

Structural Audit Report of School Building of Kendriya Vidyalaya No.2 Uppal, Hyderabad



**NATIONAL INSTITUTE OF TECHNOLOGY
WARANGAL**

**Structures Division
Department of Civil Engineering
25th FEBRUARY 2019**

Structural Audit Report of School Building of Kendriya Vidyalaya No.2 Uppal, Hyderabad

Ref: 1. F.2-19/KV 2(U)/2018-19/248 Dated: 26.11.2018
2. Consultancy Proposal 1912b – dated 21-01-2019.

The Principal of Kendriya Vidyalaya No.2 School at Uppal Hyderabad has requested Director, National Institute of Technology Warangal (NITW) to depute the concerned personnel to inspect and certify the structural Audit Report of the Kendriya Vidyalaya No.2 School building at Hyderabad (**Vide Ref. 1**). NITW accepted for taking up the work. Accordingly, the work was assigned a proposal number (**Vide Ref.2**).

In this connection one faculty member from the Structures Division, Department of Civil Engineering inspected the said building on **22nd February 2019**. The Inspection was conducted in the presence of the Principal Mrs Radha Mahalakshmi. The following is the report based on the status of the visit made as in 22nd February 2019.

The general topography is the school has certain portion with buildings along with a good sports area. There is a difference in the actual structure on the ground and the plans existing in the files identified in the school. There are roads on all the sides of the main school building campus and is well ventilated and more or less the surroundings are neatly maintained. The structure is a load bearing stone masonry structure with proper pointing and adequate plinth protection (**Fig 1**). The plinth level of the building is reasonably good.

The entire building was inspected room wise and by and large most of the portions of the building are maintained properly and there are no issues with respect to the stability of the building in general. The flooring is well maintained and does not show any signs of cracking or settlement. The structure is a load bearing structure with stone masonry and the walls are free from any cracking.

In majority of the portion of the slab, the distress has already started and the crack growth on the slab can be an indication of corrosion action as the water stored in the slab can act as potential water reservoirs enabling the water to seep inside due to porous nature of the slab and alternate wetting and drying (**Figs 2-4**). It is recommended that is the right time to go for a water proofing coat on the roof slab with suitable material (Refer CPWD Handbook on Repairs and Rehabilitation of Buildings) to prevent leakage from the slab and avoid deterioration of the slab. This may be taken up on priority basis.

The Khurrah areas on the slab close to the water outlet points are not properly maintained and it was observed that they were stagnated with water and found to be filled with leaves (**Figs 5-6**). It was also noticed that the area near water tank was stranded with overflowing water from the tank. This seems to be a regular feature from the tank. Also, the inlet and outlet GI pipes are slowly getting corroded (**Figs 7-10**). It is recommended to replace with CPVC pipes immediately.

The railing over the parapet walls in RC is corroded and needs immediate replacement. The exposure and loss of diameter of reinforcement along with areas of spalling and delamination is indicative of urgent repair. The spalled concrete may hurt the school children in ground floor. Hence, any loose materials shall be chipped off immediately and repairs shall be taken up on priority basis (**Figs 11-13**).

There is invasion of trees on to the building (**Figs 14-15**) which is resulting in the stagnation of water due to choking of outlets with leaves on the roof tops. Periodic maintenance seems to be missing on the roof top. Occasional pruning of the trees is to be done to protect the slab.

Based on the visual inspection of the building, structurally as on date the building seem to be stable while, important and minor things pointed may be attended, mainly related to maintenance and urgent repairs. Locations on the roof tops, extended portico areas and other cornices, slabs of toilet blocks, rain water outlet points, expansion joints, dampness in the walls (**Figs 16-21**) needs to be taken care.



Fig 1 Stone Masonry Structure



Fig 2 Cracking on the Slab Top



Fig 3 Delaminated Areas on the Slab



Fig 4 Potential source for Water Stagnation



Fig 5 Leaves filled up in the Khurras



Fig 6 Water Stagnation with leaves



Fig 7 Water Stagnation near Water Tank



Fig 8 Overflowing of water from tank



Fig 9 Water patches close to water tank



Fig 10 Corroded GI Pipes



Fig 11 and 12 Corrosion of the railing of the Parapet Wall



Fig 13 Loss of Diameter of Reinforcement-Severe Corrosion



Fig 14 and 15 Invasion of Trees on the Building



Figs 16 and 17 Expansion Joints-Leakage of Water from Roof Top/Floor above



Figs 18 and 19 Dampness in the Slab due to septic water from the Toilets in First Floor



Figs 20 and 21 Dampness in the Walls

To summarise, the following are the observations and recommendations with regard to the school building as on the date of visit ie 22nd February 2019.

1. The school building is a stone masonry structure with a good plinth and plinth protection and without any signs of major visual cracking.
2. Non Destructive Evaluation is not necessitated as the structure does not at present require any detailed inspection.
3. The slab area is to be immediately treated with appropriate water proofing material.
4. Periodic maintenance of the slab has to be taken up atleast twice a year to clean up the rainwater spouts and accumulated leaves on the slab.
5. The repair to the railing of the parapet wall which is subjected to severe corrosion has to be taken up on priority basis. Meanwhile, the loose material may be chipped off so that it will cause any accidents to the children.
6. Periodic pruning of the trees to be taken up to avoid invasion of trees onto the building. Few plants were observed to be propping up from the cracks and near the rainwater spouts. Such plants are to be immediately removed and measures are to be taken to prevent such plants in future.
6. The Expansion Joints are to be attended to immediately. These are the sources where the water is entering into the ground and first floors in the building during rainy season.
7. The areas near the overhead water tanks where, leakage and overflow of water is noticed has to be attended to immediately. Plumbing lines are to be periodically checked and flaws if any to be rectified immediately. All the GI pipes are to be replaced with CPVC Pipes.
8. In some areas, on the projections over the windows there is minor cracking and corrosion of steel. This could be due to accumulation of water due to clogging of rainwater spouts. This has to be addressed immediately to prevent further deterioration.
9. In some areas dampening of walls is observed. Upon inspection, it is found that water is accumulating on the projected slab areas above the lintel areas and also on the slabs. This is the potential source from where the water is seeping into the walls. This can be prevented by proper maintenance. Also, there are leakages from the toilet areas and this need to be arrested as this can potentially harm the slab due to septic water. Already, there are wet areas in the slab under the toilet locations. Also, the toilets are not maintained properly. This may be given top priority.

The above observations may be attended and suitable repairs may be taken along with periodic maintenance to upkeep the safety of the structure from durability related issues. In general it is observed that the structure is safe and stable as on the date of inspection.



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