



# STATE AID SCENE



Number 21

State Aid Division

JUNE 1997

## Bulletin Board Replacement to Commence this Summer

The Electronic Bulletin Board replacement has been installed and is ready to be rolled out! For those of you who aren't quite sure what the electronic bulletin boards are, they are the things you connect to over the phone system when you download your State Aid Needs Study data, download and upload your Bridge Inventory and Inspection data, and read notices of meetings, retirements, new hires, and things of that nature. They are being retired because they are both very old, and very slow.

Both bulletin boards will be replaced by the *Citrix WinFrame* system. *WinFrame* will allow us to make many different Mn/DOT information resources available to City and County Engineers from a single point of contact, so it will no longer be necessary to make one phone call to connect and read notices on the Civil Engineers Bulletin Board System (CEBBS), another call to download CSAH/MSAS Needs data, another call to get bridge data, yet another call to check the status of funds in the finance database, etc. Instead, you will be able to gain access to all of these items from one connection.

We will be deploying this new system to the local agencies on a district by district basis over the course of the summer. Our office will be scheduling training sessions where we will meet with the City and County Engineers of a district as a group, show them how to install and use the new software, and give folks some time to ask questions & offer suggestions while they are face to face with members of the State Aid Information Resources Team.

The minimum hardware requirements for this new system are:

- a computer with a 386 processor,
- 1 KB of Random Access Memory (RAM),
- a mouse,
- a modem that can communicate at a rate of 9600 baud or greater. (28,000 baud or higher is preferred!)

The *WinFrame* software will function on computers that use any of the following operating systems:

- DOS v 3.1 or greater
- Windows 3.x
- Windows 95, or Windows NT

With the addition of a mouse and a faster modem most of the original State Aid Computers can be used to access the new system. However, it should be noted that as it is with just about everything else, the better machine you have, the better performance of the system.

To help us prepare for these sessions and to provide information for use in other application development, such as the Bridge Inventory and Inspection Program, we are requesting that you fill out and return the **1997 State Aid Computer Survey** that is attached to the back of the State Aid Scene as soon as possible. (Our mailing address and FAX number are listed on the form.)

If you have any questions about this project, please contact Mjyke Nelson at (612) 296-6414, or Jan Littleton @ (612) 296-7039.

## **New Bridge Inventory and Inspection Program is Under Development**

Mn/DOT's Office of Bridges and Structures is currently developing a new Bridge Inventory and Inspection program to replace the current Minnesota Bridge Inventory PC System (MBIPS) and the PONTIS Bridge Inspection Program (PontisBIP). The new software will maintain all of the reports and data entry features currently available as well as provide better user interfaces and data transfer procedures.

Mn/DOT has contracted with Barr Engineering Company for development work, and it is expected that the new program will be available in the Fall of 1997. Prior to that time, agencies can continue to use the current systems to record updated bridge data, and then submit updated data to the Bridge Management Unit prior to loading the new software.

The new software will be a Windows based design which will require a Windows operating system to be installed on each computer. The system will be based on a runtime version of the Paradox for Windows database, so agencies will not be required to purchase any additional database software. It is expected that the minimum hardware requirements for the new software will be a computer with 486 processor, with Random Access Memory (RAM) requirements based on the type of operating system being utilized.

- Windows 3.1 operating system, 8 MB RAM (16 may be required)
- Windows 95 operating system, 16 MB RAM
- Windows NT operating system, 24-32 MB RAM

The Office of Bridges and Structures is planning to utilize the *WinFrame* dial in access system that is being developed by the State Aid for Local Transportation Division as a solution to help agencies that cannot meet the stated hardware requirements. If you have any questions on this project, please contact Project Manager Paul Kivisto at (612) 582-1194.

## **Sulfates in Clay Soils Study**

John Helcl of the Office of Construction and Materials is trying to gather data on the presence of sulfates in clay soils around the State. Studies done in several other states and in England indicate that use of lime in clay soils containing over 0.5% sulfates can result in expansion (called ettringite) which causes tunnels or voids in the subgrade. These can lead to rapid breakup of pavements.

John Helcl has found sulfates in Crow Wing, Wright, and Faribault Counties ranging from 0.48% to 0.52%. He is trying to find out in which parts of Minnesota sulfates are located in clay soils. He has asked for help from the counties in sending him samples of clay soils from their county. If you could send him samples, of about a pound each, from clay soils obtained in your borings, or from the roadbed of construction projects, he would obtain a large number of samples from all parts of the state in a short period of time. This would help him immensely. There would be no cost to the county, except for the cost of shipping the samples.

You can send the samples (with location identification) to:

John Helcl  
Materials and Research Lab  
1400 Gervais Ave  
Maplewood, MN 55109

## **Report of State Aid Contract**

Some cities and counties have been using the Report of Partial/Final Estimate forms for their initial payment document. It is preferred that you use the Report of State Aid Contract for this purpose. Then for subsequent payments use the Report of Partial/Final Estimate form.

## **Bituminous Liaison Committee Final 96-97 Season Meeting**

Attached are the minutes of the 4/16/97 meeting. Subjects include the 2040 mixture issues, 2350 pilot spec discussion, and pavement rehabilitation.

## Status of Turnback Accounts

The County Turnback Account was extremely busy this spring. Several plans came in at essentially the same time, so we attempted to allow all of them to proceed even though the account was not adequate to handle them. In order to allow those projects to proceed, we borrowed funds from the CSAH Construction Account balance and will pay it back over the next four years. This will allow about half of the turnback funds over the next four years to be used for projects, with about half being used each year to pay back the CSAH Construction Account. The plan for the 1998 turnback project has already been approved, therefore, any plans for additional turnback projects received in 1997 or 1998 will not be funded until 1999 or later.

Borrowing from the CSAH Construction Account seemed appropriate since \$12 million of turnback funds were distributed to the CSAH account in 1992, and \$9 million in 1987, because the Turnback Account had high balances. That money was permanently distributed to all the counties, so it seems appropriate to temporarily borrow from the CSAH Construction Account balance which stood at \$83 million at the end of 1996. This will not hinder the ability of counties to use their respective balances, nor will it inhibit counties from advancing from their next year's construction apportionment.

For those of you who are actively designing projects for use of turnback funds, it is difficult to predict when your project will be funded, except that it will be no earlier than 1999. You will not lose eligibility for turnback funding because of the fact that funds are not available. A Mn/DOT task force has been reviewing the turnback program in order to make permanent changes in the system to prevent similar occurrences in the future. Their report will be completed this fall. There has been a strong interest in turnbacks on the part of several counties over the past four years and, for the moment, funding supply does not meet demand.

The Municipal Turnback Account has essentially a zero balance, but will be able to fund turnback

projects in 1998. We are not aware of any proposed 1997 municipal turnback projects that have not been funded.

If you have any questions in regard to turnbacks, call Paul Stine at 612-296-9973, or Pat Murphy at 612-296-9872.

## **Modified Bid Analysis Management System (BAMS)**

Mn/DOT's customized BAMS will soon be obsolete and will not be supported. An interim generic version of BAMS will be utilized until it is replaced with a completely new system. Use of the generic BAMS will start in October. **This will affect all Federal Aid Project lettings starting in October and plans must be modified as follows:** Since the generic BAMS does not have the flexibility of the customized system, Special Pay Items will no longer begin with a zero but with a two. In addition to the zero, the first digit after the decimal point has always been a 6 for special pay items. That will remain the same and will be the indicator of a Special Pay Item that needs a separate writeup in the Special Provisions. The change to the generic BAMS will not have an effect on Standard Pay Items.

## **State Aid Jottings**

Julie Skallman spent three weeks at the AASHTO conference in Indianapolis. She thought the conference was very informative and useful.

Karen Wright has been hired from the Transit office. She will be our Applications Developer and Database Administrator. Karen has been with MN/DOT for five years.

Ken Hoeschen is back on the clock, after being laid up with foot surgery and a ruptured appendix. He is doing well and is ready to get back to work and golf.

Kim Whebbe has been hired to permanent status from temporary. She also recently got married, so her name is now Kim DeLaRosa.

## **Bituminous Pavement Survey**

Attached is a very short questionnaire to discover which bituminous specifications are being used on city and county projects. The survey was drafted by the MN/DOT Bituminous Engineer. Results will be discussed by the Bituminous Liaison Committee in the Fall. Your input will be greatly appreciated.

### **The Scene Needs You**

The Scene is looking for pictures to use on the cover of the Scene. We ask that if you have a photo of road work, scenery, flood damage, etc. that you think we can use, send it to Mark Channer in the State Aid office. Please note if you would like the picture returned to you. Thanks for your help.

### **Upcoming Variance Meeting Notice**

The next State Aid Variance Meeting will be held on June 18, 1997 at the usual Water's Edge location in Roseville, Minnesota. If you have any questions, please contact Paul Stine at 612-296-9973.

# 1997 State Aid Computer Survey

Please complete this form and return it to us by mail or FAX before **June 13, 1997**.

State Aid for Local Transportation - Mn/DOT  
ATTN: Ruth Cordes  
395 John Ireland Blvd. MS 500  
St. Paul, MN 55155

State Aid FAX: (612) 282-2727.

Name: \_\_\_\_\_

City/County Name: \_\_\_\_\_

## What type of computer do you have?

\_\_\_\_\_ The original State Aid Computer purchased in 1989, or thereabouts.

