

## Real Time Construction and Analyze of School Building at Nagapattinam

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**ABSTRACT:** In this project we are constructed and investigated about the Construction management and psychological process of the project and also studied the site investigation and manual design of the structures. It investigates the inter relation of outer appearance, aesthetic and special configuration of modern school building. This school building is located at Nagapattinam and Builded Structure type is framed. The area of the school building is 4000 sq.ft. In this structure built up with G+2 floors and class rooms, office rooms, staff room, art room, computer room, library and laboratory. The design were made by using IS456 – 2000, SP16, SP 34 and SP 7. The used concrete grade is M<sub>25</sub> and Fe415 HYSD steel.

**Keywords:** Cement, Coarse aggregate, Fine aggregate and Construction.

### I.INTRODUCTION

It seems axiomatic to state that school design is governed by both physical and metaphysical factors. In the physical realm the availability of financial resources, the restrictions of the proposed site, the nature of the program to be offered and the age of the children to be served are obvious influences that will affect the final more metaphysical nature (but just as critical) is the importance of preliminary and on-going consultations among all interest groups. These stake-holders are not just the designers/architects and board administrators but also school administrators, teachers, parents and, depending on maturity, students as well.

Also, for primary and elementary level pupils especially, the provision of a safe playground is paramount. Moreover, even when building in a city, it is recommended that, if at all possible, the school grounds incorporate a wooded, "natural" area.

In the northern hemisphere, south-facing and north-facing windows are the best. East-facing windows provide early morning warmth, but west-facing windows are sometimes difficult to control. Interior window walls can be architecturally pleasing and can sometimes be used to share light from another room as well as allow for teacher supervision in certain instances.

Ceilings are generally white and have very high light reflectance value (LRV). For floors the LRV should be 20% to 30%. Walls typically have a range from 40% to 60%. For furniture, equipment, doors, and door frames

the LRV should be between 40% and 50%. The primary "teaching wall" (behind the teacher) and other accent walls may have an accent colours that results in an LRV between 45% and 50%.

### II.LITERATURE REVIEW

*Amidhi et al, (2005)* studied undertook the study related to Quality education in Chamarajanagar district .According to study, Chamarajanagar district of South Karnataka has low literacy levels and a large population of Scheduled Castes (SC) and Scheduled Tribes (ST). An intervention was undertaken to improve the quality of elementary education in Government schools and Ashramshalas (Govt. aided schools) by building the capacities of all stakeholders involved. It was observed that learning levels improved during tests conducted by DQEP. Progress was made in efforts to involve and integrate the community with the school.

*Pratham, New Delhi. (2009)* evaluates the education situation in India. It focused on basic reading, comprehension and arithmetic. ASER 2008 assessed curriculum in early grades and indicators like time, school time table, maps, famous people, and currency tasks.

*Aleksandar Peulicet al, (2013),* studied the Measurement and Simulation of Energy use in a School Building in this paper, a flexible measurement system for the temperature monitoring of a school building is proposed. The system communication is completely wireless, easily operable and has a low power requirement.

*Ziegler, et.al (2014),* has studied the Designing Classrooms to Maximize Student Achievement for students to learn to their full potential, scientific evidence suggests that the classroom environment must be of minimum structural quality and contain cues signaling that all students are valued learners.



## ADMINISTRATIVE SANCTION

Administrative approval

- Revised Administrative approval

### Administrative approval

When a work other than a petty work or repairs is required by a department, the responsible officer of that department, should in the first instance, obtain the requisite approval to its execution from the competent authority. The concurrence of the competent authority is termed "administrative approval".

When a work is required to be executed by the P.H.E.D. the responsible officer of that Department shall obtain the administrative approval from the competent authority.

### Revised Administrative Approval

Revised administrative approval of the competent authority should be obtained when-

(1) Administrative approval has been given on the basis of a stage I estimate, and the amount of the detailed estimate or, in the case of a work in progress, the expenditure on the work exceeds or is likely to exceed the amount already approved by more than 20 percent.

