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FACTS ABOUT METRIC IN CONSTRUCTION

Welcome to the first issue of *Metric in Construction*. You may have heard about federal construction "going metric." Here are the facts:

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 system 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 the nation's $400 billion-a-year construction industry. According to *Engineering News-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 (see page 3).

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 sizes 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 percent 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 7 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/engi-neering/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 nonmetric 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 nonmetric U.S. products as a specific barrier to the importation of U.S. goods.

Some American manufacturers, such as Otis Elevator, are switching to metric to increase their international competitiveness 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 Sciences 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

To order the guide, send $15 ($12 for NIBS members) to Metric Guide, NIBS Publications Department, 1201 L Street, N.W., Suite 400, Washington, D.C. 20005, or use your VISA or Mastercard by calling (202) 289-7800.

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. courthouse, 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 United States

OFFICE OF SECRETARY OF DEFENSE (up to $1 million)--Various projects, Arlington, Virginia

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:___'___" = ___" add a 0 = ____ ÷ 4 = ___ + 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 ÷ 2 = ___ - 10% (___) = ___ kg

AISC METRIC PUBLICATIONS

Two new publications are available in draft form from the American Institute of Steel Construction:

- *Metric Properties of Structural Shapes with Dimensions According to ASTM A6M.* A 92-page metric version of Part 1 of the *Manual of Steel Construction.* $10.00

- *Metric Conversion: Load and Resistance Factor Design Specification for Structural Steel Buildings.* A 159-page metric version of the September 1, 1986 *LRFD Specification.* $10.00

Send a check or money order to Metric Publications, AISC, One East Wacker Drive, Suite 3100, Chicago, Illinois 60601-2001, or use your VISA or Mastercard by calling (312) 670-5414.

Metric in Construction is the newsletter of the Construction Metrication Council of the National Institute of Building Sciences, Washington, D.C.

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Metric in Construction is a bimonthly newsletter published by the Construction Metrication Council to inform the building community about metrication in U.S. construction. The Construction Metrication Council was created by the National Institute of Building Sciences to provide industry-wide, public and private sector support for the metrication of federal construction and for the adoption and use of the metric system of measurement as a means of increasing the international competitiveness, productivity, and quality of the U.S. construction industry.

The National Institute of Building Sciences is a nonprofit, nongovernmental organization authorized by Congress to serve as an authoritative source on issues of building science and technology.

The Council is an outgrowth of the Construction Subcommittee of the Metrication Operating Committee of the federal Interagency Council on Metric Policy. The Construction Subcommittee was formed in 1988 to further the objectives of the 1975 *Metric Conversion Act*, as amended by the 1988 *Omnibus Trade and Competitiveness Act*. To foster effective private sector participation, the activites of the subcommittee were transferred to the Council in April 1992. The Council is supported by funds from contributing federal agencies.

Membership in the Council is open to all public and private organizations and individuals with a substantial interest in and commitment to the Council's purposes. For membership information, contact the Council at the above address.