\_\_\_\_\_ 286    \_\_\_\_\_ 386    \_\_\_\_\_ 386/sx

\_\_\_\_\_ 486    \_\_\_\_\_ 486/sx

\_\_\_\_\_ Pentium

\_\_\_\_\_ Other (Please Specify): \_\_\_\_\_

## How much memory (RAM) is in your computer? (MB=Megabytes)

\_\_\_\_\_ I don't know

\_\_\_\_\_ 2 MB    \_\_\_\_\_ 4 MB    \_\_\_\_\_ 8 MB

\_\_\_\_\_ 16 MB    \_\_\_\_\_ 24 MB    \_\_\_\_\_ >24 MB (Please Specify): \_\_\_\_\_

## How big is the hard drive in your computer? (MB=Megabytes, GB=Gigabytes.)

\_\_\_\_\_ I don't know

\_\_\_\_\_ 40 MB    \_\_\_\_\_ 150 MB    \_\_\_\_\_ 500 MB

\_\_\_\_\_ 1 GB    \_\_\_\_\_ >1 GB (Please Specify): \_\_\_\_\_

## What operating system do you use?

\_\_\_\_\_ DOS (Please specify version #): \_\_\_\_\_

\_\_\_\_\_ Windows v.3.x

\_\_\_\_\_ Windows 95    \_\_\_\_\_ Windows v.3.51    \_\_\_\_\_ Windows NT v.4.0

\_\_\_\_\_ Other (Please Specify): \_\_\_\_\_

Do you have a mouse?    \_\_\_\_\_ Yes    \_\_\_\_\_ No

## What kind of modem do you have? (Please specify the following:)

Manufacturer: \_\_\_\_\_

Model: \_\_\_\_\_

Baud Rate: \_\_\_\_\_

**Thank you for your response!**



**MEMO**

Office of Construction & Materials Engineering  
Mailstop 645  
1400 Gervais Avenue  
Maplewood, MN 55109

**DATE:** April 18, 1997  
**TO:** Bituminous Liaison Committee  
**FROM:** Jim Schmidt  
**PHONE:** 612-779-5619  
**SUBJECT:** 4/16/97 Meeting Minutes

<b>Attendees:</b>	Wayne Olson	Damon DeVillers	Gary Nansen
	Richard Sanders	Rick Kjonaas	Mitch Anderson
	Bob Witty	Steve Theis	Greg Paulson
	Brian Gage	Jim Schmidt	Keith Engelsby

I. Introductions / Overview - Keith Engelsby

Keith distributed a project summary sheet covering the **Superpave** projects Mn/DOT will be constructing this season. (Copy Attached)

Keith asked who would be using the **2340 Mixture Durability** specification for the 1997 construction season and if any issues remain. Some discussion followed several attendees indicated they would try this spec this season. Mr. DeVillers indicated a increase in the mix price (\$2 / ton) due to this specification. Jim Schmidt indicated the increase reflects a combination increased asphalt cement and increase in aggregate quality and cost. To meet VMA requirement the Contractor may need to supply 0.2 - 0.5 % additional asphalt cement and there may be nominal cost effects due to the switch to PG grading system. Some suppliers have no increase from PG grading system while others are most likely capturing some start-up costs for their laboratories. The increase in aggregate reflects elimination of highly absorptive and/or very dirty ( too much -200) aggregate sources which are inadequate to meet the specification requirements. Mn/DOT's experience from the 96 Construction season indicated 12/16 projects with mixture durability where at or below average mixture prices while 4/16 exceeded. Price increases are closely tied to the quality of aggregate in your area. There are typically four methods to increase the VMA in a mixture. These include; reducing the -200, maintain the -200 while increasing the +4 material, use an aggregate that has a higher specific gravity (typically associated with lower absorption), or addition of washed manufactured sand. This specification has been placed on the State Aid bulletin board. Mn/DOT will be using this on 90% of our work during the 97 construction season.

## II. 2350 Pilot specification - Jim Schmidt

Jim handed out the 2350 specification which is intended to replace the 2331 and 2340. Mn/DOT will pilot this spec on 6-10 projects during the 97 construction season. The highlights of the spec were presented which include:

Coarser gradations

Fewer mixture designations

New Trial mix options

VMA and Moisture sensitivity requirements

Fines to effective asphalt requirement

Additional Contractor process control requirements

Disincentive / Incentive for density and smoothness / ride

Process control penalties for Voids, VMA, Gradation, & AC content, penalties range from 10 to 30 % of the mixture bid price.

Substantial increase in required density - 2 - 2.5 % above old specs.

More accountable verification process to ensure compliance of spec.

Densification measurement for acceptance and payment will be with cores only (exceptions include areas where rollers cannot operate, behind guardrails etc.). Many problems associated with ordinary compaction and use of the nuclear gauges for density determination will be minimized. The equipment is not always operated by a qualified person who has properly calibrated the gage when required. This does not remove the use of this device as a tool for the contractor, we simply will not use these results for acceptance.

Jim requested comments from the group and/or any interested parties in the Counties or Cities. Since this specification is intended to replace the 2331 and 2340, we need to identify any shortcomings of this specification in regard to the local government units. Many questions arose during the presentation. Some of those issues included:

1. Modifications - Will this be allowed. For instance removing the incentive portion for a 2" overlay project on a low volume facility where the current surface is in poor shape.
2. Ride incentive should be considered urban vs rural settings. The current method does not deal with these differences adequately.
3. Small contractors - Many local communities have smaller Contractors who have provided mixtures and placement for Cities and Counties using the 2331 specification. Additional testing and penalties may drive them out of business.
4. Disincentive seems pretty steep for density. How were these numbers arrived at. Can these penalties stand up in court? Comment: The values used for density disincentive come from national accepted statistics on pavement life cycle costs. Minnesota values may be obtainable however these were not used to develop this schedule.

5. Testing turn around time for the Cities and Counties is not always the best. With these new requirements will this improve. With increase accountability for the Contractor comes more responsiveness by the Agency. Comment: The specification currently requires a 2 day turnaround time for process control items voids, VMA, and AC content and 3 days for gradations. Mr. Wayne Murphy, State Construction Engineer, will require a 12 - 24 hour turn around time for all process control testing done by state labs. This memo will be sent out this week. We will direct the necessary resources to ensure that timely test results are available for construction projects.

6. Densification requirements are based upon what? They are determined as a percent of the maximum specific gravity of mixture placed that day.

7. Review? Many people do not have the knowledge let alone the time to read the 40 page document and comment. Comment: If there is another individual in your City or County that would have more interest and/or knowledge please pass the specification along for their review. Since most local agencies use our specifications, we believe your input is crucial to ensure needs for the local units are adequately met.

8. Projects scheduled for construction using the 2350 specifications 1997

1. District 1 TH 2 TH 194 to I-35
2. District 2 TH 72
3. District 3 TH 55 Brooten to Paynesville
4. Metro I- 494
5. District 6 TH 63

III. Additional specification handouts - Jim Schmidt

Mr. David Janisch of the Research section held three seminars on **pavement rehabilitation** during the past month. He covered such areas as seal coats, crack sealing, joint saw and sealing, and pavement management. Jim handed out these new specifications and discussed some of the highlights from this training. The most significant finding was the benefit from sawing and sealing new constructed bit pavements or overlays over concrete. Saw and Seal significantly reduces transverse thermal cracking in new pavement and minimizes random cracking in BOC if the sawcuts are placed properly over the concrete joints. Contact Mr. Janisch with questions regarding pavement rehabilitation 612-779-5530.

IV. Future

The committee will not meet during the summer construction season. We will contact the committee members in August for agenda items and reconvene in September.

cc: Attendees Pat Murphy Gerry Butcher  
Paul Stine Wayne Murphy David Halter  
Mike Pinsonneault Wayne Fingalson Keith Nelson

Superpave (2360) projects 1997

District	2	3	Metro	6	7
T.H	2	23	494	90	60
SP#	1101-18	7305-80	1985-120	8580-133	0708-29
Project Eng.	Lynn Eaton (ext) 1	Miky Clauson	Charles Graf	Mark Anderson	Harry Carlson
Phone #	218-755-3814	320-255-2912	297-4580	507-453-2903	
Matl. Eng.	Craig Gilbertson	Tony Kempenich	Willis Enloe	Joe Meade	Steve Oakey
Phone #	218-755-3807	218-828-2481	Charles 452-6224	507-285-7383	507-389-6951
FAX#		Hard drives		Mathie's	Keith 507-831-1238
Contractor Contact					
Project Type	Stage II Const. 4 lane	Grading & Surface	2.5 inch mill 4" overlay	Overlay w/wedge	Overlay
Overlay		N.A.	BOB	BOC	BOC
Granular		yes		yes	
Sub Surface drainage		no	yes	yes	
Aggregate Source					
Mix size (fine & coarse)					
SP tonnage	16,000		SPWR 28,867 m.	SP 36,895 m.	
MN/DOT tonnage	21,500		(41) 18,073 (31) 6636	10 million	
Saw-n-Seal	entire job		NO	Yes	
Shoulder Type	31 SH		31 SH	31 SH	
PG type	58-34 wear	52-34 nonw	WB 64-34 EB 58-28	58-34 & 58-28	58-34 & 58-28
Depth	4" wear, 3.5" nonwear	7 inch wear & nonwear	4 inch wear	4.5 inch wear	4.5 inch wear
Let Date	23-May	28-March	23-May	28-March	23-May or 2-May
Construction date		Sept. 97		June 1	Aug. 1
Polymer money	100 k		100k	anything left over	6 million (15yr)
20 year Esal's	7.6 million	5.5 million		12.7 million	9.32 miles
Length	5.37 miles	3.26 miles	3.6 miles EB+ WB	8.7 miles	Madelia
From	124+435 Midge Lake	end 4 lane at I-94	Robert st.	Jct TH 76 266.39	Lake Crystal
To	129+775 Cass Lake	10th Ave. Waite Park	I-35E	Nodine 257.82	
Cost in Million	3.6	4.2	1.07	1.6	1.6
Notes	5 miles of divided hwy with 50% new Const.	EB all Spave 4" wear over 3" 31 base. WB 50% Spave 7", 50% 2340-47 wear, 47 binder, 31B	B/B 40000 tons mix many ramps & loops 31 type shoulder	B/C Limestone potential for use as a CA on this project	B/C Bad D cracking, drainage in place, 10,000 to mix, construct about
			designers Rolland Larson	designers Rolland Larson	Keith Bloomgren FAX
			Type SP wear	Type SP wear	above
			Metric:	Metric:	Greg O. 389-6962

# **BITUMINOUS PAVEMENT SURVEY**

This is a quick survey to learn which bituminous specifications are currently being used. Questions; contact Keith Englesby, MN/DOT Bituminous Engineer at 612-779-5582.

MN/DOT District \_\_\_\_\_

City \_\_\_ or County \_\_\_

## **Asphalt Cement**

If you use more than one, indicate the percentage each is used.

Penetration Asphalt

85/100 \_\_\_\_\_

120/150 \_\_\_\_\_

PG 58 - 28 \_\_\_\_\_

200/300 \_\_\_\_\_

PG 52 - 34 \_\_\_\_\_

## **Bituminous Specifications**

If you use more than one, indicate the percentage each is used.

