Design Standards Letter

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Section/Plan No.: None

Subject: Erosion Control Ditch Liners

Body

ALL DIVISION , DISTRICT AND URBAN ENGINEERS:

Use of jute and paper netting as temporary erosion controls in roadway ditches has previously been discussed in General Letter No. 23, 1961, dated March 27, 1961. Since the date of that letter, subsequent information on the use of these and other types of materials for erosion control appears to dictate a revision of the information which accompanied the above-mentioned General Letter. Also, the addition of information on the use of other types of materials is thought to be necessary.

Furnished under separate cover is a reprint of a report of research results obtained through experimental tests made by the U. S. Department of Agriculture at the Still water Outdoor Hydraulic Laboratory to determine the ability of certain types of ditch liner material to resist erosion in newly constructed spillways and drainage channels in low erosion resistance soil. It will be seen from this report that safe usage of ditch liner materials is definitely contingent upon an analysis of flow being made in each individual case to determine the type of liner required to meet the need involved.

With the exception of sod and concrete, our experience with erosion control joiner materials is still woefully limited. We do feel, however, that by proper analysis of ditch flow and the selection of a ditch liner material that will meet the requirements of the soil type and ditch flow involved, certain types of liner materials can now be prescribed for use with reasonable assurance that the selected type will fulfill the purpose intended.

In connection with the selection of a ditch liner that will safely meet soil type and flow requirements, this office has prepared a data sheet for use as a guide which sets out in tabular form the various types of controls which may be used in certain types of soil, a Manning's "n" for the surface of each control type and maximum allowable velocities, together with estimated costs per square yard for the various types of permissible controls. A copy of this data sheet is enclosed. Prints of channel charts for six of the most commonly used ditch sections are being sent to all districts under separate cover. Each channel chart contains a slope discharge curve for each permissible type or erosion control liner from

which the maximum allowable discharge can be determined for any one type of liner in a channel of given cross section and slope, or conversely, the proper liner for use may be determined for a known discharge in a channel of given cross section and slope. When the design ditch section is close to a ditch section for which a channel chart has been developed, the charts may be used without adjustment. Similar charts may be developed for other channel sections through use of the Manning's Formula.

Glass fiber mat, either impregnated with asphalt or treated with a seal coat and chips, is considered to be comparable to concrete as a ditch liner. It appears to have a much broader field of use than concrete as a permanent ditch liner and being much less expensive, its use is encouraged wherever maximum ditch velocity limitations can be satisfactorily met. Additionally, this type protection may, with proper approval, be used as slope protection underneath bridges in lieu of concrete.

Although Type 2 paper netting may sometimes be used for erosion control in loess soil, there appears to be very little economic advantage to be gained through such use. In view of the high cost of this material and low protection qualities, it is felt that use of it will seldom ever be found justified.

The importance of following all applicable portions of the Design Manual for this type of erosion control cannot be over-stressed. The need for following Section 14.3.8.2 "Methods" and Section 14.3.8.3, "Procedure", is particularly emphasized, especially as to the widening of ditches and/or flattening grades to reduce velocity and to avoiding abrupt changes in direction of alignment. When an abrupt change in ditch alignment cannot be avoided, proper provisions should be made along the outside of the alignment break to insure that flow will be confined with the channel proper as overflow at such breaks always crates a serious maintenance problem.

Drawings and Special Provisions for erosion control are being furnished all districts under separate cover. They will supersede the drawings an provisions that accompanied General Letter No. 23, 1961 These drawings and provisions have been prepared for sue as guides only, and it may be found necessary to amend or otherwise change them to meet the design requirements for a particular project. Reproducible prints of drawings and additional prints of the channel charts will be furnished upon request.

If there are any questions concerning this subject, please advise.

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