

STRUCTURAL FEASIBILITY STUDY FOR FOUNDATION IN CONNECTION WITH
PROPOSED CONSTRUCTION OF AN ADDITIONAL FLOOR ON THE EXISTING ROOF OF
OLD BUILDING, GOKHALE MEMORIAL GIRLS' SCHOOL, 1/1 HARISH MUKHERJEE
ROAD, KOLKATA, WEST BENGAL - 700029

CONSULTANT & CONTRACTOR

KBT RELIABLE CONSULTANT AND CONTRACTOR
CONNECTING CIVIL, CONNECTING INDIA, BUILD WITH CONFIDENCE
1H GRAHAM ROAD, KOLKATA-700 040
chowdhurysarmistha3@gmail.com, ph:- 98305 42309

J. Mitra

Principal
Gokhale Memorial Girls' School

Sumita Senapati

Hony. Secretary
Managing Committee
Gokhale Memorial Girls' School

Scope of the work: To study and prepare structural feasibility report (foundation part) in connection with proposed construction of one additional floor on the existing roof of Gokhale Memorial Girls' School, Kolkata.

Brief History of the said school building:

The said school building was constructed during pre-independence period and the said school building is nearly hundred years old. The main structure is "C" type three storied load bearing structure having front length is about 40 m and depth is about 11.0m. The mid part of the structure having length is about 26.00m and width is nearly 13.50m and length of the back side of the building is about 41.00m and depth is about 11.00m. Floor to floor height of the building is 4.50m (P.L to FF), 4.50m (FF to 2nd floor), and 3.90m (2nd floor to existing roof). Later on the middle part of the building was laterally extended by constructing three storied RCC frame structure and matched with the vertical profile of the existing building. The said building requires periodical technical watch since this is school building which is fall under important structure. Foundation type of the old structure is masonry strip having width is 900 mm for outer wall and 1100 mm for internal main walls. The size of the masonry wall is 500 mm up to first floor and subsequently reduced to 400mm for FF to 2nd floor and 300 mm for 2nd floor to existing roof. Whereas the size of the column of the laterally extended part of the structure is 300x500 and size of the beam is 250x400. Three no main walls are parallels placed in all part the old building.

List of structural data obtained from visual inspection:

For Main old building:

1	Thickness of load bearing wall (PL to FF:4.50 m) for outer and inner wall	500 mm
2	Thickness of load bearing wall (FF to 2 nd Floor:4.50m) for outer and inner wall	400 mm
3	Thickness of load bearing wall (2 nd Floor to existing roof:3.90m) for outer and inner wall	300 mm
4	Thickness of floor/ roof slab	200 mm

For RCC building:

1	Thickness of external wall (PL to FF:4.50m) for outer and inner wall	250 mm
2	Thickness of load bearing wall (FF to 2 nd Floor:4.50m) for outer and inner wall	250mm
3	Thickness of load bearing wall (2 nd Floor to existing roof:3.90m) for outer and inner wall	250 mm
4	Thickness of floor/ roof slab	125 mm
5	Column Section	300x500
6	Beam section	250x400
7	Column reinforcement(main longitudinal bar)[noticed in the extended columns above roof level.	4-#16

Types of conditional assessment/Health Monitoring done for the existing structure:

Health Monitoring of the existing structure is performed by " Mythcon" (Mahendra Enclave, Block-B, Space 4 & 5 ,AA-32 , P Kanan,W.B, Pin:700101.