2331 \_\_\_\_\_

2340 \_\_\_\_\_

2340 (Amended: Mixture Durability Special Provision) \_\_\_\_\_

Other \_\_\_\_\_ Explain \_\_\_\_\_

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**Please FAX responses to Paul Stine at FAX #612-282-2727.**



# **DESIGN ELEMENT VARIANCE**

## **JUSTIFICATION CHECKLIST**

A variance request for design elements should contain the following as applicable:

1. As required by the Rules: a resolution, identify the project by location and termini, cite the specific part of standard for which the variance is requested and what is proposed in lieu of the standard.
2. Location map and typical section (in-place and proposed).
3. Describe adjacent land uses (agricultural, residential, commercial, etc). Describe effects of designing to standard versus proposed non-standard element on adjacent properties, pedestrians, bicycles, motoring public, and emergency vehicles.
4. Define the critical design element involved (i.e. not "Design Speed"): horizontal alignment (radius or degree of curvature), vertical alignment, grades, lane width, shoulder width, bridge width, structural capacity, stopping sight distance (horizontal and vertical), cross slope, super-elevation, clearance (horizontal and vertical).
5. Estimate the cost/impacts to construct to the standard, the cost to build to the proposed element, and information that logically explains why the particular proposed design was chosen. For instance, if the radius and sight distance for a horizontal curvature is proposed at 60 km/h instead of 90 km/h, include cost/impacts for 70 km/h and 50 km/h radii and sight distance.
6. Include available accident data in detail that indicates the resulting damage (property damage/injury/death), contributing causes, and location.
7. Include existing and projected traffic counts.
8. Include legal, posted, and/or safe speed of abutting roadway sections.
9. Indicate if future improvements are planned on the roadway or on adjacent property.
10. Describe safety mitigation considered, such as signing in accordance with MMUTCD, side-slope flattening, etc.
11. Any other pertinent factors.

Department of Transportation State of Minnesota  
Office of Technical Support OFFICE MEMORANDUM  
Room 625 M.S. 675



August 5, 1997

TO: Metric Implementation Team

District Metric Coordinators

Betsy Parker - M.S. 420  
Glenn Korfhage - M.S. 696  
Lonnie Cowherd - M.S.200  
John Schwartz - M.S.280  
Mike Marttila - M.S. 640  
Rod Pletan - M.S. 700  
Kay Korsgaard - M.S. 150  
- - - - -  
Tom Campbell M.S. 725  
Bob Barry M.S. 610  
Doug Schwartz M.S. 645  
Mike Herman M.S. 690  
Rashmi Brewer M.S. 470

Duane Hill D 1  
Mike Coleman D 2  
Bob Busch D 3  
Mel Hodnefield D 4  
Andy Schmidt D 6  
Lisa Bigham D 7  
Bob Jones D 8  
Jack Caroon MetroDiv  
Jim Halvorson M.S. 410  
Paul Stine M.S. 500  
Eldon Lober M.S. 633  
Sue Lodahl M.S. 725  
Bev Farraher Oakdale

FROM: Bob McPartlin  
Metrication Administrator

*Bob McP.*

PHONE : 612 296 - 4337  
FAX : 612 296 - 7654  
PROFS # : RJM200

SUBJECT: Recent publications

Please review the enclosed copies, and make them available to your group.

1. The "2nd Quarter" issue of the "Construction Metrication" newsletter, from the National Institute of Building Sciences.
2. The July - August issue the American Nation Metric Council's newsletter - "The Metric Reporter".
3. The "Summer" issue newsletter of the AASHTO Metrication Clearinghouse.

cc: Dave Kopacz - FHWA

# CONSTRUCTION METRICATION

Volume 6, Issue 2

2nd. Quarter 1997

## METRIC DIFFUSION

In his article "The Coolhunt" in the March 17, 1997, issue of *The New Yorker*, Malcolm Gladwell describes diffusion research, the study of how ideas and innovations spread. Because of its applicability to construction metrication, we are reprinting the majority of his description, with the permission of *The New Yorker*:

"One of the most famous diffusion studies is Bruce Ryan and Neal Gross's analysis of the spread of hybrid seed corn in Greene County, Iowa, in the nineteen-thirties. The new seed corn was introduced there in about 1928, and it was superior in every respect to the seed that had been used by farmers for decades. But it wasn't adopted all at once. Of the two hundred and fifty-nine farmers studied by Ryan and Gross, only a handful had started planting the new seed by 1933. In 1934, sixteen took the plunge. In 1935, twenty-one more followed; the next year, there were thirty-six, and the year after that a whopping sixty-one. The succeeding figures were then forty-six, thirty-six, fourteen, and three, until, by 1941, all but two of the two hundred and fifty-nine farmers studied were using the new seed. In the language of diffusion research, the handful of farmers who started trying the hybrid seed corn at the very beginning of the thirties were the "innovators," the adventurous ones. The slightly larger group that followed them was the "early adopters." They were the opinion leaders in the community, the respected, thoughtful people who watched and analyzed what those wild innovators were doing and then did it themselves. Then came the big bulge of farmers in 1936, 1937, and 1938 -- the "early majority" and the "late majority."

which is to say the deliberate and the skeptical masses who would never try anything until the most respected farmers had tried it. Only after they had been converted did the "laggards," the most traditional of all, follow suit. The critical thing about this sequence is that it is almost entirely interpersonal. According to Ryan and Gross, only the innovators relied to any great extent on radio advertising and farm journals and seed salesmen in making their decision to switch to the hybrid. Everyone else made his decision overwhelmingly because of the example and the opinions of his neighbors and peers."

So it goes with construction metrication. The most innovative personnel in the most innovative federal agencies and state highway departments have been the first to embrace metric conversion, and the most innovative architects, engineers, contractors, subcontractors, and suppliers have been the first to bid on metric work. Now they are being followed by the early adopters, the opinion leaders in the construction industry. By the turn of the century the early majority should begin to come on board, followed over the next few years by the late majority and, finally, by the laggards. No one knows for sure how long the process will take, but with strong inter-industry support a decade should do it.

**NOT MUCH CHANGES, page 2**  
**HIGHWAY DEADLINE, page 3**  
**METRIC RESOURCES '97, pages 4-8**

*Construction Metrication* is the newsletter of the Construction Metrication Council of the National Institute of Building Sciences, Washington, D.C. Reproduction and distribution of its contents is encouraged provided the Council receives attribution. This and previous newsletters may be viewed on the NIBS web site (<http://www.nibs.org>).

**CONSTRUCTION METRICATION COUNCIL**  
*National Institute of Building Sciences*  
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Telephone 202-289-7800; fax 202-289-1092;  
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*Construction Metrication* is a quarterly newsletter published by the Construction Metrication Council to inform the building community about construction metrication in the United States. The National Institute of Building Sciences created the Construction Metrication Council in 1992 to provide industry-wide, public and private sector support for the metrication of federal construction and to promote 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 activities of the subcommittee were transferred to the Council in April 1992.

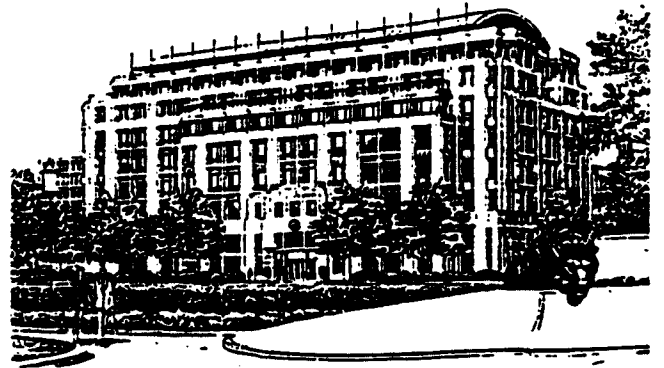
Membership in the Council is open to all public and private organizations and individuals with a substantial interest in and commitment to the Council's purposes. The Council meets quarterly in Washington, D.C., and publishes the *Metric Guide for Federal Construction* and this newsletter. It is funded primarily by contributions from federal agencies but also receives private sector support.

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## NOT MUCH CHANGES BUT THE MEASURING TAPE

You can't tell by looking at it, but the recently completed FBI regional office building in Washington, D.C. is constructed in the metric system. In the March of 1996 and again this April, the NIBS Construction Metrication Council met adjacent to the building site and quizzed construction personnel about their metric experiences. On the positive side, the \$60-million, 8-story building was delivered on-time and within budget. Contractor and construction personnel quickly learned to use metric measures. The prime contractor, Clark Construction, is looking forward to more metric work.

There were some teething problems, though. Smaller subcontractors sometimes had difficulty submitting shop drawings in metric dimensions. Longer lead times were needed for obtaining (and restocking) modular metric products such as suspended ceiling system components. And local government reviews for water and sewer plans required special hand-holding.

The FBI buildings's construction superintendent, John Morrow, stated that none of the subcontractors or any of the 100 or so entities involved in the project have claimed to have lost money due to metrication. "If you lose money on metric," Mr. Morrow said, "you have a serious management problem. It means you aren't applying yourself." In many cases, the subs and suppliers seem to have made their bids based on doing the job conventionally, assuming correctly that any metric-related problems could be resolved on the job site.

Judging from the results of numerous metric projects under construction around the country, the FBI regional office building is typical. In almost all cases, costs and schedules are unaffected, and after a short learning period everyone on the job settles into metric use. The availability of a few modular metric products remains a problem, but one that is diminishing as the number of metric projects increases.

After all, not much changes but the measuring tape.

# ELIMINATE THE HIGHWAY DEADLINE?

All across the United States, highway projects totaling billions of dollars are being constructed in the metric system. Work is going well, with virtually no schedule delays, contractor problems, or increases in project costs. Some smaller Southern road contractors with no metric experience, however, believe that metrication will cost them money. Although there is no evidence whatsoever to justify this concern, it has prompted the introduction of H.R. 813 by Rep. Bachus of Alabama. This bill would eliminate the October 1, 2000 FHWA deadline for the metrication of federally-funded highway projects. In response, the Deputy Secretary of Transportation, Mortimer Downey, sent the following letter, dated May 14, 1997, to the Chairman of the House Committee on Transportation and Infrastructure, Bud Shuster:

Dear Mr. Chairman:

The Department of Transportation would like to take this opportunity to present its views on H.R. 813, a bill "To amend the National Highway System Designation Act of 1995 to prohibit the Secretary of Transportation from requiring States to use the metric system with respect to designing, advertising, or preparing documents for Federal-aid highway projects."

