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भारतीय मानक

नहरों के लिए पत्थर चिनाई का अस्तर — रीति संहिता

(पहला पुनरीक्षण)

Indian Standard

LINING FOR CANALS BY STONE MASONRY — CODE OF PRACTICE

(First Revision)

(Incorporating Amendment No. 1)

UDC 626.823.913 : 006.76

BUREAU OF INDIAN STANDARDS
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Price Group 1

FOREWORD

This Indian standard 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.

Lining of canals is considered an important feature of irrigation projects as it not only minimizes the loss of water due to seepage but also results in achieving considerable economy in the use of cultivable land which would otherwise be prone to water logging due to rise of the water table. Further the water, thus saved, may be usefully utilized for the extension and improvement of irrigation facilities. Lining of water courses in areas irrigated by tube-wells assumes special significance as the pumped water supplied is relatively more costly.

Lining of canals permits the adoption of high velocities resulting in proportionate savings in the cross-sectional areas of the channel and land width required, with corresponding saving in the cost of excavation and masonry works, which may in certain cases completely offset the extra cost of lining. Lining also ensures stability of the channel sections thereby reducing the maintenance cost. The benefits that accrue from lining of canals generally justify the initial capital cost and due to this there is now a better appreciation of the need for lining of canals.

Judicious selection of serviceable and economical lining at the first instance and subsequent proper execution of the work while laying the lining, results in achieving considerable overall economy in the project. Selection of the type of lining for the canal, should be done in accordance with IS 10430 : 1982 'Criteria for design of lined canals and guidelines for selection of type of lining'. Having once decided to adopt stone masonry lining in any particular canal, this standard would give necessary guidance in laying of stone masonry lining. Stone masonry lining has its own advantages particularly where suitable stones are available in the vicinity of canals.

This standard was first published in 1982. This revision has been prepared so as to keep the provisions abreast of the latest practices. As stone slab lining is similar to lining by precast cement slabs, while revising this standard, the requirements for the former have been deleted and are now covered in IS 3873 : 1993 'Laying cement concrete/stone slab lining on canals—Code of practice'.

This edition 2.1 incorporates Amendment No. 1 (September 2000). Side bar indicates modification of the text as the result of incorporation of the amendment.

Indian Standard

LINING FOR CANALS BY STONE MASONRY — CODE OF PRACTICE

(First Revision)

1 SCOPE

1.1 This standard covers stone masonry lining for canals.

2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard:

IS No.	*Title*
1122 : 1974	Method of test for determination of true specific gravity of natural building stones (*first revision*)
1126 : 1974	Method of test for determination of durability of natural building stones (*first revision*)
3873 : 1993	Laying cement concrete/stone slab lining on canals — Code of practice (*second revision*)
4558 : 1983	Code of practice for under-drainage of lined canals.

3 PREPARATION OF SUBGRADE

3.1 Preparation of the sub-grade should be done in accordance with IS 3873 : 1993.

4 LAYING

4.1 The stones should be of dimensions mentioned in Table 1 and should have specific gravity not less than 2.5 when tested according to IS 1122 : 1974 and soundness not less than 10% loss of weight after 5 cycles when tested according to IS 1126 : 1974.

4.2 The stone should be laid on lime mortar (1 : 2) or cement mortar 1 : 3 over a bed of minimum 12 mm thick lime/cement mortar. The joints shall be pointed with similar mortar.

4.3 The lining should be started after at least 35 m length of canal sub-grade is properly dressed to receive lining. The subgrade should be uniformly soaked with water, without making it slushy, to ensure that water penetrates to a depth of about 300 mm in sandy soil and about 150 mm in other soils. Wetting of subgrade should continue in advance of laying of stone slabs so that the soil does not absorb moisture from the mortar placed on the subgrade for laying of the stone masonry layer.

4.4 If the water table is high it should be lowered to at least 300 mm below the subgrade.

4.5 The subgrade should be divided into compartments by stone masonry or concrete ribs of size not less than 300 mm × 150 mm. The compartments should have dimensions of not more than 15 m along the centre line of the canal. The spacing of ribs across the centre line should be selected in such a manner so as to divide the canal bed and slope symmetrically about the centre line, so that ribs are provided at the junction of the slope and bed and at the upper extremity of the slope. If stone masonry ribs are used, the stone should meet the requirements given in **4.1**. If concrete ribs are adopted, the concrete in ribs shall be of the same strength as that of the lining concrete.

4.6 Pressure relief arrangements should be done according to IS : 4558 : 1983.

4.7 Single stone profiles of lining, parallel to centre line of the canal, should be prepared at suitable intervals. Mortar should be uniformly spread over the subgrade and the stone should be properly laid in position quickly. It should be ensured that the vertical joints are completely filled with mortar. The stone should be laid on the bed with their length at right angles to the centre line of the canal, while on the side slopes they should be laid parallel to the centre line.

4.8 Stones should be firmly embedded in mortar. Hollows, if any, should be rectified by relaying the defective portions with fresh mortar.

4.9 On completion of laying and from the next day, the lining should be kept wet by sprinkling water over it, to keep the mortar well wetted. On the next day, the surface should be kept wet and joints of the stone masonry should be carefully examined. Hollow joints should be raked to a depth of 12 mm, loose mortar removed from sides and top of stone and the joints properly refilled. Any loose stone should be removed and relaid.

4.10 The completed lining should be checked for level with wooden templates and spirit levels.

Table 1 Dimensions of Stones and Thickness of Lining
(*Clause* 4.1)

Sl No.	Canal Capacity	Thickness of lining	Average Dimension along the longest axis	Minimum Dimension at any section
	cumecs	mm	mm	mm
i)	0 to less than 10	150	150	75
ii)	10 to less than 100	225	225	110
iii)	100 and above	300	300	150

NOTE — Tolerance up to 10 percent is permissible in the thickness of lining and the dimensions of stones.

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Amendments Issued Since Publication

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