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|  | Engineering and Design<br><br>PRESCRIBED PROCEDURES FOR THE<br>MAINTENANCE AND OPERATION OF<br>SHORE PROTECTION WORKS |                                    |
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DEPARTMENT OF THE ARMY  
U.S. Army Corps of Engineers  
Washington, D.C. 20314-1000

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CEEC-EH-D

Engineer Regulation  
No. 1110-2-2902

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Engineering and Design  
PRESCRIBED PROCEDURES FOR THE MAINTENANCE AND  
OPERATION OF SHORE PROTECTION WORKS

1. Purpose. This regulation provides specific performance requirements and guidance for accomplishing the satisfactory maintenance and operation of shore protection works, including coastal structures, beach fill projects, and protective dunes.
2. Applicability. This regulation is applicable to all HQUSACE and field operating activities (FOA) responsible for the planning, design, construction, operation, and maintenance of Civil Works projects on the tidal and Great Lakes shores of the United States, the tidal shores of the Federated States of Micronesia and the Marshall Islands, the Commonwealths of Puerto Rico and Northern Marianas Islands, and the Territories of the United States (U.S. Virgin Islands, Guam, American Samoa). This regulation is applicable for the above purpose to local cooperation agreements (ICA) signed more than 60 days after publication of this regulation in the Federal Register.
3. References.
  - a. Public Law 79-727, 13 August 1946, as amended
  - b. Public Law 84-826, 28 July 1956
  - c. Public Law 87-874, 23 October 1962
  - d. Public Law 89-298, 27 October 1965
  - e. Public Law 91-611, 31 December 1970
  - f. Public Law 99-662, 17 November 1986
4. Background. The Federal role in beach erosion control has been defined primarily by Public Law 727, 79th Congress as subsequently amended. The Act provides for Federal assistance in the construction but not the maintenance of work for restoration and protection against wave induced erosion of non-Federal public shores. The law specifies that when the most suitable and economic remedial measure would be provided by periodic beach nourishment, the term "construction" is construed to include the deposit of sand fill at suitable intervals of time. Thus, the Corps, while not responsible for the maintenance of shore protection projects, is involved in the periodic reconstruction or nourishment of many such projects. The Federal participation is conditioned

on non-Federal interest assuring operation, maintenance, replacement, and repair of improvements during the economic life of the project as required to serve the intended purposes. The sponsor of such a project is required to enter into a legally binding agreement with the Secretary of the Army to provide required items of local cooperation and cost sharing (PL 91-611 and PL 99-662).

5. Objective. This regulation prescribes operations, maintenance, inspection, and record keeping procedures required to obtain the intended purposes of shore protection projects.

6. Scope. The Department of the Army will furnish local interest with an operation and maintenance manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations. The efforts prescribed in the following paragraphs should be incorporated into the local operations and maintenance manual and into the planning, design, construction, operation and maintenance, and inspection of all shore protection projects, as applicable.

7. Authority. Section 912(b)(1) of the Water Resources Development Act of 1986 (PL 99-662) amended Section 221 of PL 91-611 to include the following :

"The Secretary may require compliance with any requirements pertaining to cooperation by non-Federal interests in carrying out any water resources project authorized before, on, or after the date of enactment of this Act."

8. Shore protection works; maintenance and operation of structures and facilities.

a. General.

(1) The structures and facilities constructed by or with the financial assistance of the United States for local shore protection and required locally furnished appurtenant facilities shall be maintained and operated in such a manner and for such periods as necessary to obtain the anticipated project benefits.

(2) The agency, which furnished assurances that it will maintain and operate shore protection works in accordance with Federal law, shall appoint a permanent official, hereinafter called the "Superintendent", who shall be directly in charge of an organization responsible for the efficient operation of all of the structures and facilities, and for inspection and maintenance of the project works, all without cost to the United States. The Superintendent may be established from within the existing governmental organization.

(3) The Superintendent will develop a storm emergency plan to cope with storm events greater than the project design storm. The plan should cover measures that minimize the threat to life and damage to property and provide

instructions for an orderly storm recovery effort. Depending on circumstances, it may be desirable to acquire and store certain types of goods, materials, and equipment for evacuation, flood fighting, emergency food, water and sanitary needs, and security.

(4) No other improvement shall be constructed over, under, or through the beach fill or other protective feature, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in the project without prior written approval of the District Commander, U.S. Army Corps of Engineers or an authorized representative. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction, acceptable under standard engineering practice, shall be obtained from the District Commander or, if otherwise obtained, shall be submitted for the District Commander's approval. Standard engineering drawings showing such improvements or alterations as finally constructed shall be furnished the District Commander not more than 90 days after completion of the work.

(5) It shall be the duty of the Superintendent to maintain organized records of activities and costs covering maintenance, operation, condition, inspection, repair and replacement of protective works available for the District Commander's or authorized representative's inspection and notation in the Superintendent's offices upon written request.