The Department strongly opposes H.R. 813 because it would create significant confusion in the highway construction industry; result in costly duplication in the preparation of engineering documents, contract advertisements and other materials used in highway projects; and reverse the progress that the majority of States have already made in converting to the uniform metric system.

The bill would amend section 205(c)(2) of the National Highway System Designation Act of 1995 (NHS Act) by eliminating the deadline we established to implement the Omnibus Trade and Competitiveness Act of 1988 (P.L. 100-418, August 23, 1988). Pursuant to that Act, states were required by the Federal Highway Administration (FHWA) to convert to metric usage in the preparation of documents relating to Federal-aid highway projects by October 1, 1996. The NHS Act postponed the 1996 compliance date to September 30, 2000. H.R. 813 would make such compliance voluntary for the States.

FHWA has worked closely with the American Association of State Highway and Transportation Officials (AASHTO) and the States to coordinate an orderly transition to the metric system. Currently, over 40 States are surveying and designing their new projects in metric units. To date, States have spent nearly \$71 million to convert their standard plans, specifications, and computer programs. Protracting the conversion process by making conversion voluntary could extend the time period when both metric and inch-pound construction projects are advertised and awarded and could create a period of confusion for private citizens, local government agencies,

contractors, subcontractors, fabricators, and materials suppliers. This could result in the increased possibility of bidding, construction, or supplier errors for projects in either system of units.

Enactment of H.R. 813 would create uncertainty for all involved in highway construction. Adjacent states could be operating in different measurement systems, requiring the contractors, consultants, fabricators, and materials suppliers to use two measurement systems and maintain dual inventories. Information sharing between States could become awkward. FHWA would be forced to use dual units in all documents, databases, and resources as would AASHTO in developing its standards, which would be costly and burdensome.

Conversion to the metric system is intended to enhance the competitiveness of our industries in the global marketplace. H.R. 813 would clearly detract from that goal. Although we cannot export our highways, our transportation industries can and do export the experience and technology used to construct them efficiently. Most of the construction equipment manufactured in the United States, including heavy equipment, testing equipment and survey equipment, is now based on metric units to facilitate export. Reversion would require equipment manufacturers, consultants and contractors to operate in both systems of measurement.

Accordingly, the Department strongly urges you to reject this attempt to turn back the progress we have made with our partners in the States and with the private sector. H.R. 813 is not a minor corrections bill; it is instead an anticompetitiveness, anti-efficiency bill that would burden the U.S. economy unnecessarily.

Thank you for the opportunity to comment on this legislation. The Office of Management and Budget advises that, from the standpoint of the Administration, there is no objection to the submission of this report to the Committee.

Measures similar to H.R. 813 also have been introduced in various proposals for this year's renewal of the Intermodal Surface Transportation Efficiency Act (ISTEA). But the Administration's support for maintaining the year 2000 FHWA deadline significantly reduces the chances of the measures passing, and opposition to removing the deadline is building in Congress. In addition, neither the Associated Road and Transportation Builders Association (ARTBA) nor the Associated General Contractors of America (AGC) supports a change in the October 2000 deadline. A resolution by AASHTO's Standing Committee on Highways opposes any delays in highway metrication, stating that such delays will waste tens of millions of dollars.

The Construction Metrication Council concurs with the AASHTO Committee's position and is working with the FHWA and others on this issue.

# METRIC RESOURCES: 1997 UPDATE

Here is an updated and expanded list of metric resources last published in the July-August 1995 issue of this newsletter.

## Metric Construction Guides

National Institute of Building Sciences (Publications Department, 1201 L St., N.W., Suite 400, Washington DC 20005; phone 202-289-7800). All prices include shipping and handling.

- *Metric Guide for Federal Construction, First Edition.* Written specifically for the construction industry and reviewed by metric experts nationwide. Includes background of the federal metric laws, facts about construction metrication an introduction to metric units and rules for usage, unit conversion tables for architects, engineers and the trades, requirements for metric drawings and specifications, and guidance on metric management and training. 34 pages. \$15.00.
- *Nine Metric Construction Case Studies.* Presents lessons learned from nine federal metric construction projects and includes findings on design and construction costs, the metric learning curve, experiences in the field, a summary of the results of the Canadian construction metrication experience. 25 pages. \$15.00.
- General Services Administration's *Metric Design Guide.* The official GSA design guide used by GSA project managers and their A/Es. Contains practical architectural, civil, structural, mechanical, and electrical design information; lists of available metric building products; related reference materials. 46 pages, loose leaf. \$8.00; \$5.00 if ordered with *Metric Guide for Federal Construction.*
- GSA Philadelphia Region's *M2: Metric Design Guide.* Third Edition. Similar to the above *GSA Metric Design Guide* but written more informally and containing additional information on project management, design, metric building materials and suppliers, sample drawing details, and civil design data. 106 pages, loose-leaf. \$12.00; \$9.00 if ordered with the *Metric Guide for Federal Construction.*
- *Preferred Metric Numbers for Building Construction, with an Appendix on Dimensional Coordination in Building.* Contains material excerpted from NBS Technical Note 990, *The Selection of Preferred Metric Values for Design and Construction* (published in 1978 and now out of print) and information on the Renard Series of preferred numbers, which has been adopted by the International Standards Organization (ISO) and is the most commonly used series worldwide for sizing products in metric units. Also includes an appendix on the dimensional coordination of building measurements, products, and assemblies. 33 pp. \$12.00.

The above publications also are available in electronic form on the NIBS Construction Criteria Base (CCB), a large database of construction criteria and standards on optical disk. For more information, call or write NIBS or visit the NIBS web site at [www.nibs.org](http://www.nibs.org).

## General Metric Information and Materials

U.S. Metric Association (10245 Andasol Ave., Northridge, CA 91325; phone 818-368-7443). Prices do not include postage. Member discounts are available; call USMA for membership information. For additional information on USMA products, mail a self-addressed envelope with 55 cents postage to the above address or visit <http://lamar.colostate.edu/~hillger/>.

- *Style Guide to the Use of the Metric System.* \$5.00; bulk discounts available.

- *SI Metric Style Guide for Written and Computer Usage.* \$2.00; bulk discounts available.
- *Freeman Training/Education Metric Materials List.* \$38.00.
- *Metric Vendor List, 1997.* The greatly expanded fourth edition of this excellent publication lists over 1900 companies that sell metric-dimensioned parts and supplies. The *Vendor List* is divided into three sections: company listing, listing by product category, and listing of company addresses and phone numbers. This is a particularly valuable resource for specifiers. U.S. Metric Association, 10245 Andasol Ave., Northridge CA 91325-1504. Phone 818-368-7443; fax 818-368-7443. \$49.00 including S&H.
- *Metric Poster, "Units for Everyday Use."* \$5.00.
- Metric introductory package containing *Style Guide*, metric ruler, tape measure, thermometer, poster, conversion factor sheet, and "Go metric" bumper sticker. \$14.00.
- *All About Metric* videotape (see MMEI Corporation under "Training Videotapes and Software" section, page 8.)

American National Metric Council (Publications Department, 4330 East-West Highway, Suite 1117, Bethesda MD 20814-4408; phone 301-718-6508). Prices do not include postage. Member discounts are available; call ANMC for membership information.

- *ANMC Metric Editorial Guide.* \$6.00; bulk discounts.
- *SI Metric Training Guide.* \$6.00.
- *Metrication for the Manager.* \$15.00.
- Metric conversion calculator, Texas Instruments 1895II. \$24.00.
- *Unicalc, Unit Conversion/Calculation Software for Windows.* \$79.00
- *Metric Guide for Educational Materials.* \$2.00.
- Metric Awareness Poster Program (one-year subscription). \$149.95.

Society of Automotive Engineers (400 Commonwealth Dr., Warrendale PA 15096-0001; phone 412-776-4841).

- *Metric (SI) in Everyday Science and Engineering (R121).* A well written, concise, and very practical guide to developing an in-depth understanding of the metric system. By Stan Jakuba. \$19.00.

Blackhawk Metric Supply Inc. (Box 543, South Beloit IL 61080; phone 815-389-2850).

- *Metric for Me!* A lay person's guide to the metric system for everyday use, with exercises, problems and estimations. Includes metric poster (see below). \$15.00.
- *Metric poster.* Four-color wall chart showing common metric units and their logical relationships. \$8 each; discounts for bulk orders.

Black & White Publishing (Box 20, Busby, Alberta T0G 0H0 Canada; phone 403-674-6893).

- *Metric Conversion for North America and Canada, First Edition.* \$10.00.

**Professional Publications Inc.** (1250 Fifth Ave., Belmont CA 94002; phone 800-426-1178).

- *Metric in Minutes.* A comprehensive resource for learning and teaching the metric system. \$24.95.

**Human Resource Development Press** (22 Amherst Rd., Amherst MA 01002; phone 800-822-2801).

- *Mastering Metrics.* A training program designed to teach metric basics to employees and managers. \$49.95. Participant materials packages are \$10.00 each.

**IEEE Press** (phone 800-678-IEEE).

- *Metric Units and Conversion Charts: A Metrication Handbook for Engineers, Technologists, and Scientists.* Second Edition (PP 4044). Theodore Wildi. \$19.95.

### Design References

**American Institute of Architects** (AIA Bookstore, 1735 New York Ave., N.W., Washington DC 20006; phone 202-626-7475. The following are also published by John Wiley & Sons, Professional Reference and Trade Group, 605 Third Ave., New York, NY 10158; phone 800-225-5945).

- *Architectural Graphic Standards.* A metric edition is not due for several more years, but current editions include a comprehensive section on metric conversion. \$190.00.
- *The Architect's Studio Companion: Simplified Technical Guidelines for Preliminary Design.* By Edward Allen and Joseph Iano. Includes dual units. 468 pp. \$59.95.
- *Architectural Detailing: Function, Constructability, and Aesthetics.* By Edward Allen. Includes dual units. \$64.95.
- *Fundamentals of Building Construction: Materials and Methods.* By Edward Allen. Includes dual units. \$79.95.
- *Neufert Architect's Data.* By Ernst Neufert. Second International Edition. All units are metric. 433 pp. \$55.00.
- *Wiley Engineer's Desk Reference.* By S. I. Heisler. Includes dual units. 566 pp. \$79.95.

**American Society of Civil Engineers** (phone 800-548-2723 for publications).

- *Metric Units in Engineering -- Going SI.* By Cornelius Wandmacher and Ivan Johnson. \$28.00.

