

4 Serial

Cut off trench for Minor Irrigation Dams - Amendments to the Manual of Minor Irrigation works 1983 Edition -

40913 (6d)
9 33

Copy for all
VH

सं. वि. संपर्क	
वीसक अधिसूचना	
वीसक (म. प्रशासन कक्षा)	
अधिसूचना (प्रशासन-२)	527
वीसक व संपर्क	MS
वीसक वास्तव्यता	100 m.

GOVERNMENT OF MAHARASHTRA
Irrigation Department,
Government Circular No. MNS 1088/490/88 - MIN-2,
Mantralaya, Bombay - 400 032.
Dated the 17th April, 1989.

सं. वि. (२)	3/10m
सं. वि. (३)	1/3
सं. वि. (४)	1/3
सं. वि. (५)	1/3
सं. वि. (६)	1/3
सं. वि. (७)	1/3
सं. वि. (८)	1/3
सं. वि. (९)	1/3
सं. वि. (१०)	1/3
सं. वि. (११)	1/3
सं. वि. (१२)	1/3
सं. वि. (१३)	1/3
सं. वि. (१४)	1/3
सं. वि. (१५)	1/3
सं. वि. (१६)	1/3
सं. वि. (१७)	1/3
सं. वि. (१८)	1/3
सं. वि. (१९)	1/3
सं. वि. (२०)	1/3

GOVERNMENT CIRCULAR MEMORANDUM

Introduction :

Instructions regarding the depth and width of cut-off trench under Minor Irrigation Dams are contained in para 5.11 of Chapter 5 of the "Manual of Minor Irrigation works, in Maharashtra State", 1983, Edition. These guidelines have been prevalent for many years now and we have the experience of construction of several hundred Minor Irrigation Dams. It has now come to the notice of Government that there are many cases of Minor Irrigation earth dams where post-construction problems have arisen. These are in the form of neavy seepage affecting the avallability of water, or in the form of slushy conditions on the downstream requiring relief wells for ensuring stability. Apparently such situations have arisen where a positive cut-off was not provided. A partial cut off was provided in these cases without detailed investigations of the permeability or the piping resistance of the substratum. The cost of the cut-off trench in relation to the cost of the earthen dam is small and a positive cut off trench in such cases, at a little extra cost would minimise the problems during maintenance phase and also would reduce the cost of remedial measures therefor. After considering this experience, the following modified instructions are now issued in replacement of Para 5.11 and appendix IV/15 of the Minor Irrigation Manual.

5.11 Cut off Trench -

Location : Cut off trench is provided below the hearting zone so as to cut off seepage of water from below the dam. The distance between the centre line of the cut off trench and the centre line of the dam at ground level should be equal to one fourth the height of the hearting top from ground level. This distance is to be measured on the upstream side of the centre line of the dam as shown in the sketch (see Annexure). The centre line of C.O.T. may be suitably shifted on the downstream if in the above process the upstream edge of C.O.T. goes beyond the upstream toe of the hearting at ground level.

the

Preparation of dam seat : Dam seat should be prepared by removing upto 0.6 m. of top soil. It is not necessary to cut the dam seat in shallow triangular notches as shown in Plate No.17 of Minor Irrigation Manual.

Depth : All earth dams should have a positive cut-off trench going down to impervious stratum. An impervious stratum is defined as one of the following :-

- (a) hard rock.
- (b) soft rock impervious in nature (non erodible strata - insitu material).
- (c) impervious clay underlain by impervious clay down to hard rock, without any sand layers or sand deposits in between.

It will be necessary to investigate the rock profile in every case. This can be done by taking trial pits, where the over-burden is shallow. The trial pits should be taken at 60 m. interval and down to rock. Where the over-burden is deep, bores will have to be taken at a minimum spacing of 150 m. centre to centre. Where bores are taken, it is necessary to take them to a depth of 5 m. below the bed rock. In such cases it is also necessary to investigate whether there are any deposits of pervious material between the ground level and the rock. This assessment can be made either through auger holes or by consulting the Geologist in the Irrigation Projects Investigation Circle.

The L-Section of the rock profile should be plotted along with the ground profile. The cut-off trench should necessarily be taken down to rock or the impervious stratum. However, where the depth of cut-off trench to rock appears too large compared to the height of water, a partial cut off can be provided as an exception only if the following conditions are satisfied :-

- (i) The decision to provide a partial cut off trench should be taken by an authority not less than the Superintending Engineer.
- (ii) In that portion of the dam where the depth of water (FSL-G.L) is more than 4 m. and depth to rock is more than 1.25 times the height of water; and in that portion of the dam where the height of water is less than 4 m. only where depth to rock is more than 5 m. from ground level.

In other words, where the rock is met with at less than 5.0 m. from ground level or upto 1.25 times the water height in deeper sections, a positive cut off trench is a must. In other cases a partial cut off trench can be provided under the orders of Superintending Engineer subject to detailed investigations mentioned earlier in this para. (See Annexure - Table-1 & Table-2). In all cases of partial C.O.T., anticipated seepage should be mentioned.

At the location of the head regulator it is necessary to provide a positive cut off trench. This is irrespective of the depth of rock from ground level. In addition if the dam is provided with a partial cut off on either side of the head regulator, atleast for a length of 15 m. on either side of the head regulator there should be a positive cut off trench.

Depth of cut off trench should be taken to 0.6 m. in hard rock or in other impervious strata, and 1.2 m. in impervious soft rock.

In many cases exposed rock is met with particularly in the portion of Nallabed. In such cases to ensure a proper keying effect between earth dam and the foundation, it is necessary that the depth into the rock is taken as a minimum of 1 m.

Bed width : The bed width of the C.O.T. should be at least 3 m. In the gorge portion & or where the height of dam is more than 10 m. and where rock is exposed or is at a shallow depth (say within 2 m. from ground level) the bottom width of C.O.T. should be a minimum of 5 m.

Side slopes : The side slopes of the cut off trench are specified as below wherever the depth is less than 8 m.

- (i) Soft soil and soft murum 1/2 : 1.
- (ii) hard material 1/4 : 1.
- (iii) rock 1/4 : 1.

For depth greater than 8 m. suitable stable slopes in the strata met with should be adopted.

Keying : It is also seen that the cut off trench is abruptly terminated in soil at the abutments. It is necessary that the C.O.T. is properly keyed into the abutments. It is therefore, directed that the C.O.T. should be taken as a positive C.O.T. for atleast 5 m. in the hill side from the point where the H.F.L. line meets the hill side. In L-section after the length of 5 m. it should be tapered off with a slope of 1/2 : 1."

These instructions should be followed hereafter for all Minor Irrigation Dams which are at present being constructed in accordance with Manual of Minor Irrigation works 1983 edition both at the stage of investigations for administrative approval and the state of investigations for technical sanction

By order and in the name of the Governor of Maharashtra

D.N. Kulkarni 17/1/89

(D.N. KULKARNI)

Chief Engineer (Irrigation) & Joint Secretary to the Government of Maharashtra.

Copy to :-

All the Chief Engineers, Irrigation Department.

All the Superintending Engineers, Irrigation Department.

All the Executive Engineers, Irrigation Department (Minor Irrigation)

Desk-MIN-1, Desk-MIN-2, Desk-Kharland, I.D., Mantralaya.

Sebet File of MIN-2 Desk.

No/200/Gen. Admin/292 of 1989

Superintending Engineer (Administration)
Central Designs Organisation
Nasik. Dated 6/1/89

Copy forwarded to Mr. S.E. M.D./ED/Gen/PH/DOO/200 for information pl.