

**TECHNICAL OPINION FOR EXTENSION OF
4TH FLOOR OF EXISTING SCHOOL BUILDING**

CLIENT

SHREE SWAMINARAYAN ACADEMY

SHREE SWAMINARAYAN H.V. VIDYALAYA CAMPUS

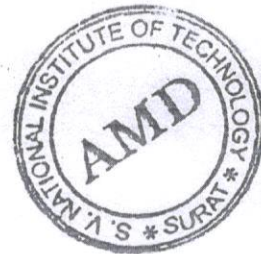
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STAFF ASSOCIATED

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**Applied Mechanics Department
S V National Institute of Technology
SURAT - 395 007**

AUGUST 2013



No.: AMD/SVNIT/Consultancy/2013-14/

Date: 26/08/2013

Report for	: Technical Opinion for Extension of 4 th Floor of existing School Building.
Client	: Shree Swaminarayan H V Vidyalaya, New Rander Road, Adajan, Surat - 395009
Ref.	: Your letter dated 07/08/2013

1.0 PREAMBLE:-

The Principal, Shree Swaminarayan H V Vidyalaya, New Rander Road, Adajan, Surat had approach Applied Mechanics Department of S V National Institute of Technology, Surat on 07/08/2013 for "Technical Opinion for Extension of 4th Floor on existing ground plus three stories school building". (T.P. S. No. 12, Adajan, F.P. NO. 173, Paikee.sub plot No.2, Adajan, Surat).

From Applied Mechanics Department, SVNIT, Surat, Dr Atul K. Desai, Professor, had visited above site on 22/08/2013 (Thursday) along with school officials. During site visit following observations were note. Photography and Non Destructive Test (NDT) were carried out.

BRIEF DETAILS OF TEST METHOD (Rebound Hammer Test)

(As per I.S 13311 - Part-2)

When the various performance characteristics of concrete in a structure are required to be assessed, the Non Destructive Testing is taken into consideration to estimate the overall quality, uniformity and residual compressive strength of structural elements. The Rebound hammer is an easy to use instrument, which provides a quick and simple non-destructive test for obtaining an immediate indication of concrete strength in various parts of a structure.

The methodology adopted for Non Destructive Testing by Rebound Hammer method is in such a way that, when the plunger of rebound hammer is pressed against the surface of the concrete, the spring-controlled mass rebounds and the extent of such rebound depends upon the surface hardness of concrete. The surface hardness and therefore the rebound are



taken to be related to the compressive strength of the concrete. The rebound is read off along a graduated scale and is designated as the rebound number or rebound index.

The conversion of rebound number to compressive strength can be achieved by producing a calibration graph for the concrete concerned. This is undertaken by testing previously sampled concrete cubes strength or cores which extracted from the sample test location and crushed to determine the in-situ strength. The calibration chart may then be used to convert rebound number to estimated cube strength. If it is not possible to produce a calibration graph, most manufacture of rebound hammer are supplied with a conversion curve, which will enable the average rebound value to be converted to an estimated concrete strength in N/mm^2 . The angle (Horizontal, Vertical & inclined) of application needs to be taken into account to give the correct reading.

The Schmidt hammer measures the true rebound co-efficient, so called "Q - Value ". It represents the physical rebound co-efficient. The Schmidt hammer measures the velocity of impact and of rebound, immediately before and after the impact, computing the fraction of energy restored by the specimen under test. The Q-Value is virtually free of error sources inherent in traditional concrete test hammers measuring the "compressive strength"

For testing, smooth, clean and dry surface is to be selected. Any loosely adhering scale observed, is to be rubbed with a grinding wheel or stone, consisting of medium grain texture silicon carbide or equivalent material (the points of impact on the specimen was not nearer an edge than 20 mm and should be not less than 20 mm from each other). The same points should not be impacted more than once. The points of impart should be more than 20mm from edge and should not be less than 20mm from each other.

The rebound numbers are influenced by a number of factors like type of cement, type of aggregate, surface condition and moisture content of concrete curing and age of concrete and carbonation of concrete surface etc.

Considering the limitation of the method into account the Rebound hammer is still a valuable tool in the NDT to assess the condition of in-situ concrete, rapidly, impart in difficult locations.



