Part 531 – Geology

Subpart D – Erosion and Sedimentation Investigations

531.40 Investigation of Problems Caused by Erosion or Sedimentation

A. If erosion or sedimentation problems, either onsite or offsite, are caused by structures or conservation practices of any type, the State conservation engineer (SCE) may initiate an engineering investigation. Depending on the geomorphic complexity of the study area; pertinent social, economic, and safety considerations; and the complexity of the structure, practice, or project, the investigation is conducted by a qualified geologist or by a person who holds appropriate job approval authority. The investigation must address the extent of the problem, identify the causes of the increased sedimentation or erosion rates, and outline possible solutions.

B. The types of problems that may require investigation are provided in Title 210, National Engineering Handbook (NEH), Part 631, Chapter 2, Section 631.0211.

C. Policy contained in Title 210, National Engineering Manual (NEM), Part 504, Subpart A, "Problems and Deficiencies," provides requirements for investigating engineering problems and deficiencies and structural problems caused by erosion or sedimentation. It also provides for committee assignments, procedures, and engineering reports.

531.41 Investigation of Watershed Sediment Yield

A. Watershed sediment yield investigations for structures and conservation practices must be conducted by a qualified geologist.

B. Watershed sediment yield investigations may be supported by conducting reservoir sedimentation surveys to determine sediment storage criteria for dams and embankment structure design.

C. Investigational guidance and methodologies are provided in 210-NEH, Section 3, "Sedimentation," and ASTM D6145, Standard Guide for Monitoring Sediment in Watersheds. The geologist has wide discretion in the choice of methodologies in the peer-reviewed literature and must therefore exercise sound technical judgment in the consideration of process relationships, the selection of field techniques to be used in studies, and the formulation of hypotheses.

D. The geologist must write a report that summarizes observations, methods used, assumptions, conclusions, and recommendations. The geologist may consult the Interagency Reservoir Sedimentation Survey Database (RESSED) to examine for similar surveys and useful data.

531.42 Reservoir Sedimentation Surveys

A. Reservoir sedimentation surveys may be conducted to support watershed sediment yield studies, to determine sediment storage criteria for dams and embankment structure design, and to predict sedimentation impacts structure performance.

B. Sedimentation surveys of Group-A and -B dams and Conservation Practice Dams (402) must be conducted or supervised by a qualified geologist. Reservoir sedimentation surveys of Ponds (378) must be conducted by personnel trained in performing such surveys.

C. Sedimentation survey methodologies must conform to procedures in 210-NEH, Section 3, and to the appropriate ASTM standards, as well as the published literature on the use of various geophysical methods.

D. Reports for each reservoir sedimentation survey must be prepared according to requirements in 210-NEH, Section 3, and must include data on watershed conditions that affect sediment yield, including soils, surface geology, topography and land forms, land use, and treatment, and all types of significant erosion. The report must include information about land-use management changes through time in the contributing watershed.

E. The SCE is responsible for the technical adequacy of the report. Copies must be filed in the State office and submitted to the Director, Conservation Engineering Division. The national geologist submits a copy to the USGS Sedimentation Survey Database (RESSED).

531.43 Geologic Investigation of Sedimentation and Erosion Processes in Stream Channels and Stream Corridor Restoration

A. Geomorphic investigations of stream corridors are conducted to support the planning, design, and implementation of streambank stabilization and fluvial geomorphic restoration practices and projects. The complexity of fluvial geomorphic processes necessitates an interdisciplinary approach to assessing stream form and function and may include input from or consultation with geomorphologists, hydrologists, geologists, biologists, soil scientists, and hydraulic engineers.

B. A stream assessment generally includes data collection, a process-based identification of potentially destabilizing factors, and a determination of the equilibrium stage of the stream. The equilibrium stage of various stream reaches and the changes occurring in the stream system must be assessed to allow for the prediction of a proposed project's impact on stream geomorphology, on the equilibrium of the system, and the impact the natural processes will have on the functionality of the project.

C. Recommendations for design must consider channel stability concepts for natural streams that allow a stream to develop a dimension, pattern, and profile that will be in dynamic equilibrium over the life of the project.

D. Guidance for investigation of sedimentation and erosion processes in stream channels and stream corridors is given in 210-NEH, Part 653, "Stream Corridor Restoration – Principles, Processes, and Practices."

E. Technical guidance and detailed procedures for stream assessments, principals of channel design, and treatment techniques for streambank stabilization are provided in 210-NEH, Part 654, "Stream Restoration Design Handbook." Other references are listed in 210-NEH, Part 631, Chapter 2.

531.44 Evaluation of Rock for Erosion Control

A. The acceptability of an identified rock material for erosion control applications may be based on experience with use in similar applications under comparable performance conditions.

B. The assessment of questionable rock sources for erosion control must be conducted according to ASTM D4992, Standard Practice for Evaluation of Rock to Be Used for Erosion Control, and other related ASTM standards.