(2) Administrative approval has been accorded on stage II estimate and the expenditure exceeds or is likely to exceed the amount approved by more than 10 percent.

(3) Material deviations are made from the original proposals, even though their cost may be covered by savings on other items.

- Site maintained
- Material maintains
- Labor maintains

### Technical Sanction

This sanction is known as the "Technical sanction to the Estimate" and, except as provided in Paragraph, must be obtained before the work is commenced.

(1) All sanctioned estimates should be recorded in the Division Office.

(2) A return of all estimates sanctioned by the E.E. should be sent to the S.E. and the Accountant General and those sanctioned by the C.E. and the S.E. should be sent by them to the A.G.

(3) In exceptional cases where it is desirable to commence work on a project to which expenditure

sanction has been accorded by competent authority before the detailed estimate for the whole project has been sanctioned, it is permissible for the authority competent to sanction the final technical estimate as a whole to accord sanction to detailed estimates for component parts of the project subject to the following conditions:-

(a) For each such work or component part there must be a fully prepared detailed estimate, and in the expenditure sanction as a whole, there must be a clear and specific amount corresponding to the work or component part in question.

(b) The amount of the detailed estimate must not exceed the amount included in the expenditure sanction.

(c) The sanctioning authority must be satisfied before according sanction, that no material deviations from the whole project as prepared for the purpose of expenditure sanction are to be anticipated and that the amount of the technical sanction for the whole project is not likely to exceed the amount of the expenditure sanction.

Project size, level of contract detail and specific client demands for waste management are the three main factors associated with waste management efforts.

- Drawing checking
- Quantity prepared
- Measurement checking

### SITE MANAGEMENT STUDY:

Job Relevance, Including Daily Routines, Tasks And ICT Support For Daily Tasks, Is Important For ICT Use, Which Makes It Similarly Important To Understand Construction Site Managers' Daily Routines, Tasks And Information Needs.

Tanah (1986) refers to primary functions and information needs of construction staff already in the mid-1980s. He considers construction site managers' primary functions to be supervising and organizing the work of foremen, and supervising equipment, materials and services to ensure that project is built within schedule, overseeing budget, safety and quality standards, directing all pre-construction activities and directing inspection and completing punch lists, warranties and operating data.

Some of these tasks require information sharing and problem solving platforms allowing the input of subcontractors, designers, materials suppliers and other site personnel.

- Engineers and labors
- Soil test
- Problems

- Climate change
- Safety

- Quality of work
- Quantity of work
- Job knowledge –Demonstrated knowledge or requirements, method, technics and skills.
- Related work knowledge, judgment, initiative, resource utilization, dependability.
- Technical wise week for labor.
- Full of the energy used to working on site.

## ENGINEERS

The Engineer has to keep in mind the municipal conditions, building bye laws, environment, financial capacity, water supply, sewage arrangement, provision of future, aeration, ventilation etc., in suggestion a particular type of plan to any client.

These trends can be explained by the nature of problem solving activities, which require easy communication, sending digital files, such as pictures, and taking notes during on-site meetings.

It is more likely related to difficulty of data entry due to the need to wear safety gloves on site, or gloves to protect against low temperatures. It might also be due to site managers not feeling a strong need for mobile devices to record work hours, waste volumes and materials use.

By measuring output and input quality in more details and taking account of the service elements of construction, it would be possible to discuss underlying construction productivity growth and how it can be improved site managers require:

- (i) Blueprints, Specifications And Other Contract Documents
- (ii) Local Union And Labor Activities, Safety Regulations, Labor Agreements, Quality Control And Testing Regulations
- (iii) Work Status And Progress, Reports, Detailed Schedule, Critical Item Action Reports and a Field Diary
- (iv) Purchase Order Control, Shop Drawing And Sample Control, Procurement Status, Field Labor, Back Charges, Vendor And Subcontractor And Change Order Report

Unit rates are estimates of the total price of projects expressed as an amount per m<sup>2</sup> of built floor area in the case of buildings and m<sup>2</sup> or linear meters in the case of civil engineering work. There is, however, uncertainty across countries about the rules of floor area measurement

## LABOURS

Productivity in construction is often broadly defined as output per labor hour. Since labor constitutes a large part of the construction cost and the quantity of labor hours in performing a task in construction is more susceptible to the influence of management than are materials or capital, this productivity measure is often referred to as labor productivity.

