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(Reaffirmed 1998)

भारतीय मानक

नहरों के रख-रखाव की रीति संहिता

भाग 3 नहर संरचना, नालियाँ, निकास, जंगल निकास, रोपण एवं नियंत्रण

(दूसरा पुनरीक्षण)

Indian Standard

CODE OF PRACTICE FOR MAINTENANCE OF CANALS

PART 3 CANAL STRUCTURES, DRAINS, OUTLETS, JUNGLE, CLEARANCE, PLANTATION AND REGULATION

(Second Revision)

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Price Group 2

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Irrigation Canals and Canal Linings Sectional Committee had been approved by the River Valley Division Council.

This standard (Part 3) gives necessary guidance regarding the maintenance of a canal for the assistance of engineers in field. However, it is not possible to cover all types of contingencies in this standard and the discretion of the Engineer-in-charge would be required in such cases. Part 1 and Part 2 of this standard covers the maintenance of unlined and lined canals respectively.

This standard (Part 3) was first published in 1969 and revised in 1979. This second revision has been taken up to incorporate certain changes found necessary in the standard in the light of comments received from the users. The salient changes that have been incorporated in this revision are listed below:

a) Slight improvements have been made under maintenance of canals.

b) In lined canals closure after a period of 3-4 years have been recommended.

c) Register to be maintained to evaluate working of outlets.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CODE OF PRACTICE FOR MAINTENANCE OF CANALS

PART 3 CANAL STRUCTURES, DRAINS, OUTLETS, JUNGLE CLEARANCE, PLANTATION AND REGULATION

(Second Revision)

1 SCOPE

This standard (Part 3) covers maintenance of canal structures, drains, outlets, jungle clearance, plantation and regulation of canals.

2 REFERENCE

The Indian Standard IS 7784 (Part 2/Sec 3) : 1981 'Code of practice for design of cross drainage works: Part 2 Specific requirements, Section 3 Canal syphons' is a necessary adjunct to this standard.

3 CANAL STRUCTURES

3.1 All masonry works should be inspected and soundings taken in the vicinity and repairs carried out during the closure period. A register of masonry works for main canals should be maintained and updated from time to time when improvements are affected. It is proposed that in addition to the register the drawings of all the masonry structures are maintained on tracing-cloth and remodelling or repairs, etc, carried out from time to time, are marked in different colours and note to this effect is given on the tracing cloth itself, so that the relevant case and the document could be linked.

3.1.1 All masonry structures should be maintained through proper repairs in a sound condition. Any damage noticed in these works should be speedily rectified. Care should be taken to ensure proper curing of repair work.

3.2 No grass should be allowed to grow near the parapets or wings of canal structure which should be kept scrupulously neat and tidy.

3.3 Metalling over bridges and earthwork in both cart road and driving road ramps should be complete and wall consolidated everywhere.

3.4 Ramps for the bridges over canal should be maintained in proper condition so as to ensure that the canal bank is not encroached upon.

3.5 All drainage and crossing, downstream of canal structures where significant erosion persists due to turbulence of wave action, dumped rip rap consisting of brick bats or boulders should be provided. Protection by launching apron should be provided only in a length so as to cover maximum scour in a slope of 2 : 1. Dumping of boulders/brick bats should not be above bed level. Embankments should be protecting by pitching on the side slope with bricks/stones. Bricks/stones left out protruding in a staggered fashion will be helpful in dissipation of energy. However, if this provision does not improve the situation, the cause should be investigated and suitable energy dissipating device provided downstream of the canal structures. Scour charts showing the depth and extent of scour should be maintained for all major canal structures where this tendency persists. The charts should be replotted and revised at least once a year after the annual closure.

4 OUTLETS

4.1 All outlets should be regularly checked and set right, if found defective, in accordance with the detailed instructions issued by the department.

4.2 Outlet pipes should not be left lying about the canal. They should be carried to the nearest inspection house as soon as change in outlet has taken place and pipes are found surplus. They should be stacked neatly.

4.3 Water courses should have culverts/siphons wherever needed and should be properly maintained to avoid wastage of water.

4.4 Register should be maintained and head of water (H) of each outlet i. e. the difference between the water level in the canal and the centre line of the outlet at its exit end, when the canal is running at full supply level should be measured every month. It will be of great help for ensuring that the outlets draw their authorised share of canal water. The outlets should be so fixed that these draw their proportionate share of supplies/silt when compared to the supply in the parent channel. The working of the outlets can be evalauted from the register and these can be adjusted suitably during the month of April and October.

