

DIRECTIVE TABULATION SHEET

TITLE NO. 210 **DIRECTIVE NAME / TYPE** NATIONAL ENGINEERING MANUAL – MISSOURI SUPPLEMENTS

DIRECTIVE NUMBER ^{1/}	ISSUE DATE	PART, SUBPART, PAGES, ETC., OR BULLETIN SUBJECT	FILED BY
Supp. MO-9	08/04/00	MO 542-6(1 thru 24)	
Supp. MO-10	01/26/01	MO 501-1(1), MO-501-2(1), MO-501-3(1), MO 501-6(1), MO 501-7(2), MO 501-12(3 thru 14), MO 503-1(1), MO 503-2(1 thru 4)	
Supp. MO-11	01/31/01	MO 520-10, MO 520-10(a, b, c, & d)	
Supp. MO-12	02/05/01	MO 505-5(1), MO 512-20(1 thru 3), MO 512-21(1 thru 17), MO 512-29(1), MO 512-31(1), MO 520-11(1 thru 5), MO 520-12(1), MO 520-12(b, c & d), MO 531-8(1 thru 3), MO 540-1(1), MO 540-3(1 thru 4), MO 541-2(2), MO 541-6(1 thru 6), MO 541-7(1 thru 6), MO 544-1(1), MO 545-2(1), MO 501-12(1 thru 2), MO 501-12(7 thru 8)	
Supp. MO-13	06/28/01	MO 512-29(1)	
Supp. MO-14	11/04/02	MO 542-6(1-23)	
Supp. MO-15	12/02/03	MO 520.23 and MO 520.28	
Supp. MO-16	03/10/05	MO 520.21, Pages MO 520-10, and MO 520-10a thru 10d	
Supp. MO-17	04/12/05	MO 541-2 (1 thru 2), MO 541-7 (1 thru 5), MO 541-8 (1 thru 6)	
Supp. MO-18	7/18/05	MO 504-2(1), and MO 504-4(1) thru MO 504-4(3)	
Supp. MO-19	9/28/05	MO 511-6(1), MO 512-8(1), MO 512-20(1 thru 4)	
Supp. MO-20	1/22/07	MO 503-1(1), MO 503-2(1), MO 503-2(3 thru 4)	
Supp. MO-21	12/21/07	MO 501-1(1), MO 501-2(1) thru MO 501-3(1), MO 501-4(1) thru (3), MO 501-5(1), and MO 501-7(1)	
Supp. MO-22	1/14/08	MO 503-2(1) thru MO 503-2(5); discard MO 501-12(1) thru (14)	
Supp. MO-23	5/30/08	MO 501-2(1) thru MO 501-3-(1), MO 503-1(1)	
Supp. MO-24	11/17/09	MO 531-8(1) thru MO 531-8(2)	
NOTE:		<i>Missouri Engineering Forms used shall be the current version shown in the Missouri Engineering Forms Handbook.</i>	

^{1/} PERMANENT DIRECTIVES: INSERT THE ISSUE, EDITION OR AMENDMENT NUMBER
 BULLETINS: INSERT THE SEQUENCE NUMBER(S), OMIT TITLE AND FY

PART 531 – GEOLOGY

MO 531.21(a)

§MO 531.21 Minimum requirements for group I Dam Sites

(a) The intensity of geologic investigation for Group I dam sites shall be as follows:

(1) All dams in job approval classes VI, VII, and VIII shall be investigated by a qualified geologist. The geologist will determine the intensity of investigation in cooperation with the engineer having approval authority or responsibility for the job.

§MO 531.23 Minimum requirements for group II Dam Sites

(a) The intensity of geologic investigations for Group II dam sites shall be as follows:

(1) On dams in job approval class III, IV, and V, the dam shall be evaluated by a qualified geologist. For each dam, the designer will make a preliminary evaluation and submit it to the State Conservation Engineer on Form MO-ENG-C91 (Geologic Evaluation Request). The State Conservation Engineer will have a geologist review the designer's recommendations. A field trip may be required. The geologist will prepare a report which will be returned to the designer.

(2) On dams in job approval class I and II, the person with the approval authority will determine the intensity of the investigation. In areas of complex geology or known problems, a geologist will be consulted. In particular, investigation by a geologist should be considered for all sites where bedrock is involved.

(b) Subsurface geologic investigations are required for all agricultural waste management systems and shall be made by a qualified geologist. In addition to the subsurface geologic investigation, all earthen basins (such as treatment lagoons, storage basins, etc.) are to have investigations made in accordance with Missouri Department of Natural Resources regulations (10 CSR 20-6.300 and 10 CSR 20-8).

The geologic investigation, at a minimum, will determine:

- Depth to bedrock if within 4 feet of the bottom elevation of the structure.
- Depth to seasonal high groundwater table if within 6 feet of the bottom elevation of the structure.

The minimum laboratory analyses performed for each site are:

Design Stage:

- Atterberg limits
- Standard proctor density
- Coefficient of permeability (remolded)
- Particle size distribution

Post construction:

- In-place density test of finished soil liner

PART 531 – GEOLOGY

§MO 531.23 Minimum requirements for group II Dam Sites

MO 531.23(b)

Other sources of information on geologic investigation and material testing are:

- (1) National Soil Mechanics Center, Use of Soil Testing Laboratories for Evaluating and Designing Animal Waste Lagoons and Storage Structures. This is filed as an attachment to Geology Note 5 in Chapter 3 of National Engineering Handbook Section 8, Geology. Forms MO-ENG-C356 and MO-ENG-C357 shall be used to submit soil samples to Soil Mechanics Laboratory. These forms shall be approved by the State Conservation Engineer or his designated representative.
- (2) National Engineering Handbook, NEH Part 651, Chapter 10, Appendix 10D, Geotechnical, Design, and Construction Guidelines (formerly the AWMFH).
- (3) National Engineering Handbook, NEH Part 651, Chapter 7, Geologic and Ground Water Considerations.