## SOIL TEST

To find the texture of a soil sample, first separate the fine earth, all particles less than 2 mm, from large particles such as gravel, pebbles and small stones. Fine earth is mixture of sand silt clay.

- Bottle test, manipulative tests are conducted by field.
- Soil test is important of the building structure construction.
- Every 3m test the soil.
- Footing is based to the strength of soil
- Week soil provided a pile foundation.

## Problems

Change to design, materials handling, rework (wrong installation and removal), weather, vandalism and misplacement

- Water problem
- Electrical wise problem
- Store room
- Site approach road
- Materials stock surfaces
- Labor arrangement and safety

## SAFETY:

- No electrical wires would be allowed to lie free on the ground.
- No fire shall be made at the construction site.
- No ladder with structural default should be used.
- Helmets, Shoes, Boots, Safety belts are personal protection of safety.
- Outer side cover net
- Special care needs to be taken for scaffolding work.
- All-round cover built a scaffolding

## MORTAR

Cement mortar is to be 1 part cement to 3 parts sand by volume and shall be used within one hour of mixing. No partially set mortar may be used.

Cement, sand and water is mixed with suitable proportion on site. Cement mortar is used for plastering, brick work and pointing.

## SITE INVESTIGATION AND STUDY OF WORK

- Site Preparation
- Existing Obstructions
- Existing Drainage
- Earthwork Excavation
- Concrete
- Construction Of Brickwork
- Wall Plastering
- Painting And Decorating
- Plumbing And Sanitary Installations

**Site Preparation:** Set out building to approved site plan, remove all loose rubbish, etc., grub up shrubs and roots, remove all vegetation and soil to a depth of 225 mm or as necessary, stockpile good topsoil for future use, cart away remainder and leave site ready for excavation under guidance from Operational Services.

**Existing Obstructions:** Break up, remove and cart away any existing obstruction, concrete path, base or foundations which affect excavation for the new work.

**Existing Drainage:** Stop off manholes, drains etc. where route affects new work, divert or make temporary arrangements as necessary for duration of new work.



**Fig3.4: Column Center Line Marking**

Before new works are started which involves demolition of existing structures or excavating, adequate provision must be made to ensure the stability and protection of existing nearby structures. Markers will be fixed, levels taken and agreed with the representative Engineer.

### Earthwork Excavation

Excavate to reduce levels over the area of the new works as required by the drawing and Project Specification. Carry out all necessary support measures to retain sides of excavation as required under Risk Assessment. Stockpile good topsoil for future use and cart away to tip as directed by the Environment Agency, after soil sampling excess spoil and material unsuitable for use as fill. Keep excavations free of standing water. Level and ram bottom of excavation.

This is the first process of building construction. Excavate the foundation place and install the column.

**Floor Slab:** On the prepared formation or fill material, lay one layer of 1000g polythene, lapped 150mm at the joints. The surface of the floor slab shall be suitable to receive the specified finish. Where this is steel trowelled or power floated it shall be carried out as soon as access is possible to the surface.

For monolithic granolithic finish, while the slab is still green the top 15mm will be formed by a specialist sub-contractor using Portland Cement, aggregate according to B.S.882 finishing with trowelling to a smooth surface. The surface shall be covered with polythene or similar approved covering for at least seven days before allowing access.

**Soundness of Concrete:** Finished concrete shall be sound, free from hollows and as specified. Any concrete considered by to be defective for any reason shall be cut out and replaced with sound concrete at no additional cost.

**Expansion Joints:** All concrete work shall be formed allowing adequate expansion and construction joints in accordance with current codes of practice. Refer to Series 1700 Structural Concrete.