5 GATES AND PLANKS/*KARRIES*/NEEDLES

5.1 Mechanical gates should be oiled, greased and kept in perfect working order. Exposed surfaces should be kept properly painted to prevent rusting and date of painting marked on them. Exposed surfaces which have been recently painted should be periodically examined and any patches of rust found should be removed and surface painted.

5.1.1 The lifting gear should be properly lubricated to keep it in an easy operating condition and to prevent rusting and all lifting gears should be properly lubricated once a month.

5.1.2 The gates and their embedded parts should be inspected during closure. They should be repaired, painted and lubricated, wherever necessary.

5.1.3 Gates, etc, should be periodically operated to the extent possible to see that these are in proper upkeep.

5.2 Planks/*Karries*/Needles at regular heads should be kept in good condition. These should be painted/coal tarred once a year to keep them in good condition.

5.2.1 Planks/*Karries*/Needles should always be kept near the works for which they are needed. They should be stacked on edge of masonry walls built in shade if possible, and occasionally turned upside down to prevent their getting warped or destroyed by white ants.

6 DRAINS

6.1 The inspection bank should be maintained in good condition.

6.2 Silt cleared from the bed of a drain should be used to fill up holes and ruts on the inspection bank. This silt should not be thrown up in heaps in such a way as to interfere with the ingress of drainage. The silt should also not be disposed off on the inner slopes of the drain to safeguard against its re-entrance into the drains during rains.

6.3 Toe drain should be provided according to IS 7784 (Part 2/Sec 3) : 1981. Toe drain provided to intercept seepage water should be cleared of weeds before the sowing of the crop in that region, to keep down the spring level.

6.4 Trees should not be allowed to grow on the inner slopes of drains. The dead branches and rubbish that may have accumulated in the drains should be cleared before the monsoon breaks.

6.5 Bunds should not be permitted in drains and should be removed if found existing before monsoon breaks.

6.6 Discharge of drains in high floods should be observed each year at suitable points and recorded in a register.

6.7 Any slipped pitching, etc, of the drain cross section should be made good particularly before monsoon.

7 JUNGLE CLEARANCE

7.1 All vegetative growth on canal banks should be cleared from 1·5 m beyond the outer edge of the road on the inspection bank and 3 m beyond the shade line on the other bank. Where the full supply level of the canal is more than one metre above the ground level jungle clearance should be done from toe to toe of the outer slopes of the banks.

7.2 All vegetative growth on distributaries and minors should be cleared from toe to toe of the outer slopes of the banks. Shrubs, large grass such as *Kans*, *Jhunds* and small trees, especially *Dhak* should be dug out by the roots. Stumps of trees that have been standing should be cut down to at least below the ground. Ant hills shall be dug out and levelled off.

7.3 All vegetative growth on escapes and drains should be cleared from the outer edge of the riding bank to the inner edge of the opposite bank.

7.4 The surroundings of chainage stones should be kept clear of jungle, grass or any other rubbish to enable them to be seen from a distance.

7.5 Grass and jungle should never be allowed to grow on masonry works; it should be dug out by the roots, and the masonry then pointed or plastered. Grass growing against masonry work should not be scrapped off, as the masonry may get damaged in the process. No trees, tall grass, nor jungle of any kind should be allowed within 10 m of a masonry work. No big trees such as *Pipal*, *Gular*, *Pilkhan*, and *Bargad* should be allowed to grow within 25 m of an important masonry work, as the roots of these trees may extend up to the joints and damage the masonry.

7.6 Slime and moss, which often coat masonry should be carefully scrapped off, care being taken not to injure the mortar or plaster in doing so.

7.7 When a tree is to be felled, a hollow should be dug round the base, and the trunk cut through as low down as possible, the hollow should be then filled up to cover the root.

7.7.1 Shade line trees should not be felled without special sanction.

7.7.2 Pruning of trees, if done at all, should not be carried out with axes. The branch should first be sawn about half through on the underside and then completely through from the top, so that the bank may not be torn off. It should be done preferably in February just before the sap begins to rise.

8 PLANTATION

8.1 Acquired land width of canal should be demarcated by planting suitable species of trees at suitable intervals.

8.2 Sowing seed or plantation should commence in June and be finished by the middle of the month; so as to get the full benefit of the rains.

