

भारत सरकार /GOVERNMENT OF INDIA
रेल मंत्रालय/ MINISTRY OF RAILWAYS
(रेलवे बोर्ड/RAILWAY BOARD)

No. 2022/19/CE-III/BR/RDSO/1 (E-3422013)

New Delhi, Dated: As Signed

Principle Chief Engineers,
All Zonal Railways.

Chief Administrative Officers,
All Zonal Railways.

Sub: Core, Permeability & NDT Test in addition to Cube Test for concrete works in Bridge.

Ref: ED/B&S-II/RDSO's letter No. CBS/Codes/A&C dated 04.05.2026

The quality of structural concrete components of bridges is presently assessed primarily through cube tests, sampled as per Para 8.7.2.2 and tested in accordance with Clause 4.3.1.2 of the Concrete Bridge Code (CBC), based on the quantity of concrete poured at a time. In view of certain issues observed relating to the quality of construction in bridge works, RDSO has recommended the adoption of additional tests for comprehensive assessment of concrete quality.

Based on the recommendations of RDS, the Competent Authority has decided that, henceforth, in addition to the mandatory cube tests, Core Test, Permeability Test and Ultrasonic Pulse Velocity (UPV) Test shall also be conducted for all works involving construction of Mega and Major Bridges. The frequency and locations for conducting these tests for various structural elements shall be as specified in Annexure-I enclosed herewith.

It has further been decided that the above testing regime shall be implemented with immediate effect for all Mega and Major Bridge works presently under construction.

This issues with the approval of the Competent Authority.

DA: As Above

(Abhimanyu Lamba)
Director, Civil Engg./B&S-I
Railway Board

Copy to: (i) DG/IRICEN for information please.
(ii) PED/Infra-I & PED/Infra-II for information & necessary action please.

Schedule of test to be performed on various element of Mega/Major Bridge in addition to cube test.

BRIDGE ELEMENT	CORE TEST	PERMEABILITY TEST	ULTRASONIC PULSE VELOCITY (UPV) TESTING
Foundation (Each)	<p>Minimum 4 cores shall be obtained from:</p> <p>a) different lifts in case of open foundation</p> <p>b) Pile cap by dividing the cap in 4 zones and one core from every zone in case of pile foundation</p> <p>c) Well cap by dividing the cap in 4 zones and one core from every zone in case of well foundation</p> <p>Equivalent cube strength of minimum three Cores:</p> <p>Average core strength $\geq 0.85 f_{ck}$</p> <p>Individual core strength $\geq 0.75 f_{ck}$</p>	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
Pier/Abutment (Each)	<p>The pier/abutment shall be divided into 4 zones. Minimum one core shall be obtained from each zone.</p> <p>Equivalent cube strength of minimum three Cores:</p> <p>Average core strength $> 0.85 F_{ck}$.</p> <p>Individual core strength $> 0.75 F_{ck}$.</p>	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
Piercap/Abutment cap (Each)	<p>Minimum 4 cores shall be obtained from different region of cap</p> <p>Equivalent cube strength of minimum three Cores:</p> <p>Average core strength $> 0.85 F_{ck}$.</p> <p>Individual core strength $> 0.75 F_{ck}$.</p>	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 2 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
Concrete Super-structure (Slat/Girder), Deck slab of concrete composite Girder	<p>Minimum 4 cores shall be obtained from different region of one span/super-structure and from deck slab</p> <p>Equivalent cube strength of minimum three Cores:</p> <p>Average core strength $> 0.85 F_{ck}$.</p> <p>Individual core strength $> 0.75 F_{ck}$.</p>	One test per 300 cum of concrete subject to minimum one test per slab/girder and deck slab. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.

Note:

1. Cube Test results shall satisfy the acceptance criteria as per clause 8.7.6 of IRS CBC.
2. Acceptance of core test results shall be based on Annex B of IS 516 (Part-4).
3. Wherever core test is not possible due to any reason at any location/zone, the dispensation shall be given by Chief Engineer/Construction or CBE as the case may be satisfying personally that extraction of core for testing is not practically possible.
4. The acceptance of any element of bridge shall be based on the results of cube test, core test, permeability test and ultrasonic pulse velocity test. If the concrete is deemed not to comply to requirement mentioned herein, the structural adequacy of the parts affected shall be investigated and any consequential action as needed shall be taken.