- Non Destructive Test (NDT) like Rebound Hammer Test was performed to determine probable compressive strength of the concrete of the RCC structure(part of the structure constructed later on and RCC slab of old structure) and it has been found that the compressive strength of the concrete of the existing RCC slabs is nearly 30 Mpa.
- NDT test like Ultra sonic Pulse Velocity test is also performed to judge the uniformity of the concrete i.e presence of internal voids in the structural elements.As per report, it has been found that some doubt regarding uniformity of concrete is noticed in some places of the structural elements.
- Soil Investigation Report also prepared by the "Associated Foundation Engineers" , 20, K.N Sen Road, Kolkata-700042 for the proposed vertical extension. As per report , it has been

Sumita Sen
Hony. Secretary
Managing Committee
Gokhale Memorial Girls' School

J. Mitra
Principal
Gokhale Memorial Girls' School

found that allowable Bearing capacity for 2.0m x2.0m isolated footing is about 9.80 t/m² and for 2.0m strip is about 8.0 t/m²

List of data required to proper judge the structural feasibility of foundation to carry additional loads coming from proposed vertical extension structure.

- i) Type of foundation and its detail of the old block:
[Available only outer walls]
- ii) Type of foundation and its detail of the extended block(RCC structure):
[Not available]
- iii) Soil Investigation Report:
[Available]
- iv) Details of all structural elements (columns, beams, slab) of RCC structure
[Not available]

Design Calculations and observations:

As per available architectural drawings of the existing buildings, load calculations are made for the existing structure as well as load from the proposed structure (Load calculation sheet attached) and accordingly net upward pressure beneath the foundation is calculated for outer load bearing masonry walls, internal load bearing masonry walls and loads coming in the outer (edge) and internal columns of the RCC adjoining structure.

Following results is observed from the load calculation:

Type of wall	Net Upward pressure in Ton/m ²	Allowable Bearing Capacity in Ton/m ²	Remarks
Outer wall adjoining corridor part	17.577	8.00 t/m ²	Since Net upward pressure beneath the foundation due to the existing structural load including structural load of the proposed construction is greater than the allowable bearing capacity of soil, therefore existing strip foundation is not safe to carry additional load.
Internal wall adjoining Corridor/middle block	21.294	8.00 t/m ²	Since Net upward pressure beneath the foundation due to the existing structural load including structural load of the proposed construction is greater than the allowable bearing capacity of soil, therefore existing strip foundation is not safe to carry additional load.
Internal wall adjoining Corridor/back side	21.928	8.00 t/m ²	-Do-

J. Mitra

Principal
Gokhale Memorial Girls' School

Sumita Senapati

Hony. Secretary
Managing Committee
Gokhale Memorial Girls' School

20/11/20

Principal
Gokhale Memorial Girls' School

Total Load outer col(edge) of RCC structure	844.025kN	10.00 t/m ²	Foundation Type not known
Total Load internal col(edge) of RCC structure	1216.3kN	10.00 t/m ²	-Do-

As per the available design parameters and performed calculations, it has been observed that the structure is no longer to carry additional structural loads which will come from the proposed vertical extended part of the building. However, vertical extension with light steel roofing structure and very light exterior walls made of cement fibre board of approved brand/ any other approved brand as per engineer-in-charge, very light weight flooring work may be adopted. Such rooms should be used for office purposes, class room and not for book stacking, library, storage room, etc.

For vertical extension with light weight steel roofing, following points to be considered during construction work as well as from functional point of view:

- i) Lime terracing or any roof treatment on the existing roof be shall completely remove from the entire roof.
- ii) Very light weight floor finish preferably within 0.5 kN/ m shall be provided
- iii) Any kind of stack loading of books / stationery will not be allowed on the proposed floor.
- iv) All external walls will have very light weight and height resistance against weather action.
- v) Structural damages if any in the existing element s.i.e. in columns, beams, slab and load bearing walls to be repaired and rehabilitated to initial condition.

Nilanjan Basu 13/3/2020

NILANJAN BASU
Empowered No. 147/1, C-1.
Empowered Structural Engineer
Building Department
The Kolkata Municipal Corporation

J. Nitesa

Principal
Gokhale Memorial Girls' School

Sumita Senapati

Hony. Secretary
Managing Committee
Gokhale Memorial Girls' School

Gokhale Memorial Girls' School