**Instrument Society of America** (Box 3561, Durham NC 27702; phone 919-549-8411).

- *ISA Guide to Measurement Conversions.* By George Platt. 172 pages. \$56.00.

### Cost Estimating

**R. S. Means Company** (Box 800, Kingston MA 02364; phone 800-632-6732).

- *Means Building Construction Cost Data, Metric Edition.* \$99.95.
- *Means Heavy Construction Cost Data, Metric Edition.* \$99.95.
- *How to Estimate with Metric Units.* \$49.95.

**Frank R. Walker Co.** (Box 3180, Lisle IL 60532; phone 630-971-8989).

- *Building Estimator's Reference Book.* Includes Walker Pocket Estimator. \$69.95.

### Specifications

**ARCOM** (phone 703-684-9153).

- *AIA MASTERSPEC®.* User can select either inch-pound or metric units.

**National Institute of Building Sciences** (1201 L Street N.W., Washington, D.C. 20005; phone 202-289-7800; see [www.spectext.org](http://www.spectext.org)).

- *SPECTEXT®.* User can select either inch-pound or metric units.

### Building Codes

**Building Officials and Code Administrators International** (4051 W. Flossmoor Rd., Country Club Hills IL 60477-5795; phone 708-799-2300).

- Dual units are included in the text of the BOCA National Codes.

**International Conference of Building Officials** (5360 South Workman Mill Rd., Whittier CA 90601; phone 310-699-0541).

- Dual units are included in the text of the ICBO Uniform Codes.

**Southern Building Code Congress International, Inc.** (900 Montclair Rd., Birmingham AL 35213-1206; phone 205-591-1853).

- Dual units are included in the text of the SBCCI Standard Codes.

**National Fire Protection Association** (1 Batterymarch Park, Box 9101, Quincy MA 02269-9101; phone 1-800-344-3555).

- Dual units are included in the text of NFPA 101, *Life Safety Code*, and all other NFPA standards.

### Metric Standards

**ASTM** (100 Bar Harbor Dr., West Conshohocken, PA 19428-2959; phone 610-832-9585). Call ASTM for current prices. All ASTM standards are published in metric or dual units.

- ASTM E621, *Standard Practice for the Use of Metric (SI) Units in Building Design and Construction.* (This standard will be replaced by IEEE/ASTM SI-10, *Standard for Use of the International System of Units (SI): The Modern Metric System*, in late 1997)
- ASTM E380, *Standard Practice for Use of the International System of Units (SI).*
- ASTM E713, *Guide for Selection of Scales for Metric Building Drawings.*
- ASTM E577, *Guide for Dimensional Coordination of Rectilinear Building Parts and Systems.*
- ASTM E835, *Guide for Dimensional Coordination of Structural Clay Units, Concrete Masonry Units, and Clay Flue Linings.*

**American National Standards Institute, Inc.** (11 W. 42nd St., New York NY 10036; phone 212-642-4900). Call ANSI for current prices. Many ANSI standards are available in metric units.

- ANSI/IEEE 268, *American National Standard Metric Practice.* (This standard will be replaced by IEEE/ASTM SI-10, *Standard for Use of the International System of Units (SI): The Modern Metric System*, in late 1997.)
- ANSI/AWS A1.1, *Metric Practice Guide for the Welding Industry.*
- ANSI/IEEE 945, *Preferred Metric Units for Use in Electrical and Electronics Science and Technology.*
- ISO 1000, *SI Units and Recommendations for the Use of Their Multiples and Certain Other Units.*

National Institute of Standards and Technology (Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-9325; phone 202-512-1800).

- NIST Special Publication 330. *The International System of Units (SI)*. Barry N. Taylor. \$4.50.
- NIST Special Publication 811. *Guide for the Use of the International System of Units*. Barry N. Taylor. \$5.50.

### Civil, Highway, and Public Works

American Congress on Surveying and Mapping (5410 Grosvenor Lane, Suite 100, Bethesda MD 20814; phone 301-493-0200).

- *Metric Practice Guide for Surveying and Mapping*. 11 pp. \$12.00.

American Association of State and Highway Transportation Officials (444 N. Capital St., N.W., Suite 225, Washington DC 20001; phone 800-231-3475).

- *Guide to Metric Conversion*. 105 pages. \$16.00.
- *Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 17th Edition*. Two-volume set. \$262.00.
- *Guide to Standardized Highway Barrier Hardware*. \$60.00.
- *AASHTO LRFD Bridge Design Specification, Metric Edition*. \$54.50.
- AASHTO Metric Information Clearinghouse for other highway-related metric publications, reference materials, and technical updates. Call 504-661-0434, fax 504-661-1707, or send an e-mail message to [amenefee@tamu.edu](mailto:amenefee@tamu.edu).

American Public Works Association (APWA Educational Foundation, 106 West 11th St., Suite 1800, Kansas City, MO 64105-1806; phone 816-472-6100).

- *Transition to the Metric System, An Implementation Guide*. 56 pp. Order No. PB.AMSG. \$12.00.

BNI Building News (502 Maple Ave. West, Vienna, VA 22180; phone 800-873-6397).

- "Greenbook: " *Standard Specification for Public Works Construction*, 11th Edition. Includes both metric and inch-pound units. 750 pp. \$49.95.
- "Greenbook Companion: " *Standard Plans for Public Works Construction*, 4th Edition. Includes both metric and inch-pound units. \$59.95.
- *Work Area Traffic Control Handbook*. Includes both metric and inch-pound units. \$5.95.

Water Environment Federation (601 Wythe St., Alexandria VA 22314; phone 703-684-2400).

- *Units of Expression for Wastewater Treatment Management (M0006)*. 47 pp. \$8.00.

### Wood

American Forest and Paper Association (formerly National Forest Products Association; 1250 Connecticut Ave., N.W., Washington DC 20036; phone 800-890-7732).

- *Wood Products Metric Planning Package*. 30 pages. 1994. \$10.00.

Composite Panel Association (18928 Premiere Ct., Gaithersburg MD 20879; phone 301-670-0604).

- Metric units have been added to the ANSI standards for particleboard and medium-density fiberboard. \$6.00 each.

Hardwood Plywood Manufacturers Association (Box 2789, Reston VA 22090-2789; phone 703-435-2900).

- *ANSI HPVA HP-1-1994, American National Standard for Hardwood and Decorative Plywood*. Includes dual units. 24 pp. \$15.00.

### Steel

American Institute of Steel Construction (Metric Publications, 1 E. Wacker Dr., Suite 3100, Chicago IL 60601-2001; phone 800-644-2400 for publications and 312-670-5444 for software).

- *Metric Properties of Structural Shapes with Dimensions According to ASTM A6M*. Metric version of Part I of the *Manual of Steel Construction*. \$20.00.
- *Metric Conversion of Load and Resistance Factor Design Specification for Structural Steel Buildings*. \$20.00.
- *Guide to Metric Steel Fabrication*. \$20.00.
- *AISC Database, Version 2.0, Metric Units*. An ASCII data file that gives programmers electronic access to the dimensions and properties of structural shapes -- W, M, S, HP, C, MC, WT, MT, ST, L, 2L, TS, P, PX, PXX -- in metric units. \$60.00.
- *AISC for AutoCAD, Version 2.0* (for AutoCAD Release 12 and 13 in DOS), a utility that automatically draws plans, side elevations, and end elevations for the above mentioned structural shapes. The program includes both inch-pound and metric units. \$120.

American Welding Society (550 N.W. LeJeune Rd, Box 35104, Miami FL 33135; phone 800-334-9353 or visit <http://www.amweld.org>).

- All AWS standards include dual units, except the 1996 *Bridge Welding Code*, which is published in a metric edition.

### Concrete

American Concrete Institute (Box 19150, Redford Station, Detroit MI 48219; phone 248-848-3808).

- *ACI 318M/318RM, Building Code Requirements for Reinforced Concrete and Commentary*. Metric edition of ACI 318/318R. \$96.50.

Portland Cement Institute (Order Processing, 5420 Old Orchard Rd., Skokie IL 60077; phone 800-868-6733).

- *Design and Control of Concrete Mixtures, Canadian Metric Edition*. \$35.00 plus \$6.75 S&H.

Wire Reinforcing Institute (301 E. Sandusky Street, Findlay, OH 45840-7182; phone 419-425-9473).

- *Manual of Standard Practice, Structural Welded Wire Fabric*. \$8.00 plus S&H.
- *Metric Welded Wire Reinforcement*. TF-206, data sheet. Free.
- *Metric Welded Wire Reinforcement for Concrete Pipe*. TF-311. \$1.25.
- Plastic pocket card. Lists metric areas, diameters, and masses for 23 wire sizes, with inch-pound conversions. \$1.25.

Concrete Reinforcing Steel Institute (944 N. Plum Grove Rd., Schaumburg IL 60173; phone 847-517-1200).

- 3-page fold-out bar chart. Metric rebar design and detailing data are provided on one side of the chart, inch-pound data are provided on the other. \$10.00.
- Two plastic pocket cards. Blue card provides metric bar det. white card provides inch-pound and metric bar marking information. \$6.00 for 15 cards.

## Fasteners

**Industrial Fasteners Institute** (1105 East Ohio Building, 1717 E. 9th St., Cleveland OH 44114; phone 216-241-1482).

- *Metric Fastener Standards*. \$60.00. A greatly expanded edition will be published in late 1997.

## Mechanical and Electrical

**American Society of Heating, Refrigerating, and Air-Conditioning Engineers** (1791 Tullie Circle, N.E., Atlanta GA 30329; phone 404-636-8400). Call ASHRAE for current prices. All ASHRAE standards are published in metric or dual units. ASHRAE plans to discontinue the use of inch-pound units by 2000.

- *SI for HVAC&R*. 1986. 11 pp. Free on request.
- *Psychrometric Charts SI*. Charts 1 through 7.
- *1995 Handbook -- HVAC Applications*. SI edition.
- *1987 Handbook -- Fundamentals*. SI edition.
- *1994 Refrigeration Handbook*. SI edition.
- *1996 Handbook -- HVAC Systems and Equipment*. SI edition.

**American Society of Mechanical Engineers** (22 Law Dr., Box 2300, Fairfield NJ 07007; phone 1-800-843-2763). Call ASME for current prices. All ASME standards, except the *Boiler and Pressure Vessel Code*, are published in either metric or dual units. ASME plans to discontinue the use of inch-pound units by 2001.

