

Design Standards Letter

Letter Number: D-1994-09

Letter Date: 05/23/1994

Effective Date: 05/23/1994

Section/Plan No.: D1-01, D1-02, D1-03, D1-04, D2-01, D2-02, D2-03, D2-04, D2-05, D2-06, D3-01, D3-02, D3-03, D4-01, D4-02, D4-03, D4-04, D4-05, D4-06, D4-07, D4-08, D4-09, D5-01, D5-02, D5-03, D5-04, D5-05, D6-01, D6-02, D6-03, D6-04, D6-05, D6-06, D6-07

Subject: Metric Design Manual Chapters 1, 2, 3, 4, 5, and 6

Body

Please find enclosed copies of the above mentioned Chapters of the New Metric Policy, Procedure and Design Manual. For an interim period, both manuals will be kept up to date.

This new metric manual includes both hard and soft conversions to metric units based upon AASHTO guidelines and the general industry trends as currently available at the time of printing.

Our Metric Conversion Team (MCT) has adopted the policy of placing a "M", to denote metric, in the title block before each drawing, table, or figure number. An "M" is not placed before the section, figure number., etc. in the test part of the manual.

We are maintaining the same format and numbering system as the existing manual.

Please note that we've reissued the previously released metric sections (4-04, 4-06, 4-07). Portions of these sections have been revised since we've received additional AASHTO design criteria. The early releases should be discarded.

Any figures in the English design manual not included in the metric design manual have not been converted yet.

The MCT has adopted the following items as a result of converting to metric, these changes will be seen throughout the design manual:

Kilometer Station - A station is 1000 meters (1 kilometer) in length.

Slopes will be expressed vertical to horizontal.

The Pavement Design Committee has stated that pavement and shoulder cross slope will be single slope of 2 percent. We've prepared the design manual using 2% cross slopes.

Some of the changes detailed below affect the English design manual. The English design manual will be revised to reflect these revisions soon.

CHAPTER 1 GENERAL INFORMATION

Subsection 1-01.4 Metric abbreviations have been added to the list.

Subsection 1-01.5 Forms D-50 thru D-71 have been changed to metric values, also, typical sections for New Pavement Design have been added to the list.

Subsection 1-01.6 This is a new section on metric rules and regulations and should be reviewed closely.

Section 1-04 Federal Aid Urban is changed to Surface Transportation Program (STP) as a result of the Intermodal Surface Transportaion Efficiency Act (ISTEA).

The remainder of the chapter has been converted to metric values and terminology.

CHAPTER 2 PRELIMINARY DESIGN

Subsection 2-01.11 The sixth paragraph states that Forms AD-1006 and SCS-CPA-106/106A are to be completed in dual units. These and other environmental forms will be completed in dual units until the issuing agency distributes new metric forms.

Subsection 2-01.12 The accident rate formula will remain in English units until we receive further FHWA guidance.

Figures M2-01.5 and M2-01.7 have been changed to reflect the new 2% pavement cross slope.

Subsection 2-02.5(1)(f) - A paragraph was added to the notice of public hearing form so we comply with Americans with Disabilities Act (ADA).

The remainder of the chapter has been converted to metric values and terminology.

CHAPTER 3 SURVEYS

Subsection 3-02.1 - Procedure was updated to include more information on survey data recorders. Table M3-02.1 was converted to metric values.

Table M3-02.2 - Elevations are currently recorded to 0.01'; hard converts to 5 mm.

Subsection 3-02.4(5)(a) A curve is no longer defined by degree of curve, instead a curve is defined by its radius.

Subsection 3-02.4(5)(b) Staking curves by coordinates was added to this subsection.

Section 3-03 This section has been extensively revised by the Photogrammetric Task Force and should be reviewed closely.

Subsection 3-03.2 Was hard converted to metric values. Please note that new metric flight heights imply the accuracy of the mapping.

SECTION M4-01 GENERAL

The numerical values have been converted to metric units.