## CONSTRUCTION OF BRICKWORK

Brickwork shall be built in straight, even courses, rising four courses per 300mm. Bricks shall be well wetted before laying, with joints well-buttered and flushed up as work proceeds. Walls shall be carried up evenly ensuring no part rises more than 900mm above adjoining parts.

All jambs and quoins shall be vertical and perpendiculars to be strictly kept and all properly bonded.



**Fig 3.8: Basement Wall Construction**

No bricks shall be laid during frosty weather and any green work is to be protected from damage in frosty weather. Any work damaged by frost is to be removed and made good. Fair face work shall be pointed up as the work proceeds.

**Bonding:** Half brick walls shall be built in stretcher bond and solid brickwork in English Bond. All partition or cross walls are to be firmly attached to main walls by bonding or tying.

**Scaffolding:** Scaffolding suitable for the job will be used and all safety regulations are to be observed.

**Protection:** All recognized means must be used for protecting brickwork during the work. Any stains which occur must be removed.

## WALL PLASTERING

### Water:

Water shall be clean mains water.

### Storage:

Materials shall be stored under cover and protected from spoilage, contamination, damage, etc.

### Surface Preparation:

The surfaces shall be brushed and all dust, loose particles, etc., removed, oil on surfaces shall be removed, smooth concrete or brickwork shall be roughened to form a key or a bonding agent may be used to form a key, all steps shall be taken to ensure that the surface to be plastered is suitably prepared.

### Metal Angle Beads:

Protected metal angle beads shall be used at all external angles for interior work.

### Plastering:

Plastering generally shall be carried out in two coats (on metal lathing three coats), finished thickness 12mm ( $\frac{1}{2}$ "). On brickwork or block work the undercoat shall be one part browning to three parts sand. On concrete the undercoat shall be one part browning to two parts sand. The undercoat shall be even and keyed properly to accept the finishing coat applied 3mm ( $\frac{1}{8}$ ") thick and trowelled to a true and even surface. Lightweight plasters shall be used strictly in accordance with the manufacturer's instructions.

## Painting and Decorating

### Materials:

Materials shall be suitable in all aspects for the particular application and conform to the appropriate Indian Standards.

### Softwood Painting

All knots shall be treated with genuine shellac knotting and allowed to dry. The surface shall be primed with one coat of wood primer. Before application of the undercoat all cracks, holes, etc., shall be made good with hard stopping. End grain surfaces shall receive two coats

of primer. The second and third to be undercoating applied liberally and laid off evenly.

### Hardwood Painting:

Unless otherwise specified all hardwood shall be thoroughly rubbed down with fine glass paper, dusted off, stopped, stained as necessary or desirable to give an even colour and shall receive two coats of matt clear marine quality varnish, rubbed down between coats.

**Iron, Steel and Galvanized Surfaces Painting:** Unless otherwise specified new iron, steel and galvanized steel surfaces shall be thoroughly cleaned and all traces of scale, rust, grease and dirt removed. The clean surface shall be primed immediately with the appropriate metal primer. The second and third coats to be undercoating applied liberally and laid off evenly. The finishing coat to be gloss or eggshell as particularly specified, applied liberally and laid off evenly.

**Plaster, Brickwork, Concrete and Hardboard Painting:** These surfaces shall be thoroughly cleaned and prepared as appropriate. The finishes shall be as specified in the project specification.

For emulsion paintwork the first coat shall be thinned by the addition of water in the ratio of 1:10. The second and third coats shall be thinned only as necessary for application and material liberally applied and laid off evenly.

For oil paintwork the surface shall be sealed with the appropriate sealer, the second and third coats shall be undercoating applied liberally and laid off evenly.

For sprayed plastic paintwork the surface shall be primed and sprayed all to the manufacturer's specification. For cement stone painting of concrete, etc., apply "Arpax" strictly in accordance with the manufacturer's specification.

## Plumbing and Sanitary Installations

### Steel Rainwater Goods:

Where steel eaves gutters are required these shall be painted two coats bituminous paint prior to positioning, jointed with red lead cement and screwed with gutter bolts.