- SI-1, *Orientation and Guide for Use of SI (Metric) Units*.
- SI-2, *SI Units in Strength of Materials*. 14 pp.
- SI-3, *SI Units in Dynamics*. 20 pp.
- SI-4, *SI Units in Thermodynamics*. 55 pp.
- SI-5, *SI Units in Fluid Mechanics*. 36 pp.
- SI-6, *SI Units in Kinematics*. 14 pp.
- SI-7, *SI Units in Heat Transfer*. 36 pp.
- SI-8, *SI Units in Vibration*. 13 pp.
- SI-9, *Guide for Metrication of Codes and Standards Using SI (Metric) Units*. 33 pp.
- SI-10, *Steam Charts, SI (Metric) and U.S. Customary Units*. Edited by J. H. Potter. 128 pp.

**National Environmental Balancing Bureau** (1385 Piccard Dr., Rockville MD 20850; phone 301-977-3698).

- All NEBB publications include metric units and the NEBB *Study Course for Testing-Adjusting-Balancing of Environmental Systems* is available in a metric version.

**Institute of Electrical and Electronics Engineers, Inc.** (Box 1331, Piscataway NJ 08855-1331; phone 800-678-IEEE).

- Most IEEE standards are published in metric units. IEEE will publish standards only in metric units after 2000.

**National Fire Protection Association** (1 Batterymarch Park, Box 9101, Quincy MA 02269-9101; phone 1-800-344-3555). Call NFPA for current prices. The text of all NFPA standards includes dual units.

- NFPA 13, *Installation of Sprinkler Systems*. Text includes dual units.
- ANSI/NFPA 70, *National Electrical Code*. Text includes dual units.

**Sheet Metal and Air Conditioning Contractors National Association** (4201 Lafayette Center Dr., Chantilly VA 22021; phone 703-803-2980).

- All SMACNA publications are being converted to dual units.

**Underwriters Laboratories, Inc.** (333 Pfingston Rd., Northbrook IL 60062; phone Global Engineering Documents at 800-854-7179).

- Virtually all UL standards contain dual units.

## Elevators

**National Elevator Industry, Inc.** (185 Bridge Plaza, Room 310, Fort Lee, NJ 07024; phone 201-944-3211).

- *NEII Vertical Transportation Standards*, 7th Edition. Contains suggested elevator dimensions in metric units. \$45.00.

## Ceiling Systems

**USG Interiors** (100 Crocker Rd., Westlake, OH 44145-1089; phone 216-871-1000).

- *USG Interiors Ceilings (SC2000)*. Contains dual units. No charge.

## Product Manufacturing

**Association for Manufacturing Technology** (7901 Westpark Dr., McLean VA 22102-4269; phone 703-893-2900).

- *Guidelines for Metric Conversion in Machine Tool and Related Industries*. \$15.00.

**American Society of Mechanical Engineers** (Box 2300, Fairfield, NJ 07007; phone 800-843-2763).

- *Metric Standards for Worldwide Manufacturing*, Second Edition. ISBN 0-7918-0041-5, Order No. 800415. \$114.

## Canadian Metric Products

The *Canadian Directory of Metric Products* is available at no charge by sending a fax request to 213-346-2767.

## Metric Measuring Devices

Dual unit or metric tape measures are all that are needed for most job-site work and are readily available at larger hardware stores or directly from Stanley Tools (phone 860-225-5111), Lufkin/Cooper Tools (phone 919-362-1709), or U.S. Tape (phone 515-289-0500).

Metric measuring wheels are available from Reddington Counters, Inc. (phone 800-395-7337).

## Metric Scales and Templates

Metric architectural and engineering scales are available from graphic arts supply stores. Popular models are Staedtler-Mars 987-18-1, Alvin 117 PM, and Charvoz 30-1261. Imprinted scales are available in bulk orders from Woodrow Engineering Company, Catalog No. 115 (Box 138, Sister Bay, WI 54234; phone 414-854-5946).

*Scale Master II Plan*, a wheeled, digital measuring device for doing take-offs from drawings, includes metric scales (Calculated Industries, Inc., 4840 Hitech Dr., Carson City, NV 89706; phone 702-885-4900).

Metric plumbing templates are available from American Standard (phone Barbara Munson at 703-444-0547).

## Metric Conversion Calculators

Metric conversion calculators include the *Sharp Model EL-344G Metric Calculator*, *Texas Instruments Model 1895II* (see ANMC on page 4), *Radio Shack Model 65-828*, and *OHAUS Metric Conversion Calculator*, \$21.95 (phone 800-672-7722). An especially easy-to-use conversion calculator that also has fractional capability is the *1-Step Conversion Calculator Plus*, \$39.95 (4069 Caminito Suero, San Diego, Ca 92122-5103; phone 800-963-8742 or visit [www.shaban.com](http://www.shaban.com)).

Two construction calculator brands include metric units: *InchMate Plus* (Digitool, Box 12350, Aspen CO 81612; phone 970-925-8177) and *Construction Master IV* and *Dimension Master Plus* (Calculated Industries, Inc., 4840 HYTECH Dr., Carson City, NV 89706; phone 702-885-4900).

## Metric Conversion Software

Vidtrack Technologies Co. (540 S. Main St., Suite 941, Akron, OH 44311-1010; phone 330-762-5141).

- *ConvertFile Conversion Utility*. Metric conversion software for IBM-compatible computers. Includes metric style guide and ability to create custom tables. \$19.95 for DOS; \$39.95 for Windows.

GreyMATTERS Knowledge Foundry (Box 472552, Charlotte, NC 28211; e-mail [graymatr@vnet.net](mailto:graymatr@vnet.net)).

- *GreyMATTERS SciWAVE!*. Converts virtually any measurement unit to any other. Also provides physical laws and theories, useful equations and constants, the periodic table, and binary and Roman numerals. Requires Windows 3.x or Windows 95, 8MB memory, and 4MB free hard disk space. \$40.00. Free demo can be downloaded from <http://users.vnet.net/graymatr/graymatr.html>.

Presley and Sons Systems (e-mail [james.presley@worldnet.att.net](mailto:james.presley@worldnet.att.net)).

- *Conversion Buddy*. Free network software that converts between all inch-pound and metric measures and displays derivation, rounding errors, and other useful information for each conversion. Download from <http://www.sharewarejunkies.com/conversi/htm>.

Milmore Corporation (7425 S. Bushnell Blvd., Broken Arrow, OK 74116-2510; phone 918-357-2849; e-mail [milner@oknet.com](mailto:milner@oknet.com)).

- *MCAD™ English/Metric Conversion Program*. Converts AutoCAD drawings a drawing at a time, using artificial intelligence to discern

between measurements and other numbers. Provides a range of conversion options. \$395. Free demo can be downloaded from <http://www.oknet.com/geometric>.

(See also *Unicalc* as listed under ANMC on page 4.)

## CAD and Engineering Software

The two largest CAD vendors, Autodesk and Intergraph, allow the user to work in either inch-pound or metric units. Many structural, mechanical, and cost estimating programs have metric capability, too. Before purchasing computer software, *make sure its base computations are in metric units*.

## Training Videotapes and Software

Workplace Training (540 N. Arm Dr., Mound, MN 55364; phone 800-472-2564; e-mail [phanssen@wptraining.com](mailto:phanssen@wptraining.com)). Call for prices.

- *SI Metric for the Workplace*. Six-tape video/workbook courseware. Provides in-depth metric training for construction professionals. Includes an introduction to metric, units of measure, reading/writing rules, design applications, and metric conversion rules.
- *Metric (SI) Training for Highway Agencies*. Computer-based training program designed for use with the National Highway Institute's workbook on the same subject.
- *Geometric Design of Highways*. CD-ROM multimedia computer training course. Contains video, audio, text, animation, on-board calculator, embedded questions, pre- and post-knowledge checks, and references. Over 80 contact hours in 34 modules on 12 disks.

MIMEI Corporation (2247 Lexington Pl., Livermore, CA 94550; phone 510-449-8992).

- *All About Metric*. Three-tape video training package explains benefits of the metric system, provides tips on how to remedy everyday units, reviews the rules for using metric units and symbols, and discusses the technical units used in industry. Accompanying 80-page reference manual includes conversion tables and other information. Instructor's manual contains lesson tips, test questions, and illustrations suitable for use as masters for overhead projector transparencies. \$500. Also available through the U.S. Metric Association; see page 1.

English is the international language of business.  
Metric is the international language of measurement.



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*The Construction Metrication Newsletter*

# metric reporter

*The newsletter of the American National Metric Council*  
*"Metric builds our competitive edge"*

## **ANMC's Richardson hands on metric cube**

ANMC president Hal Richardson is in the process of retiring from Lockheed Martin and has "passed on the metric cube," or presidency of ANMC, to vice president Gian Argentati of Ingersoll-Rand. "Gian will make an excellent president of ANMC," Richardson said.



"I have greatly enjoyed my 10 years of working on implementing the metric system in our industries and this country as president of ANMC," he said.

"Over these years, I have met some dedicated people who have worked, and continue to work hard, on this effort. One is Gerry Underwood, our president a few years back, who once handed out yellow 1 cm cubes at a national metric conference. Well, I still have mine and have been pushing it down the road to a totally metric country!

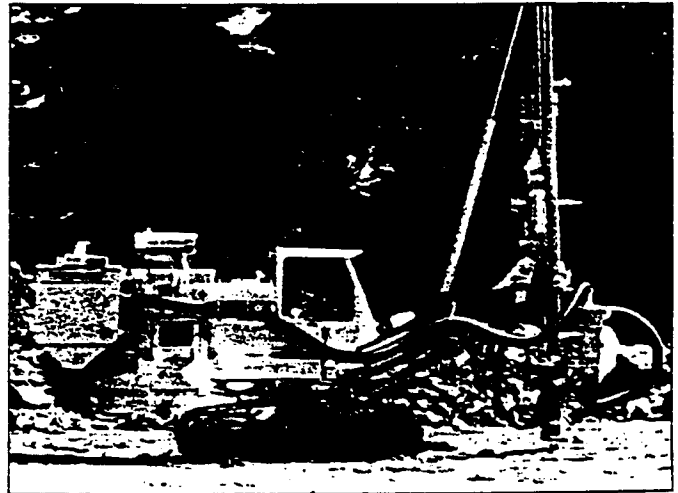
"I feel that we have made significant progress, although we still have a ways to go. I bid you all farewell and offer my best wishes for a metric country in our near future."