(6) The District Commander, and authorized representatives, shall have access at all times to all portions of the project.

(7) The Superintendent shall assure that maintenance measures or repairs which the District Commander deems necessary are promptly taken or made. Failure to act within 30 calendar days after receipt of the District Commander's notice may result in the Government completing the work and pursuing a remedy by law as provided in the local agreement contract.

b. Beach berm and foreshore.

(1) Operation. A beach fill project anticipates erosion of the sand directly in front of, or beneath, the beach front development. The rate and extent of erosion depends on the water elevations, storm wave climate, storm durations, and characteristics of the shore material. The level of storm protection obtained will depend on the fill volume in the beach berm and its elevation. During the recreation season, appropriate beach conditions shall be provided to promote and encourage healthful public recreation. The Superintendent should be certain that:

(a) At least one complete survey of profiles (identified in the operations and maintenance manual) is made each year prior to the storm season.

(b) The dry beach width above normal high tide is measured periodically to determine seasonal changes and storm induced sand deficiencies. This is accomplished by direct measurement at predetermined stations along the length of the project and repeated as prescribed in the operation and maintenance manual.

(c) Conditions such as a beach scarp, steepening of the beach face, or the presence of runnels or beach cusps are noted and recorded at each profile during the above surveys.

(d) If the beach berm fails to naturally build back to the minimum cross section within 14 days after the passage of a storm, beach nourishment action is initiated.

(e) No drains discharge onto the beach berm (the intent is to prevent erosion of the beach berm). Health and safety restrictions determine if storm and/or sanitary drains are permitted to discharge into recreational waters.

(f) Sand stockpiles and other resources and equipment required for flood fighting, storm warnings, and evacuations are adequate and maintained in serviceable condition.

(g) Vehicle parking is restricted to parking areas which do not interfere with the function or recreational use of the project.

(2) Maintenance. The Superintendent shall provide such maintenance (excluding periodic nourishment when defined as construction) as is required to insure serviceability of the beach berm and foreshore for erosion control during storms and for recreation during non-storm periods. Measures shall be taken to prevent sand from blowing off the berm onto nearby streets and into gutters and yards. When the berm has narrowed to the point that its protective function is jeopardized, the Superintendent shall initiate action to accomplish maintenance or nourishment of the project. When periodic nourishment is construed as construction for project purposes, such action will be coordinated with the District Commander. Conditions for initiating early nourishment or delaying scheduled nourishment shall be outlined in the operation and maintenance manual. The Superintendent shall insure that:

(a) Prompt action is taken to correct localized, excessive loss or gain of berm cross section beyond that which is allowed in the operations and maintenance manual (this may include grading and reshaping the beach berm in order to move sand from areas of excessive accumulation to areas of depletion); prevent erosion from flanking structures; and placing needed additional sand fill when materials are stockpiled for this purpose.

(b) Devices and/or vegetation used to catch blowing sand are preserved and replaced where needed.

(c) Hazardous conditions are eliminated where possible. Abrupt variations in berm grade are smoothed out and the beach berm and foreshore are kept free of trash and hazardous debris during periods of recreational use. Hazardous conditions which can not be eliminated are clearly marked and isolated from public access to the extent practicable.

c. Protective dune.

(1) Operation. During storm periods, particularly those which are accompanied by abnormal high tides, the storm protection dune may be eroded. The rate and extent of the erosion depends on the height and duration of the storm tide, the beach profile in front of the dune, the extent of vegetative or sand fence stabilization, and characteristics of the material in the dune and berm. The protection provided depends on the volume of material in the dune and its height. To insure satisfactory performance of the storm protection dune, periodic inspections shall be made by the Superintendent to insure maintenance measures are carried out and that:

(a) At least one complete survey of profiles (identified in the operations and maintenance manual) is made each year prior to the storm season.

(b) Post storm surveys are made as required by the operations and maintenance manual.

(c) No action is being taken, such as burning, grazing, or mowing, which is retarding or preventing the growth of vegetation on the dune or promoting erosion on the dune.

(d) No action such as mining of dune sand or degrading the dune is permitted without specific advance written approval of the District Commander.

(e) Encroachments are not made on the dune right-of-way which might hinder its proper functioning during storms or hinder necessary repairs and maintenance.

(f) There is no unauthorized pedestrian or vehicular traffic on the dune and authorized access crossovers are open and safe.

(2) Maintenance. The protective dune (when combined with beach erosion control works) is designed to withstand the project design storm. The protection provided by the dune depends on the crown elevation and the amount and characteristics of sand maintained within the project cross section. Maintenance and repair of the protective dune cross section is a local responsibility. A predetermined minimum cross section must be maintained to obtain the anticipated storm protection benefits. Pedestrian and vehicle traffic on the dune must be limited to the minimum necessary. This requires specific designated crossovers at controlled access points through or over the dune. Areas found to be below minimum grade and which pose a threat to the

integrity of the dune shall be repaired expeditiously and revegetated, if required. The Superintendent will take immediate steps to insure the following maintenance:

(a) Damage to the dune is repaired immediately. Trapping wind blown sand in the dune section by use of devices or, sometimes more effectively, by use of vegetation is appropriate for maintaining the minimum cross section or building a larger cross section.

