ASSAM ENGINEERING COLLEGE

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CENTRE FOR ASSAM ENGINEERING COLLEGE CONSULTANCY

DEPARTMENT : CIVIL ENGINEERING

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STRUCTURAL AUDIT OF SCHOOL BUILDING AND STAFF QUARTERS OF KENDRIYA VIDYALAYA A.F.S. DIGARU, SONAPUR, KAMRUP M (ASSAM)

Ref: Your letter No. (1) F. 201463/98/Cnstretn & Rnvtn/KVD-AFS/2022-23/66 dated 22/05/2023
& letter No. (2) F. 201463/98/KVD-AFS/2023-24/ dated 06/11/2023

TEST REPORT

INTRODUCTION

A request was received by the Department of Civil Engineering, Assam Engineering College from **Principal, K. V. AFS, Digaru, Sonapur**, Assam to perform the Structural Audit of School Building and Staff Quarters of Kendriya Vidyalaya, A.F.S. Digaru, Sonapur, Kamrup M (Assam).

The request was accepted and a team of faculty members made a site visit to study the structure on 25/11/2023.

A series of non-destructive tests viz. rebound hammer test and ultrasonic pulse velocity test were conducted on different structural elements of the following buildings.

The buildings are

1) New Building
2) Main Building (Old Building)
3) Type II Quarters (2 units)
4) Type II Quarters (2 units)
5) Type III Quarters (2 units)
6) Type IV Quarter (1 unit)

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Table 6: Results of Ultrasonic Pulse Velocity of Quarters

Sl No	Description of the location	Name of the Structure (Marked as)	Pulse Velocity in km/Sec	Concrete Quality Grading
1.	Type II (Col: 2/11 & 2/12)	Column 1	3.012	Medium
2.	Type II (Col: 2/9 & 2/10)	Column 2	2.894	Doubtful
3.	Type II (Col 8)	Column 3	2.282	Doubtful
4.	Type II (Col 5)	Column 4	3.225	Medium
5.	Type III (Col 5)	Column 5	2.147	Doubtful
6.	Type III (Col 7)	Column 6	3.461	Medium
7.	Type II (Col 1)	Column 7	2.161	Doubtful
8.	Type II (Col 3)	Column 8	2.483	Doubtful
9.	Type III (Col 1)	Column 9	1.702	Doubtful
10.	Type III (Col 3)	Column 10	1.711	Doubtful
11.	Type IV	Column 11	1.375	Doubtful
12.	Type IV	Column 12	1.880	Doubtful

OBSERVATION & REMARKS

1. **For the New Building,** the observed compressive strength assessed by Rebound Hammer Test on different structures are varies from 22.2 N/mm^2 to 32.3 N/mm^2. Quality of concrete assessed by UPV are also Medium to Good.

2. **For the Main Building (Old Building),** the observed compressive strength assessed by Rebound Hammer Test on different structures varies from 4.7 N/mm^2 to 28.5 N/mm^2. The compressive strength of most of the tested structures are exceptionally low. Similar results are observed in case of UPV test too. Although, few results show medium quality concrete, but most of the tested structures are showing doubtful concrete.

3. **For the Staff Quarters,** the observed compressive strength assessed by Rebound Hammer Test on different structures seems to be satisfactory for the buildings namely (i) Type II (No. 2/11 & 2/12), (ii) Type II (No. 2/9 & 2/10), (iii) Type II (with Quarter No 5 & 8), (iv) Type III (with Quarter No. 5 & 7). The concrete quality assessed by UPV of the above-mentioned quarters are medium to doubtful. But, observed compressive strength seems to be not satisfactory for the buildings namely (i) Type II (No. 1 & 3), (ii) Type III (No. 1 & 3) and (iii) Type IV (Principal's Quarter). The concrete quality assessed by UPV of the above-mentioned quarters are doubtful.

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4. The false ceiling at some locations of the **New Building** is required to be repaired immediately for safety purpose.

5. Slab reinforcement of **Main Building (Old Building)** gets corroded in too many locations.

6. Shear failure of beam was observed at number of locations of the **Main Building.**

CONCLUSION

From the extensive non-destructive testing and rapid visual inspection, following conclusions may be drawn:

1) The **New Building** is structurally sound with requirement of false ceiling repair.
2) It is evident from the Table 3 and 4 that most of the structural elements of the **Main Building (Old Building)** are structurally unsound. Hence, it is not recommended to continue the uses of the building without retrofitting the structural elements. Considering the assessed quality of the structural elements and the age of the building (Approximately 43 years, as reported), the retrofitting solutions for almost all the structural members will attract a huge cost and does not seem to be economic.
3) The conditions of the **Quarters** namely (i) Type II (No. 2/11 & 2/12), (ii) Type II (No. 2/9 & 2/10), (iii) Type II (with Quarter No 5 & 8), (iv) Type III (with Quarter No. 5 & 7) are good, but for optimal serviceability, some maintenance work has to be done.
4) The conditions of the **Quarters** namely (i) Type II (No. 1 & 3), (ii) Type III (No. 1 & 3) and (iii) Type IV (Principal's Quarter) are **not structurally sound**.

For limitations of these tests and influence of various other parameters on test results, please refer IS 13311–1992 (Pt.1) and IS 13311–1992 (Pt.2)

This report is purely academic in nature and hence not to be used for other purpose whatsoever.

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