Table M4-01.1 The accuracy table has been hard converted to metric units and should be reviewed closely. As stated in Chapter 3, elevations will be recorded to 5 mm.

SECTION M4-02 RIGHT OF WAY

Subsection 4-02.11 We have added a paragraph on metric guidelines for right of way and included a new figure M4-02.4. The other figures were renumbered.

Subsection 4-02.12 The Cultural Resource Assessment Questionnaire will be completed in dual units, until the issuing agency has distributed a metric version.

SECTION M4-03 PLANS-SPECIFICATIONS-ESTIMATES

Subsection 4-03.3 The standard metric sheet size is 533 mm by 865 mm. These are the sizes set up in CEAL and ProCadam.

Figures 4-03.1 to 4-03.9 will be converted at a later date by the CADD Standards Quality Circle.

Figures M4-03.10 to 4-03.12 have been converted to metric units.

Figures 4-03.13 to 4-03.17 are on hold till the unit bid items and estimate program are converted to the metric system.

SECTION M4-04 BASIC DESIGN CRITERIA

Figure M4-04.1 was updated based on the Metric Green Book.

Subsection 4-04.2(7) Operational Sight Distance - Figure 4-04.6 was deleted and the text was modified. The remaining figures were renumbered.

SECTION M4-05 INTERSECTIONS AT GRADE

Table M4-05.4 The sight distance information has been hard converted to metric values.

SECTION M4-06 INTERSECTIONS

Table M4-06.1 has been revised after reviewing the Metric AASHTO Green Book. References to kmph have been changed to km/h.

SECTION M4-07 URBAN PROJECTS

Figure M4-07.1 has been updated based on the Metric AASHTO Green Book.

Noise Abatement was relocated from Subsection 4-07.3(3)k and assigned to a new subsection 4-07.4.

SECTION M4-08 GRADING

The numerical values have been converted to metric units.

Table M4-08.1 Linear grading limits have been hard converted to metric values. With the use of a kilometer station the values have changed considerably.

SECTION M4-09 MISCELLANEOUS

Subsection 4-09.8 Guard rail must be soft converted until metric equivalents are available.

Subsection 4-09.11(3) "2B" Sheet Procedure, Column 4 Depth "D" has been soft converted from inch-pound system. These values will probably change pending FHWA guidelines and the construction industry trends on manufacturing drop inlets.

Subsection 4-09.17(2) Degree of curvature will not be used. Curvature will be defined by radius.

Subsection 4-10 Example plan sheets are not available at this time.

CHAPTER 5 BRIDGE REPORTS AND LAYOUTS

Bridge Division has revised this chapter to metric values.

Old Figures 5-03.1 to 5-03.7 have been deleted from the Design Manual.

Figures M5-03.1 (old fig. 5-03.8) and M5-03.2 (old fig. 5-03.9) have been converted to metric values.

The remaining figures in Section 5-03 and Section 5-04 will be renumbered and issued at a later date as metric versions become available.

SECTION M6-01 SUBGRADE AND M6-02 UNDERDRAINAGE

The numerical values have been converted to metric units.

SECTION M6-03 PAVEMENTS

The numerical values have been converted to metric units.

Figure M6-03.7 and M6-03.8 have been revised by Materials and Research Division.

SECTION M6-04 SHOULDERS, M6-05 3R/4R PROJECTS AND M6-06 SEAL COATS

The numerical values have been converted to metric units.

SECTION M6-07 BITUMINOUS CONSTRUCTION MATERIALS

Figure 6-07.1 has been converted to metric values and updated by Materials and Research Division.

We strive to get metric design criteria disseminated accurately and promptly, based on the current information that is available. These six chapters are just the beginning, we will continue to update and convert the remainder of the design manual, the standard drawings and the specification book. We suggest the designer take some time to review and understand the changes that are a result of converting to the metric (SI) system.

The

MCT is working on a plan metrication guide to help explain metric design criteria including kilometer stationing (km sta), metric curves, scales, etc. This guide should be available Fall 1994.

tea/ddf