

**Forest Service Manual
National Headquarters - Washington Office
Washington, DC**

**Forest Service Manual 7100 – Engineering Operations
Chapter - Zero Code**

Amendment: 7100-2004-2

Effective date: December 23, 2004

Duration: This amendment is effective until superseded or removed.

Approved by: Frederick L. Norbury, Associate Deputy Chief, NFS

Date approved: December 14, 2004

Responsible Staff:

Last Change: 7100-2004-1 to 7110

Superseded Document(s): 7100_zero_code, Amendment 7100-2000-1, September 15, 2000)

Digest: Following is an explanation of the changes throughout the directive by section.

7109.17: Updates the name of the Handbook to National Construction Certification Handbook.

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Guidance documents lack the force and effect of law, unless expressly authorized by statute or incorporated into a contract. USDA may not cite, use, or rely on any guidance that is not available through their guidance portal, except to establish historical facts.

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7101 - Authority [Reserved]

7102 - Objective [Reserved]

7103 - Policy

7103.1 - Signs and Posters

1. Forest Service signs and posters should be planned, designed, procured, installed, and maintained according to the guidance in the Engineering Management (EM) series administrative document, EM-7100-15, "Standards for Forest Service Signs and Posters" (FSM 7108.11).

2. The use of other signing systems is discouraged, and use of non-standard signs must be approved by the Regional Sign Coordinator.

7103.2 - Cartographic Specifications and Symbols

Follow the guidance in EM-7140-24, "Cartographic Specifications and Symbols" (FSM 7108.11). This administrative document should be used in conjunction with FSH 7109.13a, Geometronics Handbook, as the standard for Forest Service Primary Base Series/Single Edition Quadrangle (PBS/SEQ) and Secondary Base Series (SBS) mapping, which includes the Family of Maps-Visitor Information Series, and for Cartographic Feature File (CFF) Digitizing Specifications.

7103.3 - Traffic Control Devices

Signs, signals, markings, and other devices used by the Forest Service to control traffic on streets or highways should comply with the requirements in the "Manual on Uniform Traffic Control Devices," published by the Federal Highway Administration, Department of Transportation (FSM 7108.21).

7103.4 - Operation of Vehicles

Drivers and operators of Forest Service vehicles should follow the guidance in the "Driver-Operator Guide," EM-7130-2 (FSM 7108.11 and 7130.07).

7103.5 - Explosives and Blasting Materials

Forest Service operations related to the use, storage, and transportation of explosives and blasting materials must comply with the requirements in the "Guide for Using, Storing, and Transporting Explosives and Blasting Materials," Missoula Technology and Development Program, TE02L14, Technical Services-Explosives, 7100-Engineering, 9271-2815-MTDC (FSM 7108.12). Related direction on hazardous materials is in FSM 2160 and FSH 6709.11. The following major requirements are covered in more detail in the introductory sections of chapters 1, 3, 4, and 5 of the blasting guide:

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1. Ensure that all force account work with explosives (including transportation, use, mixing of component explosives, storage, magazine inspection, and disposal) is conducted under the direct supervision of a qualified blaster who holds a current Forest Service Blaster's certificate. The Blaster-in-Charge is responsible for posting flaggers or guards and warning signs; notifying all persons in the blast area; and giving all necessary audible warning signals. The Blaster-in-Charge is the last person to leave the blast area before a blast is fired.
2. Comply with Federal, State, and local laws as applicable; follow the most stringent requirements where a difference appears.
3. Notify residents and representatives of utilities in the vicinity at least 24 hours in advance of blasting.
4. Use only explosives or explosive materials approved by Regional Foresters.
5. Allow no one to handle explosives while under the influence of liquor, narcotics, or prescription drugs that impair performance.
6. Ensure that only personnel certified for disposal are involved in the movement and disposal of explosives. Never abandon explosives, ammunition, or blasting agents.
7. Never fight a fire that is in imminent danger of contacting explosives; evacuate the area.
8. Ensure that magazines where explosive materials are stored are inspected at least every 7 days; notify the nearest Regional office of the Bureau of Alcohol, Tobacco and Firearms, and appropriate State offices within 24 hours of any loss, theft, or unauthorized entry into a magazine. Maintain a record of changes in stock inventory and of inspections at each magazine.
9. Maintain a blasting record, showing the date and time of each blast and the amount and type of explosive used.
10. Ensure that storage of explosives conforms to requirements in Title 27, Code of Federal Regulations, part 55, subpart K (27 CFR part 55, subpart K). Exceptions to these requirements, other than adherence to more stringent local, State, or Federal regulations, must be approved by the Director of the Bureau of Alcohol, Tobacco and Firearms. For requirements on explosives storage in remote, uninhabited, roadless locations and in field locations, see sections 3.2-3.3 in the blasting guide.
11. Ensure that shipments of explosives comply with requirements in 49 CFR. Vehicles transporting explosives shall be driven only by operators qualified as specified in 49 CFR part 391 and certified to transport explosives in accordance with 49 CFR part 383.

7104 - Responsibility [Reserved]

7105 - Definitions [Reserved]

7108 - References

7108.1 - Forest Service Administrative Documents

7108.11 - Engineering Management (EM) Series

These Forest Service administrative documents have been developed for the guidance of employees of the Forest Service, agency contractors, and cooperating Federal and State agencies. The information in the administrative documents has not been approved for distribution to the public and must not be construed as recommended or approved policy, procedures, or mandatory instructions, except when such compliance is required by references in the Forest Service Manual or Handbooks.