(b) Designated access walkways and roads over or through the dunes are properly repaired and replaced as needed.

(c) Devices and/or vegetation used to catch blowing sand and stabilize the dune cross section are repaired and replaced as needed.

d. Coastal structures.

(1) Operation. The Superintendent will insure the proper functioning of sand bypass systems, closure structures, and other features requiring operation or adjustment as prescribed in the operations and maintenance manual. The Superintendent shall inspect the structures incorporated into the shore protection project (such as, but not limited to, groins, revetments, seawalls, bulkheads, breakwaters, closure structures, and sand bypassing systems) prior to the storm season, immediately following each major storm, and otherwise at intervals not exceeding 90 days. During such inspections the Superintendent should be certain that:

(a) Post storm condition surveys are made as required by the operations and maintenance manual.

(b) No seepage, saturated areas, piping, or scour are endangering the structure.

(c) No undue settlement has occurred which affects the stability of the structure.

(d) Concrete is not cracking, spalling, or breaking to an extent which might affect the integrity of the structure.

(e) There are no encroachments upon the structure or its right-of-way which might endanger the structure or hinder its function or repair.

(f) Care is being exercised to prevent accumulation of trash and debris adjacent to the structures.

(g) No bank caving, toe scour, or flanking erosion exist which may endanger stability or functioning of the structure.

(h) The drainage systems and mechanical features such as pumps or flood gates are in good working condition.

(i) No excessive loss of materials such as stones or armor units exist that may endanger stability or functioning of the structures.

(j) No floating plant or boats are allowed to lie against or tie up to the structures unless they are designed for such use or it is necessary for repair efforts.

(2) Maintenance. The possibility of one coastal storm closely following another requires that coastal structures, particularly those which provide storm protection, be maintained to the extent practicable in a state of readiness. Measures to eliminate unauthorized encroachments and to effect repairs found necessary by inspection shall be undertaken immediately. All repairs shall be accomplished by methods acceptable to the District Commander or an authorized representative. The Superintendent shall insure the following maintenance is carried out expeditiously:

(a) Causes of seepage, saturated areas, piping, or scour which endanger the stability or functioning of structures are removed.

(b) Areas of undue settlement or material loss are filled.

(c) Cracking, chipping, or breaking of concrete which affects the integrity or functioning of structures is repaired.

(d) Trash and debris adjacent to the structure are removed and disposed of properly.

(e) Bank caving, toe scour, or flanking erosion which endangers structure stability or functioning is remedied.

(f) Drainage systems and mechanical features are repaired or replaced as needed and maintained in working condition.

e. Appurtenant facilities and services. To assure realization of public recreation benefits, certain appurtenant facilities and services are required at local expense, such as: public access, parking areas, and sanitary facilities. The required items are considered self liquidating and therefore not included in the project cost.

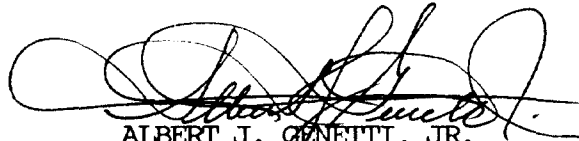
(1) Operation. Appurtenant facilities shall be operated to provide safe and healthful public recreation on a nondiscriminatory basis. Facilities should be sized and operated to produce the recreation benefits anticipated for the justification of the project. Those facilities dedicated to support the beach erosion control project shall not be used for conflicting purposes or otherwise diverted without the approval of the District Commander.



(2) Maintenance. The Superintendent shall provide such maintenance as is required to insure safety and serviceability of required public access, parking areas and sanitary facilities during periods of recreational use of the project beach. The facilities shall be inspected 20 to 30 days prior to the recreation season and at least once a month during the recreation season to insure that all required facilities are providing safe, serviceable public use. Proper measures shall be taken to provide for the prompt maintenance or repair of deficiencies noted during such inspections. Violations of public health and building codes shall be treated as evidence of inadequate project maintenance.

9. Compliance. District Commanders shall keep informed as to the extent of compliance with provisions of this regulation and the project Operation and Maintenance Manuals through periodic inspections of the projects, and analysis of project records maintained by the Superintendents. These actions shall be included in the continuing inventory of local cooperation agreements and the status of their performance, transmitted to Congress annually in compliance with Section 221(e) of PL 91-611. The agreements, upon being accepted on behalf of the Secretary of the Army, become enforceable in a court of law. Federal funds are withheld on projects with documented accumulated deficient maintenance. Federal expenditures may be resumed upon correction.

FOR THE COMANDER:



ALBERT J. GENETTI, JR.  
Colonel, Corps of Engineers  
Chief of Staff