects, Arlington, Virginia

Other Countries Have Converted With Minimal Problems

The British, Australians, South Africans, and Canadians all converted from the inch-pound system to metric during the past 20 years and encountered only minimal problems in converting the construction industry. In fact, the conversion proved much less difficult than anticipated since much work is built in place and most manufactured components can be used without dimensional change.

There was no appreciable increase in either design or construction costs, and conversion costs for most construction industry sectors were minimal or offset by later savings. Design firms found that it took a week or less for staff to begin thinking and producing in metric; most tradespeople adapted in only a few hours.

The architecture/engineering community preferred metric dimensioning since it was less prone to error and easier to use than feet and inches. Engineering calculations were faster and

more accurate because there were no unit conversions and no fractions.

Metric offered a one-time chance to reduce the many product sixes and shapes that had accumulated over the years but were no longer useful, thus saving production, inventory, and procurement costs.

Metric Conversion Is Readily Achievable

The use of computer-aided design and drafting systems continues to increase, and most engineering and cost calculations are performed on computers. Virtually all HVAC system controls are digitized, and computer-controlled manufacturing operations are now common. In each of these areas, computers make switching between the inch-pound system and the metric system simple.

The codes of two of the country's three model code organizations, BOCA and SBCCI, and the standards of NFiPA and ASTM feature dual units (inch-pound and metric) where measurements are specified. Many other organizations have added metric measurements to their standards or are in the process of doing so.

The preliminary results of several recent General Services Administration metric pilot projects in the Philadelphia area indicate no increase in design or construction costs.

American design and construction firms use metric routinely in foreign work with no reported problems.

The costs of metric conversion in other U.S. industries have been far lower than expected, and the benefits greater. Total conversion costs were less than 1% of original estimates at General Motors, which now is fully metric. Rationalization of fastener sizes at IBM during metric conversion reduced the number of fasteners from 38,000 to 4,000. The liquor industry reduced the number of container sizes from 53 to seven after converting to metric.

International Competition Demands Metric

For those sectors of the U.S. construction industry that export goods or services, metrication is vital.

In 1990, U.S. non-lumber construction product exports totaled about $2.8 billion and imports totaled about $4.2 billion.

The foreign billings of American architecture/engineering/contracting firms amounted to $3.2 billion in 1989 with about a third of this from Europe.

The European Community, now the world's largest market, has specified that products with non-metric labels will not be permitted for sale after 1992.

The largest U.S. trading partners, Canada, and Mexico, are now predominantly metric countries.

In the ongoing U.S.-Japanese Structural Impediments Initiative negotiations, the Japanese have identified non-metric U.S. products as a specific barrier to the importation of U.S. goods.

Some Americanmanufacturers, such as Otis Elevator, are switching to metric to increase their international competi-

tiveness and reduce their parts inventories. Other sectors of the construction community, such as the wood industry, have shipped exports in metric for many years.

Even without the federal impetus, there is a growing consensus that it is in the American construction industry's long-term interest to "go metric."

Metric Guide Available

To help the construction industry learn about converting to metric, the National Institute of Building Science has published a 34-page booklet called the *Metric Guide for Federal Construction.* The guide includes:

—An introduction to metric
—A primer on metric usage for architects, engineers, and the trades
—Requirements for metric drawings and specifications
—Guidance on metric management and training
—A complete list of available metric construction references

This new guide is available from AWCI for $15 (member) or $30 (nonmember) plus shipping. It provides the most comprehensive and accurate guidance to building professionals who need to understand and comply with the new requirements. For more information, call (703) 684-2924. Use the order form on page 15.

Your Body Metrics

Your approximate height in centimeters:
Add a zero to your height in inches, divide by four, and add 3 cm. *(For an exact conversion, multiply your height in inches by 2.54 cm.)*
Your height: _____" divided by 4 plus 3 cm = ____ cm

Your approximate weight in kilograms:
Divide your weight by two, then subtract 10% more. *(for an exact conversion, multiply your weight by 0.454 kg.)*

Your weight: _____lbs. divided by 2, minus 10% = ____kg

Designed for the Construction Industry . . . *the only Federally Approved Guide on Metrication Now Available*

—In Canada and Great Britain, metric conversion proved much less difficult than anticipated.
—American construction firms routinely use metric in foreign work with no reported problems.
—The largest U.S. trading partners, Canada and Mexico, have become predominantly metric countries.
—The European Community, now the world's largest single market area, has specified that products with non-metric labels will not be permitted for sale after 1992.
—During recent trade negotiations, the Japanese identified non-metric U.S. products as a specific barrier to the importation of U.S. goods.

importance of accepting the metric system of measurement in your business and work, many analysts believe you will soon be left behind. The first major step in convening the U.S. to nationwide metric is about to occur.

By September 30, 1992, agencies of the federal government are required to use the metric system of measurement, to the extent feasible, in all procurement, grants and business-related activities. Pilot projects for metric construction are already under way in many agencies, and the Construction Subcommittee of the federal Interagency Council on Metric Policy has set a goal of January 1, 1994 for all federal construction to be designed in metric.