

# **SHEKHAR PANANDIKER & ASSOCIATES**

## **CONSULTING STRUCTURAL ENGINEERS & DESIGNERS**

WING A, 2ND FLR., HIRA NIKETAN, ABOVE SARASWAT BANK, MARGAO - GOA. 403 601.

TEL. : (0832) 2738399      GSTIN: 30AEGPP8227A1ZY      PAN: AEGPP8227A

E-mail : shekhar@shekharpanandiker.com / info@shekharpanandiker.com

www.shekharpanandiker.com

**Subject:**                      **Non Destructive Tests of Concrete**

**Site:**                              **Bharatiya Vidya Bhavan's  
Narayan Bandekar School,  
Goa Housing Board colony,  
Upasnagar,  
Vasco- Goa**

**Date of Testing:**      **June 28<sup>th</sup> , 2021**

### **INTRODUCTION:      BUILDING: MAIN SCHOOL BUILDING**

The above building is Main School Building at Bharatiya Vidya Bhavan's Narayan Bandekar School at Upasnagar, Vasco, Goa. The building is a RCC framed structure consisting of a ground floor, first and second floor. It has a RCC slab. There is galvalume sheeting at the top. This is a report on Non Destructive Tests carried out on the RCC columns of the said building in order to assess and evaluate the average strength and quality of concrete for the purpose of stability certification of this structure.

### **OBSERVATION:**

Visual inspection of the building was carried out. It showed no signs of distress in the form of cracking or deflection of RCC members, de-bonding of plaster etc. The visual inspection showed that the building is safe and stable.

### **NDT TESTS CONDUCTED:**

**REBOUND HAMMER TEST  
ULTRASONIC PULSE VELOCITY TEST**

**METHOD OF TESTING: IS 13311 (PART 1 & PART 2): 1992 - NON-DESTRUCTIVE TESTING OF CONCRETE – METHOD OF TEST**

### **EQUIPMENT USED:**

- 1) SILVER SCHMIDT FROM PROCEQ [DIGITAL REBOUND HAMMER].**
- 2) ULTRASONIC TEST EQUIPMENT FROM PROCEQ [UPV MEASURING APPARATUS].**

**3) TRITEX MULTIGAUGE 5600 ULTRASONIC THICKNESS GAUGE WHICH COMPLIES WITH BRITISH STANDARD BS EN 15317;2007(COVERS THE CHARACTERISATION AND VERIFICATION OF ULTRASONIC THICKNESS MEASURING EQUIPMENT).**

**Note:**

1. Silver Schmidt from Proceq measures the Rebound Coefficient based on the fraction of energy restored by the concrete element under test and calculates the Approximate Strength based on the classic correlation curve.
2. Rebound Hammer tests mainly offer us a compressive strength of the concrete to a limited depth from the surface, and the results can be used mainly to assess the uniformity and overall quality of concrete and comparing one element of concrete with another in relation to the compressive strength of the concrete structure.
3. Accuracy of predication of concrete by Rebound Hammer method is  $\pm 25\%$  vide IS Code 13311 (Part 2): 1992. However this accuracy is much improved by use of the new generation Rebound Hammer like the Silver Schmidt from Proceq as the results are based on the measurement of the difference in inputs and output energy in the process of rebound thereby eliminating errors from frictional effect of a mechanical rebound hammer.
4. Ultrasonic Test Equipment from Proceq assesses the quality of concrete based on transmission period of Ultrasonic Pulse. The underlying principal of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of homogeneity and uniformity is good. In case of poorer quality, lower velocities are obtained.
5. If there is a crack, void or flaw inside the concrete which comes in the way of transmission of pulses, the pulse strength is attenuated and it passes around the discontinuity, thereby making the path length longer. Consequently lower velocities are obtained
6. The actual pulse velocity obtained depends upon the material and the mix proportions of concrete. Density and modulus of elasticity of aggregates also significantly affect the pulse velocity. IS Code 13311 (Part 1): 1992 covers the object, principle, apparatus and test procedure of Ultrasonic Pulse Velocity test method.

## ANALYSES OF THE RESULTS:

The above tests were carried out on RCC columns of the Main School building at Bhartiya Vidya Bhavan's Narayan Bandekar School, at Upasnagar, Vasco, Goa. The average compressive strength of the RCC columns checked for this building were found to be in the range of 22 & 28 N/SQMM and the average compressive strength was found to be 25.2 N/SQMM. The code allows for a variation of  $\pm 25\%$ . In our opinion the grade of concrete must be equivalent to M-25. Also the results obtained by Ultrasonic Pulse Velocity Testing confirm that the quality of concrete tested is overall 'Medium'.

## CONCLUSION:

Based on the above Non destructive tests, the structure tested is found to be structurally safe and stable.

*Shekhar W. Panandiker*

Shekhar W. Panandiker

CHARTERED ENGINEER

B.E.(CIVIL), DIP.(STRUCTURAL), M.I.E., P.E

M.I.C.I., M.I.L.B.E., M.I.C.A.C.I., M.I.S.S.E.

*Shekhar*  
*11/12/2021*

Principal  
Bharatiya Vidya Bhavan's  
Narayan Bandekar School  
Upasnagar