GENERAL OBSERVATIONS:

1. Above said building was 11 years old. This was constructed in the year 2002.
2. At the time of construction license engineer and structural designer were appointed. Surat Municipal Corporation approval was also taken.
3. During visit we found good geometrical configuration and of grid structure. Building frame was in good condition.
4. Building was in good condition and aesthetics looks, also nice.
5. On site no water leakage, crack formation and settlement of flooring observed. All beam column joint were observed, and found O.K.
6. In Building all Chhajja cantilever beam and slab found in good condition.
7. In building no settlement crack and no settlement of steps observed. No settlement of flooring observed.
8. Stiffness of beam and column found O.K. on site. Dimension are also I.S. requirements.
9. Building was constructed with back side "Step Elevation" from road side.
10. Entrance foyer of building supported on Round Column found in good condition.
11. In building staircase, lift duct and other area are in good condition.
12. At terrace level good quality water proofing observed and with maintaining proper slope. Appropriate No.s; of water drain outlet, (Rain water pipes observed).
13. Lift machine room and overhead water tank also found on good structural system.
14. During site visit following concrete compressive strength using N.D.T (Non destructive Testing) using Rebound Hammer was observed.

VISUAL OBSERVATIONS & REBOUND HAMMER TEST RESULT

TABLE – 1: DETAILED VISUAL OBSERVATIONS & REBOUND HAMMER TEST RESULTS ALONG WITH SUGGESTIONS

Location ID	Structural Component	Position of Rebound Hammer	Compressive Strength (N/mm ²)	Observation
C1	Column (Exterior Ground Floor)	Horizontal	32.0	• Non crack, No Bulging observed. Found O.K.
C2	Column(Exterior Ground Floor – In biaxial)	Horizontal	30.0	• Non crack, No Bulging observed. Found O.K.



Location ID	Structural Component	Position of Rebound Hammer	Compressive Strength (N/mm ²)	Observation
C3	Column (Internal – Ground Floor)	Horizontal	32.0	• Non crack, No Bulging observed. Found O.K.
C4	Column Interior – Ground Floor)	Horizontal	30.0	• Non crack, No Bulging observed. Found O.K.
C5	Column (Ground floor – near toilet block)	Horizontal	28.0	• Non crack, No Bulging observed. Found O.K.
C6	Column(Exterior Ground Floor – In biaxial)	Horizontal	28.0	• Non crack, No Bulging observed. Found O.K.
C7	Column(Exterior Ground Floor – In biaxial)	Horizontal	32.0	• Non crack, No Bulging observed. Found O.K.
C8	Column Interior – Ground Floor)	Horizontal	30.0	• Non crack, No Bulging observed. Found O.K.

CONCLUSION:

1. A non Destructive Test result shows good compressive strength of concrete in range of 28 N/mm² to 32 N/mm².
2. While extension of one more R.C.C. slab floor, following care must be taken.
 - a. For reducing dead load remove all water proofing layer loads, from terrace.
 - b. Use light weight (Low density) construction block for construction of exterior and interior (main partition wall, and railing) wall, in 4th floor (Additional) construction.
 - c. No constructions are allowed on circular shape poarch slab, near entrance.

As building is in good condition and all structural components were good structural rigidity, based on our past experience and judgement we can safe concluded that **“addition of one more floor (4th Floor) with R.C.C. slab and good quality light weight construction block, will not endanger safety of building”**. We give permission for one more floor extension, from structural engineering point of view.



NOTE : As no other drawing (Architectural & structural) we available accept Surat Municipal Passing drawing, hence old Structural Design, Bearing Capacity Report, Materials Test certificate, were not checked.

Important Note:

This report was prepared based on our past experience & visual judgment. Moreover above report was based on observations made till date 23/08/2013 only. If any addition or alteration/ structural modifications or breaking of any structural components, by any person, agency is made then SVNIT expert team is not at all responsible.

The construction of addition floor must be carried out with I.S.I mark materials and person having minimum experience of 5 years in relevant field. Accuracy of construction is most essential for increasing safety of above building. Above report is prepared based on visual observation & conducting rebound hammer test, as such for building the architectural, structural drawings, material test report and soil bearing capacity report were not available.

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(Handwritten signature)
27/08/2013

(Dr. Atul K. Desai)

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Department of Applied Mechanics
SVNIT, Surat


Date : 18/07/2023

STABILITY CERTIFICATE

This is to certify that the building higher secondary school building situated at T.P. Scheme No.- 12 (Adajan), F.P. No. 173, subplot no.- 2 Surat is constructed as per the structural design & drawings provided by us. The building consists of Ground floor, 1st floor to 3rd floor & Terrace floor level construction work was started in the year 2004-2005.

The structural design of the said building incorporates provisions of relevant codes of practice (i. e. IS – 456, IS - 875 part – 2). We periodically supervised the building during construction.

This building is safe for another extension of the fourth floor with an addition. We are appointed as structural engineers for the above said addition & alteration as per the approved plan.



Signature of Structural Engineer

(Dr. B. K. Patel)

Design Point Consult Pvt. Ltd.
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