### Cast Iron Rainwater Goods:

Where downpipes are necessary inside a building, cast iron pipes and fittings shall be used. Similarly cast iron pipes shall be used for below floor rainwater drainage within the curtilage of the building and manholes shall be constructed at all junctions. All joints in drains and down pipes shall be made with hemp

and molten lead or approved compound and caulked to form a watertight connection.

#### **P.V.C. Rainwater Goods:**

If P.V.C. rainwater goods are specified in the particular project specification these shall be heavy duty grade jointed and fixed in accordance with the manufacturer's recommendations.

#### **Soil, Water and Trade Effluent Drainage:**

Within the curtilage of a building all drainage shall be carried out in cast iron, stainless steel, or polypropylenewith joints made as required to form a watertight connection. Manholes shall be constructed at all junctions and changes of direction.

#### **Hot and Cold Water Installations:**

These will normally form part of the Mechanical Service contract up to the point of connection to cisterns, sinks, etc., and including waste connections from sinks to galleys, etc. Pipework and fittings from urinal cisterns shall be chromium plated.

#### **W.C. Suites, Urinals, Sink:**

These shall normally be specified in the particular project specification. Equipment of this type is to be carefully stored on site prior to installation and protective coverings left on until the facilities are handed over for use at which time all items are to be thoroughly cleaned. Any damaged or defective items shall be replaced immediately at no cost

#### **Wire Balloons:**

Galvanized wire balloons shall be fitted to all drain ventilating pipes and gutter outlets.



**Fig 3.9: Piles Foundation Trench**

## **RESULT AND CONCLUSIONS**

### **GENERAL**

Structures must have a degree of robustness, so that they are unlikely to be sensitive to adverse effects, such as misuse or accident, leading to damage disproportionate to the cause. Detailed consideration at design stage should be given to the safety of the building envelope both during construction and in use.

The Structural design must provide adequate strength, stability and durability, (i.e. to avoid such things as spalling masonry, the failure of fixings for cladding, and the loosening of concrete cover because of corrosion).

The building structure should be serviceable. Deformation, movement, cracking and vibration should comply with the requirements of the relevant codes of practice for structural design and, in addition, must not impair the use of the building during its design life. Deterioration or defects should be limited, and appearance should remain acceptable.

### **DESIGN OF LINTEL**

To prevent sun's rays & rain from entering a room through external doors & windows sunshades are required in all directions.

### **DESIGN OF STAIRCASE**

#### **STAIRCASE**

Staircase is a structural form provided in building to facilities easy vertical movements of persons from one floor to another. Staircase of different type and shapes are provided and the aesthetic appearance required.

#### **COMPONENTS OF STAIRCASE:**

Staircase generally consists of one or more inclined waist slabs and horizontal landing slabs. Steps are provided on the inclined waist slab to facilities easy climbing stringer beams are sometimes provided along the middle or edges of the flight slab to support the waist and landing.

#### **CLASSIFICATIONS OF STAIRCASE:**

- Dog legged staircase
- Open well staircase
- Circular staircase
- Spiral staircase
- Quarter turn staircase

#### **RISE:**

The vertical height of a step is called rise. The rise of the steps, in buildings generally varies from 150mm to 200 mm.

**TREAD:**

The horizontal going of a step is called as tread. Generally it varies from 225mm to 300mm.

10. R.c.c design ,B.C.Punmia,ashok kumar jain,arun kumar jain,laxmi publisher, new delhi.

**CONCLUSION**

We conclude that there is a difference between theoretical and practical work done, A the scope of understanding will be much more when practical work is done. As we get more knowledge in such a situation where we have great experience doing the practical work .Knowing the loads we have designed the slabs depending upon the ratio of longer to shorted span of panel. In this project we have designed slabs as two way slabs depending upon the end condition, corresponding bending moment.The coefficients have been calculated as per I.S, code methods for corresponding  $l_x/l_y$  ratio.The calculations have been done for loads on beams and columns and designed frame analysis by moment distribution method.Here we have a very low bearing capacity, hard soil and isolated footing done.

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