*For a profile of Argentati, see p. 3. mr*

## **Ingersoll-Rand's new World Crawler – metric machine set to drill into the global market**

*An Ingersoll-Rand world crawler, designed in metric for the world market.*

*Photo courtesy of Ingersoll-Rand.*



Ingersoll-Rand (IR), one of the world's leading manufacturers of engineering and construction equipment, has taken a "forward-looking" step in the metric realm by designing its new "World Crawler" in metric.

"At the onset of the project, one of the primary objectives was to design the machine in metric, which would give us global sourcing and increase the availability of components on a worldwide basis," said Ingersoll-Rand's John P. McCann, Quarry Industry Manager, and Robert Kimberlin, Engineering Manager at IR's Rock Drill Division.

"This was not a simple task,

since there is no *true* worldwide metric standard to follow on such projects. Metric does not mean just designing in millimeters; there are several other issues to consider."

Crawlers are machine drills that make 3 1/2 to 4 1/2-inch-diameter holes of up to about 104 feet deep at quarries and are used to get aggregates and rock out of quarries to make crushed stone and other materials. They also are used in construction conditions of rock in building new roads.

The intent was to use "the most widely accepted" metric standards. The World Crawler is manufactured

*Continued, p. 2*

## Crawler, from p. 1

in Roanoke, VA, but "we wanted flexibility to react to extreme currency shifts, large job funding that specifies particular points of manufacture or other issues, so the unit could be manufactured at Ingersoll-Rand locations in Europe and Asia," said McCann and Kimberlin. "Moving the point of manufacture would not be a turn-key project, but we did not want to 'design out' the possibility of moving it."

Ingersoll-Rand sourced the components globally, with track and guide components, as well as the drifter, coming from Europe. U.S. components came from global

suppliers and are available worldwide to exact specifications.

"This machine is unique because it used the engineering talents of our French and Japanese colleagues," noted Kimberlin. "The French input focused on hydraulic feedback processes to monitor rock conditions - this drill can change to match those conditions."

"The Japanese contributed much of the ergonomics of the cab. Both the ergonomics and the monitoring capacity make the crawler very user-friendly."

### "This project was forward-thinking for sales globally"

The majority of structural shapes or weldments are of bent plate. Shapes are only needed in a few areas of the machine, but metric equivalents for those elements are readily available and interchangeable. These include the guide extension tube, inner/outer boom tubes and enclosure tube structure.

The cab of the crawler uses a tube produced by one of Ingersoll-Rand's vendors, allowing both a lower cost and reduced weight on the cab structure while providing adequate ROPS/FOPS protection.

"We specified an extrusion for the drill guide, to duplicate our current three-piece structural tube shapes," said Kimberlin and McCann. "The benefits are reduced weight, cost and fabrication time."

All fasteners on the machine are zinc or cad-plated coarse thread metric. The company also is using flange nuts and bolts to reduce the part count on the machine when possible, and is using Aeroquip Global hoses with JIC hose ends. Hydraulic connections use SAE o-ring flanges; motor and pump flanges are SAE-type.

Drawings for the crawler were generated on CAD and are compatible with Ingersoll-Rand's CAD system, which the company uses internationally. The drawings and designs are in metric, with allowance for using both inch/pound and

metric plates. The drawings are labelled in the English language with third-angle projection of the drawing views.

### "... benefits and future savings outweigh the added initial design and material costs"

Although Japan and France models could not be manufactured anywhere else without extensive redesign, added cost and complexity from the product support side, by design and source of components, the World Crawler eventually will replace some Ingersoll-Rand models currently manufactured in Japan and Europe.

"This project was forward-thinking for sales globally," said Kimberlin and McCann. "The World Crawler gives the Rock Drill division more manufacturing options and will reduce our support costs worldwide. It also allows our global customer base to maintain and repair their units at reduced costs."

"Metric standardization and sourcing from 'global' suppliers may add cost initially, but over the life of a crawler drill in the worldwide market, the benefits and future savings outweigh the added initial design and material costs." mr

## ANMC METRIC

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ANMC is a not-for-profit trade association, founded in 1973 by private industry to assist organizations in the metric transition process.

Chairman/President:  
Gian Argentati  
Ingersoll-Rand

Vice-President: to be announced  
Sec'y/Treasurer: Howard Ellsworth  
Department of Defense (retired)

Executive Committee members:  
William Brenner, AIA  
National Institute of Building Sciences  
Phil Robinson  
Parker Hannifin Corporation  
Executive Director: W. Frank Morris III

## metric reporter

As the newsletter of the American National Metric Council (ANMC), the *metric reporter* (mr) informs ANMC members and supporters about progress and issues in U.S. industrial metrication. Ruth E. Thaler-Carter, writer/editor.

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### Promote your metric products and services!

Make 1997 the most profitable year yet for your metric products and services! The ANMC *metric reporter* is the ideal venue for promoting your metric-related services and products.

Advertising rates are: full page: \$350; half page: \$250; quarter page: \$150; classifieds: \$1 per word, \$25 minimum, paid in advance. Discounts for long-term contracts. Production services available.

Please send camera-ready ads to ANMC office with payment (*see box, left*). For assistance with production, contact the office and ask for Ruth E. Thaler-Carter, editor. mr

## anmc activities

ANMC is pleased to announce that Gian Argentati, manager of Ingersoll-Rand Company's Corporate Engineering Information and Standards in Phillipsburg, NJ, is its new president.

Argentati has served as vice president of ANMC for the past several years and has been active in the association for many years. He steps up to serving as ANMC president on the retirement from Lockheed-Martin of Hal Richardson, who has served as ANMC president for the past 10 years (see p. 1).

Argentati has worked with IR since 1974. Since 1987, he has managed the corporate Engineering

Information and Standards departments and Corporate Technical Library; maintained its Parts Management System on a CD-ROM system that has been installed at every domestic and overseas IR operation; facilitated Ingersoll-Rand division certification to ISO 9000 and division transitions to using the metric system; transposed divisional historical files to CD-ROM; created, maintained and distributed the IR library of Product Safety Labels on CD-ROM; facilitated company-wide implementation of parts management system for purchasing and manufacturing components, representing engineering on an advisory board; and maintained the Corporate Engineering Standards and Procedures manual and the Corporate Engineering drafting standards.

From 1983-1987, Argentati

supervised a company-wide project to classify procured and manufactured parts for IR. He designed turbo machinery, air compressors and mining machinery for IR from 1974-1983. Before joining IR, Argentati worked as a senior draftsman for the Foster Wheeler Corporation, from 1968-1974.

In one of his first acts as incoming ANMC president, Argentati commissioned the page 1 article on IR's new World Crawler drilling machine for this issue of the ANMC newsletter. He encourages all ANMC members to take an active part in providing updates on metric initiatives, projects and successes to the association for coverage in the *metric reporter*.

"I look forward to leading ANMC in serving industry transition to metric," said Argentati. *mr*

## Metric in recipes – Consider consumers when converting

By Stan I. Jakuba, President  
SI Jakub Associates

Conversions of English recipes into metric can be so "exact" that they provoke consumer resistance to the metric measures. The impact of such conversions can perhaps be best illustrated with the reverse conversion: If the metric people were adopting inch-pound measures, would they convert their cookbooks like this?

<u>From</u> metric measures	<u>To</u> inch-lb.
1 teaspoon	.17 fluid oz
1 tablespoon	.503 fluid oz
1 cup	7.9 fluid oz
1 cinnamon stick	2 <sup>3</sup> / <sub>16</sub> " cinnamon
100 grams of flour	.71 cup of flour
boil	cook at 212°F

There are two morals to be drawn from this table.

■ Do not convert "kitchen" measures. The teaspoon, tablespoon and cup are just as appropriate in a metric cookbook as a "pinch" and a "handful." There is no need for such exact conversions unless the recipes are for people unfamiliar with common household utensils.

■ When measures *must* be

converted, round off the conversions. For instance, consider a baking temperature. "Bake at 300°F" must be converted. The exact conversion would be 148°C, which should be rounded off to 150°C.

Consider a quantity of butter. One-quarter pound of butter should be converted, but to 100 g, rather than 112 g.

Retaining "kitchen" measures and rounding off the converted numbers is only common sense. Cooking is not an exact science. Personal palate and the quality of ingredients matter a great deal in how closely one follows a recipe. Although a pinch and spoon differ in size from household to household, so does the accuracy of every stove thermostat. Let's not take "accuracy" as an excuse for overwhelming – and alienating – consumers by printing too many overly precise numbers.

Sensible rounding contributes to the acceptance of metric measures. It also follows the age-old practice of the real world: The numbers in the original recipes also were rounded off!

*mr*

## seen & said

■ Excerpts from national coverage of the final Metric Town Meetings of the federal Metric Program Office include the following items.

√ *Beacon Journal*, Akron, OH, and *Advocate*, Baton Rouge, LA: "Gerard Iannelli could have done anything with his life ... Instead, he's trying something really difficult: persuading Americans to go metric ..."

"'We all resist change,' noted Iannelli, the metric-program director at the U.S. Department of Commerce ..."

"Conversion scares people. It is hard to remember a kilometer equals 0.62 miles or a hectare is 2.47 acres ..."

"But when learned from scratch, the metric system is far simpler than the English system."

"The metric system is based on water and the circumference of the Earth. Length, mass, volume and temperature are all linked. And measurements can be easily divided or multiplied by 10 instead of the

*Continued, p. 4*

## letters to the editor

Dear Editor:

As always, I found the latest *mr* interesting and stimulating. I want to thank you for mentioning my name in the March-April issue.

I also want to contribute to the comments you printed in the latest issue. [I am] disgusted with the never-ending battle with cookbook editors who insist on the most unfriendly conversions when attempting to publish a metric cookbook.

Stan I. Jakuba, President  
SI Jakub Associates

*Editor's note: See p. 3 for details of Jakuba's perspectives on metric conversions in cookbooks. Jakuba is a longtime ANMC member and respected metric trainer. He can be reached on the world Wide Web at:*

[www.webcreations.com/metric](http://www.webcreations.com/metric)

### We want your input!

What do you think about metric issues? Please send your ideas or suggestions for articles, letters to the editor and any other items for the *metric reporter* to ANMC. See box, p. 2, for contact information.