8.3 In low ground liable to flooding, seeds should be sown on ridges.

8.4 The roots of seedlings should not be cut nor broken when transplanting. They should be dug out with a good ball of earth adhering and so carried to the new site. If grown in pots like eucalyptus, the roots are sure to be pot-bound. In such cases the pot should be carried to the new site and the seedling roots bare of earth and straightened down into the holes dug for them. This greatly facilitates their subsequent growth.

8.5 The parasitic plants such as AMARBEL and BANDA should be removed, carried to an open space and burnt. If the tree is completely covered by the parasite, it is recommended to cut it down and burn the parasitic plant at once.

8.6 Branches and twigs overhanging a bank or roadway should be sawn or looped off sufficiently to give a clear headway of 4 m above the road or bank.

8.7 Young plants should not be put out in the shade line until they have attained a height of at least 1·25 m. It is better to lose a few plants by their being rather too large for transplanting than to undertake the nursing of small seedlings in the shade line.

8.8 All large roots found in the plantations should be taken out during the rains and burnt into charcoal when dry.

8.9 All newly planted trees and also those which are less than 2 m in height should be properly protected by suitable tree guards.

8.9.1 The old tree guards should be repaired properly where necessary and all grass, jungle and large grass such as KANS weeded out.

8.10 Small trees should be all erect and not reclining sideways. Where necessary, a prop should be used for the purpose.

8.11 Newly planted trees should be watered regularly but not in excess and the top soil loosened soon after watering. Established plants which have only been less than two years on the shade line require to be given similar treatment though not so often.

8.12 Large trees are well able to look after their own nourishment. A good heavy watering of 5 or 6 bucketfulls about once a month only in the very hot weather is about all that is necessary for trees of medium growth; and even so the very big and established trees do not even need this attention.

8.12.1 Watering of trees should be given in ring trenches made away from the trunk. As the tree grows the trench should be taken further away from the tree, so as to lie over the root development where the water is required as shown in Fig. 1.

8.13 All trees should, however, be carefully watched and any bad effect noticed should be immediately attended to.

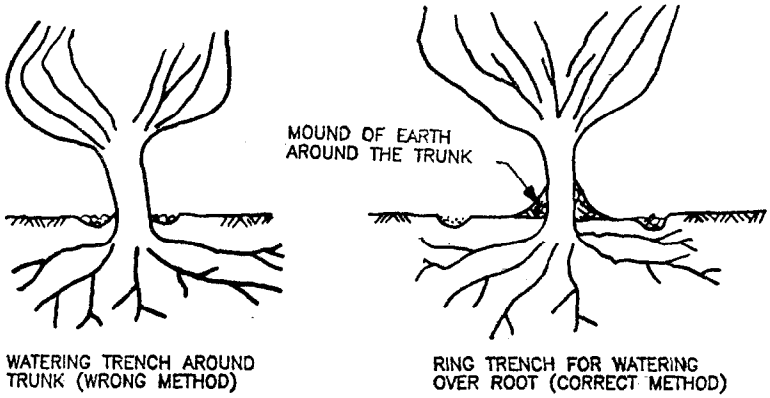

FIG. 1 WATERING OF TREES

9 REGULATION

9.1 No leakage should be permitted through the heads of canals that have been closed, as a little water dribbling down a canal promotes the growth of grass and weeds in the bed.

9.2 When a canal is first opened after clearances a low supply should be run, for a few hours and the gauge then gradually raised according to requirements.

9.2.1 The gates at the cross regulators should be lowered only after the parent channel has been run for sometime. The lowering of gates should be to the extent necessary to create the designed pond level. The down stream of the parent channel should not be kept dry with full pond level upstream of the regulator unless conditions require the same and the structure is designed for it.

9.3 For regulating supplies into distributaries the discharge through each bay should be more or less equal when the number of bays is more than one. Suitable silt control measure should be introduced where excessive silt is likely to be drawn by a distributary.

9.4 Standing regulation orders for all important main canals and branches and critical works there on should be framed and observed to ensure safety of works and proper utilization of water. These regulation orders should be action oriented specifying the duties of various categories of staff connected with the regulation work and should be in possession of all the concerned staff looking after the maintenance.

9.5 No regulator should be planked up higher than is necessary for regulation, or kept planked up after the necessity no longer exists.

9.6 The staff-in-charge of a canal regulator or distributary head should always have written instructions about the gauges to be run, the maximum and minimum permissible being clearly stated therein.

9.7 A line marking the full supply level should be painted on the upstream face of every structure. If there is no structure in a considerably long reach, the full supply level should be marked on profile walls specially constructed for this purpose such that it is conveniently visible from the inspection bank.

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