Copies of EM series documents and lists of current administrative documents in the EM series are available from the Director, Engineering Staff, Washington Office; additional sources for copies of these administrative documents are listed with the descriptions of each document.

The main EM documents to be followed in engineering operations include:

1. Signs and Posters. Follow the guidance in EM-7100-15, "Standards for Forest Service Signs and Posters" (FSM 7103.1). This guide, which provides the basic principles for planning, designing, procuring, installing, and maintaining Forest Service signs and posters, is available through Regional Sign Coordinators.

2. Cartographic Specifications and Symbols. Follow the guidance in EM-7140-24, "Cartographic Specifications and Symbols" (FSM 7103.2). This administrative document should be used in conjunction with FSH 7109.13a, Geometronics Handbook, as the standard for Forest Service Primary Base Series/Single Edition Quadrangle (PBS/SEQ) and Secondary Base Series (SBS) mapping, which includes the Family of Maps-Visitor Information Series, and for Cartographic Feature File (CFF) Digitizing Specifications. The specifications are intended to provide uniformity between the Forest Service Base Series map products and a similarity in the symbology used by the U.S. Geological Survey, which is included as part of EM-7140-24.

3. Vehicle Operations. Follow the guidance in the "Driver-Operator Guide," EM-7130-2, which is available through the Regional Equipment Engineers (FSM 7103.3 and 7130.7).

7108.12 - Technology and Development Program Administrative Documents

The Technology and Development Centers at Missoula, MT, and San Dimas, CA, issue administrative documents on technical subjects needed to guide Forest Service employees, contractors, and cooperating Federal and State agencies. Copies of these administrative documents and lists of current Technology and Development Program administrative documents are available from the Missoula Technology and Development Center, Fort Missoula, Building

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No. 1, Missoula, MT 59801, and from the San Dimas Technology and Development Center, 444 East Bonita Avenue, San Dimas, CA 91773.

1. Explosives and Blasting Materials. The use, storage, and transportation of explosives and blasting materials must comply with the requirements in the "Guide for Using, Storing, and Transporting Explosives and Blasting Materials," Missoula Technology and Development Program, TE02L14, Technical Services-Explosives, 7100-Engineering, 9271-2815-MTDC (FSM 7103.4). Related direction on hazardous materials is in FSM 2160 and FSH 6709.11.

7108.2 - Publications of Other Federal Agencies

7108.21 - Federal Highway Administration, Department of Transportation

The "Manual on Uniform Traffic Control Devices" issued by the Federal Highway Administration contains uniform standards for traffic control devices used on streets and highways throughout the United States. Copies are available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Pittsburgh, PA 15250-7954 (telephone 202-512-1800; fax orders may be placed to 202-512-2250).

7108.3 - Information Center Service

7108.31 - Datum

The DATUM Information Center Service offers a nationally accessible, electronic source of Forest Service information materials about the variety of map products, services, and geospatial data available from the Geometronics Service Center. The Manager, Geometronics Service Center, Washington Office, is responsible for the management and maintenance of DATUM.

Users nationwide can review a list of documents available electronically from DATUM and request a document by sending a message to the DATUM mailer's profile, stating the document desired on the subject line. The DATUM document requested is mailed automatically to the requester's inbox, where it can be viewed or printed as a CEO document. Some documents also may be printed in Office/PUBLISHER and TeX desktop publishing formats. Further instructions can be found in the !Help drawer within the Information Center Service.

DATUM includes information about such materials as Cartographic Feature Files (CFF), Digital Elevation Models (DEM), LT Plus Backup Files (LTP) and other geospatial data. It contains information on how to order reports on data availability, upcoming conferences and training opportunities, past editions of DATUM newsletter, GIS tools for using the data, and available assistance.

7109 - Handbooks

7109.1 - Internal Service-wide Handbooks

7109.13a - Geometronics Handbook (FSH)

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This Handbook provides guidelines for geometronics operations and contains information on map standards, acquisition of aerial photography, and development projects. It also has reserved chapters for Annual Reports and Digitizing.

7109.14 - Geographic Names Handbook (FSH)

This Handbook contains specific standards for geographic naming and procedures for recommending, investigating, and reporting geographic names.

7109.17 - National Construction Certification Handbook (FSH)

This Handbook establishes standards by which qualifications can be measured. It advises employees on how they demonstrate their skill and knowledge to meet these standards.

7109.19 - Fleet Equipment Management Handbook (FSH)

This Handbook contains information on fleet equipment acquisition, identification, classification, fleet assignment and utilization, inspection, maintenance, repair, equipment disposal, use and storage. It also contains information on qualification, testing, and training of drivers, operators, and mechanics.

7109.2 - Internal Unit Handbooks

7109.21 - Geotechnical and Materials Engineering Handbook (FSH)

This Handbook provides guidelines for planning, investigating, analyzing, and designing engineered facilities involving soil, rock, asphalt, concrete, and other engineering materials.

7109.5 - Internal Service-wide Handbooks

7109.52 - Engineering Activities Evaluation Handbook (FSH)

This Handbook contains guidelines on developing evaluation standards for Regional and Forest level Engineering activities, as well as on evaluating the performance of engineering activities against those standards.