*mr*

### Seen, continued

more confusing base-12 system used for feet and inches."

✓ *Arizona Daily Star*, Tucson, AZ: "... [Iannelli's] job, quixotic though it may be, to convince hardheaded Americans to think in terms of hectares, joules, grams and meters ...

"Companies that continue using non-metric measurements increase their costs ... They limit themselves to non-metric suppliers and risk paying more for parts and equipment.

"By manufacturing products according to metric specifications, the United States can increase its ability to trade in global markets, which in turn will stimulate our economy and increase American jobs," Iannelli said.

"George Sudikatus, metric coordinator for the ICF Kaiser Hanford Co., headquartered in eastern Washington [state], said he has heard every imaginable excuse for avoiding the metric system.

"One person told me, 'We won World War II with our non-metric bombs,'" Sudikatus said with a smile. 'Well, folks, we can't bomb people into using our system anymore.

"People think of this as advanced math. But all they have to do is move the decimal point.'

## Clarification

Jim McCracken of the federal Metric Program Office pointed out that a magazine such as *Adobe*, mentioned in the May-June issue of the *mr* as an example of a publication being printed on "metric" (A4) paper, is finished and bound to be A4 size. He also noted that the ANMC *mr* newsletter is printed on A3 paper that then is folded to A4 size.

*mr*

■ National Metric Day generated this in the *Phoenix, AZ Gazette*:

"... Words like 'kilogram' and 'millimeter' sound so, well, foreign. Xenophobia isn't the issue here. Understanding and complexity are.

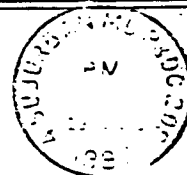
"Most people we know like the K.I.S.S. principle (Keep It Simple Stupid). It isn't so much that people fear the metric system. It's that they are comfortable with what they have and what they know

"Actually, it isn't necessary to understand the metric system to coexist with it. One can purchase a liter bottle of soda without knowing whether it's a bit more or a bit less than a quart. Same with 35mm film. As long as the pictures turn out pretty, who cares what a millimeter is? ..."

*mr*

# ANMC

METRIC



NLTR= 1

Mr. Bob McPartlin

2009

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4340 East West Highway, Suite 401  
Bethesda, MD 20814-4411

### Find it on the Web!

- **Metrication of Roadside Hardware.** This article summarizes some of the most important recommendations regarding metrication of roadside safety hardware. Find it at <http://www.tfhrcc.gov/pubrds/summer95/p95su3.htm>.
- **U.S. Department of Veterans Affairs.** The VA is in the process of providing dual (English and metric) units for all VA design and construction standards. Find it at [http://www.va.gov/facmgt/standard/metr\\_idx.htm](http://www.va.gov/facmgt/standard/metr_idx.htm).
- **State Legislatures.** This site deals with state legislatures and reports the web page links for each of the states. Find it at <http://www.nasire.org/ss/STlegislatures.html>.
- **AASHTO Metrication Clearinghouse.** This site features links to past issues of the *Newsletter*, metric bibliographies, contacts, and publications, and other metric sites. It should always be your first stop! Find it at <http://tti.tamu.edu/metric/index.stm>.

### Anti-Metric Legislation Introduced in Congress

Two bills have been introduced in Congress which echo last year's failed Duncan bill. Representative Spenser Bachus, Alabama, introduced House Resolution 813 on February 25, 1997. Senator Max Baucus, Montana, introduced Senate Bill 532 on April 4, 1997.

Both bills would amend section 205(c)(2) of the NHS Designation Act of 1995 (23 U.S.C. 109 note; 109 Stat. 577). That section now reads:

Before September 30, 2000, the Secretary shall not require that any State use or plan to use the metric system with respect to designing or advertising, or preparing plans, specifications, estimates, or other documents, for a Federal-aid highway project eligible for assistance under title 23, United States Code.

If successful, either bill would alter the above statement to read:

The Secretary shall not require that any State use or plan to use the metric system with respect to designing or advertising, or preparing plans, specifications, estimates, or other documents, for a Federal-aid highway project eligible for assistance under title 23, United States Code.

HR 813 has been referred to the Committee on Transportation and Infrastructure, Subcommittee on Surface Transportation. S 532 has been referred to the Committee on Environment and Public Works.

#### Inside:

- **FHWA Adopts AASHTO "Green Book" for NHS Projects**
- **NHTSA Revises Federal Motor Vehicle Safety Standards**
- **South Carolina Delays Metric Conversion**
- **Arizona Early Metric System Conversion Prohibited**

### **FHWA Adopts AASHTO "Green Book" for NHS Projects**

The FHWA has adopted the 1994 metric revision of the AASHTO publication, *A Policy on Geometric Design of Highways and Streets*. Commonly known as the "Green Book," the new policy will constitute the FHWA's policy on the geometric design of projects on the National Highway System (NHS).

These federal design standards apply to all NHS projects, regardless of funding source—even to NHS projects wholly funded by a state. In expanding the Secretary's authority to all roads on the NHS, Congress sought to ensure a uniform, safe, interconnected system of principal arterial routes.

Federal-aid projects not on the NHS are to be designed in accordance with state standards. These changes are based on provisions in both the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the NHS Designation Act of 1995. This final rule was published in the Federal Register on April 1, 1997 (62 FR 15392).

### **NHTSA Revises Federal Motor Vehicle Safety Standards**

The National Highway Traffic Safety Administration (NHTSA) proposes to revise selected Federal Motor Vehicle Safety Standards (FMVSS) by converting measurements specified in those standards to metric measurements.

In this notice of proposed rulemaking, NHTSA proposes to convert the following FMVSS to metric units:

- Standard 101 *Controls and displays*
- Standard 109 *New pneumatic tires*
- Standard 111 *Rearview mirrors*
- Standard 116 *Motor vehicle brake fluids*
- Standard 117 *Retreaded pneumatic tires*
- Standard 119 *New pneumatic tires for vehicles other than passenger cars*
- Standard 123 *Motorcycle controls and displays*
- Standard 201 *Occupant protection in interior impact*
- Standard 202 *Head restraints*
- Standard 203 *Impact protection for the driver from the steering control system*
- Standard 204 *Steering control rearward displacement*
- Standard 209 *Seat belt assemblies*
- Standard 210 *Seat belt assembly anchorages*
- Standard 219 *Windshield zone intrusion*
- Standard 220 *School bus rollover protection*
- Standard 222 *School bus passenger seating and crash protection*
- Standard 301 *Fuel system integrity*
- Standard 302 *Flammability of interior materials*

The proposed conversions are not intended to make any changes in the stringency of the affected FMVSS. This notice of proposed rulemaking was published in the Federal Register on April 21, 1997 (62 FR 19253).

### **South Carolina Delays Metric Conversion**

South Carolina will not implement the metric conversion process until 2000.

In a May 9, 1997, letter to the clearinghouse, the South Carolina metric coordinator informed the clearinghouse of the following South Carolina Department of Transportation action:

"On motion of Commissioner Jefferson, seconded by Commissioner Whitehead, the Commission unanimously passed a motion approving the recommendation of the Director to adopt a policy delaying until the year 2000 the SCDOT converting plans to the metric system except in situations when it is beneficial to the Department and contractors to have plans in both English and metric."

South Carolina will not convert any existing plans started in metric.

### **Arizona Early Metric System Conversion Prohibited**

New Arizona legislation (Senate Bill 1319) prohibits the Arizona Department of Transportation (ADOT) and the State Transportation Board from taking any further actions to convert to the metric system before this conversion or use is required by federal law.

Provisions of the legislation include:

- Prohibits ADOT and the State Transportation Board from spending any monies, adopting any rules or implementing any policies or programs to convert signs to the metric system
- Prohibits ADOT and the State Transportation Board from requiring the use of the metric system with respect to designing or preparing plans or other highway project documents, until this conversion is required by federal law.
- Contains a delayed effective date of October 1, 1997.
- Exempts ADOT and the State Transportation Board from provisions of the bill for any design plan or specification for any highway project that was awarded before October 1, 1997.
- Allows ADOT six months to prepare for metric conversion before the use of the metric system is required by Federal law.

### **Alabama Metric Legislation Blocked**

Similar legislation (Senate Bill 392) was introduced in Alabama but did not reach the legislative floor for vote. The bill had sought to mandate the use of the English system of measurement for all measurement purposes, including, but not limited to, road signs, bids, specifications, contracts, publications, or any other use of measurement.

### Have any questions?

The mission of the AASHTO Metrication Clearinghouse, which operates under NCHRP Project 20-40, is to facilitate the adoption of the metric system by highway agencies and their suppliers by gathering, organizing, and sharing information in a timely, efficient, and cost-effective manner. Comments, suggestions, and information requests are welcome and should be addressed to:

AASHTO Metrication Clearinghouse  
Texas Transportation Institute  
3235 Arizona Ave.  
Los Alamos, NM 87544  
(505) 661-0434  
(505) 661-1707 (fax)

E-mail: [amenefee@tamu.edu](mailto:amenefee@tamu.edu)

<http://tti.tamu.edu/metric/>

Principal Investigator:  
Byron C. Blaschke, P.E.

Clearinghouse Coordinator:  
Anne M. Menefee

### Clearinghouse Project Extended

The AASHTO Metrication Clearinghouse has been authorized to continue operations until December 31, 1997.

We at the AASHTO Metrication Clearinghouse thank you for your business. We recently solicited your input on the products and services supplied to you. Your responses help us learn how to serve you better. Here's what you told us:

- On average, you utilize a clearinghouse service or product once a month.
- The overall level of satisfaction with the clearinghouse is high, and those who have used the service indicated that they would be willing to recommend it to others.
- 89% of customers who responded to a customer satisfaction survey recommended that the operation of the AASHTO Metrication Clearinghouse be continued for another year.
- 11% of customers felt the clearinghouse should not be continued; most felt that they had completed conversion efforts and no longer needed assistance.

Many customers submitted comments on the clearinghouse services and products which are most important to them.

Our most recent action in response to those comments was to move the *Newsletter* to a quarterly publishing schedule. Many of the states have completed or nearly completed conversion and no longer need bimonthly conversion updates.

If you have any questions or wish to discuss this activity, please call Anne Menefee, clearinghouse coordinator, at (505) 661-0434, or Byron Blaschke at (409) 845-5274.

