

NAME: OLAWOYIN SADEEQ BABALOLA

MATRIC NUMBER: 18/ENG05/048

DEPARTMENT: MECHATRONICS ENGINEERING

COURSE CODE: ENG 284

COURSE TITLE: ENGINEERS IN SOCIETY

SCOPE OF WORK FOR RENOVATION OF THE ALFA BELGORE HALL

PROJECT OVERVIEW

The university founder, Are Afe Babalola has a requirement to renovate and modernize the Alfa Belgore multipurpose hall. The works shall be done as per the scope of work, all given specifications and the general contract conditions. This project requires an experienced contractor for its design and execution.

The contractor in charge of this project shall be responsible for the provision of materials, tools, labour, supervision and equipment required for the completion of the project as per the specification given.

PROJECT DELIVERABLES OR MAJOR TASKS

PLANNING

This is the first stage of the rehabilitation project. It involves extensive planning of the project requirements, designs, materials and grade of materials required. All activities carried out during this stage are to come before actual work starts on the project.

ACCESSING THE FOUNDATION

- As the hall is required to be more spacious after the renovation, the foundation needs to be accessed in consideration of turning the hall into a storey building. When accessing the foundation, the following are considered

the depth and type of foundation
the drainage system
which internal walls have foundations

For the depth and type of foundation a structural engineer will be responsible for the following:

digging holes large enough to expose the foundations of the building, around a metre in depth and width

taking a soil sample at the bottom of the pit

bagging up your soil sample

sending it off to an accredited soil-testing laboratory for testing.

When the foundation is certified to be perfect for the construction of a storey building, the development of the project will move to the next stage.

ROOF REMOVAL

- Due to the deteriorating state of the substandard roof used during the initial construction process, the roof is to be removed and replaced with high quality roofing materials which will be purchased from Germany. The removal of the roof and its underlay material is done using power roof cutter, pry-bar, Roof hatchet, Linoleum-type knife. The removal of the spoilt roof is the first stage of renovation of the project.

CONSTRUCTION OF TWO NEW STOREYS

- The Architect in charge of designing the new building plan is tasked with creating a building plan which fits the specification of the client and which will be standard. When the plan is complete and approved, the construction process begins. The construction will be carried out as stated in the steps below:

Design of building component

1. Formwork design
2. Staircase design
3. Deep Beams
4. Slabs

Column Casting

1. On the raft the column layout is done.
2. The column ties and link bars are provided as per column reinforcement drawings and general specifications.
3. Displacement of main bars should be provided with L bar
4. The plumb of formwork should be checked.

5. Height of cast should be calculated accurately

Expansion Joint

- Since concrete is subjected to volume change. Provision must be made to cater for the volume change by way of joint to relieve the stresses produced.
- Expansion joint is function of length
- Since the building is longer than 45m, it is provided with one or more expansion joints.
- Material used as expansion joint material is armor board whose thickness is 25 mm.

Water Bar

- Water bar is provided in the retaining wall so that the moisture can't move from the soil to the joint.
- Water bar is provided at the constructions joints of retaining wall of two different storeys

Building

When all frameworks required are complete, the bricklayers start building the additional storeys according to the building plan given to them. This process will be supervised by a structural engineer or a civil engineer. After the completion of this stage, the building will be plastered in preparation for other processes to be carried out.

ROOF FRAMING AND FIXING

- The roof frame is designed to hold a structural load including dead load, its own weight and weight of the roof covering. Due to the need for durability of the roof, metal roof imported from Germany will be used. The metal roof will be used instead of other types of roofing materials because of its high durability, high wind resistance, versatility and high fire resistance.

PLUMBING WORKS:

Pipes, fittings and joints will be installed and connected to the existing system as shown below:

1. Pipes, joints & fittings will be installed in accordance with recognized industry practices which will achieve permanently leak proof piping systems, capable of performing each indicated service without piping failure.
2. Piping runs will be located except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines.

3. Each system of piping will be flushed prior to testing for the purpose of removing grit, dirt, sand, etc., from the piping for as long as time is required to
+
thoroughly clean the system.
4. In erecting pipe, friction wrenches and risers shall be used exclusively; any pipe cut, dented or otherwise damaged shall be replaced.
5. Plumbing fixtures and accessories will be installed as indicated, in accordance with manufacturer's written instructions, applicable codes and regulations, and in accordance with recognized industry practices to ensure that installation complies with requirements and serves intended function.
6. Plumbing fixtures will be fastened securely to supports on building structure. Secure water supplies behind or within wall construction to provide rapid installation.
7. Proper joint sealant and silicone will be applied for all joints around all the finished fixtures and accessories as required to provide sealed installations.

Doors, Windows and Metal works

Frames for the windows, doors and burglary proof are made on site and fixed. Then, the doors imported from China and sound proof windows too will be fixed according to specifications required for hall project.

Tiling Work Execution

1. Tiles will be laid from the centerline of each space outward to obtain border tile of equal width and larger dimension.
2. The tiles for the ground floor will be laid in grid pattern.
3. The tile shall be set firmly on mortar bed.
4. Make adjustment of tile before initial set of the mortar takes place.
5. Work shall be terminated neatly at obstructions, edges, and corners without disturbing the pattern or joint alignment.
6. Cleaning: Upon completion of installation, tile surfaces will be cleaned so they are free of foreign matter and leave finished installation clean and free of cracked, chipped, broken, non-bonded, or otherwise defective tile work.

Electrical Fittings and Installations

This stage is where:

1. fitting of sockets, lightbulbs (both general purpose light and stage light) will be fixed to all required spots in the hall.
2. The fans and Air conditioning system of the hall will also be installed.
3. Large display screens will be fixed at all corners of the hall for better view of an event going on.
4. Projectors will be installed in the hall for display of slides during conferences or seminars.
5. Speakers for use in the hall will also be fixed and tested for efficient work.

Painting Work

Interior and Exterior Painting Work

I. Preparations

Manufacturer's recommendations in regard to preparation of surfaces to receive paint and application of paint itself shall be observed. Procedures shall include, but not necessarily be limited to, the following:

- a. Cleaning: Oil, grease and loose foreign matter, including mold, dirt and corrosion products shall be pressure cleaned in a manner which causes neither undue damage to the substrate nor damage to, or contamination of, the surroundings or the paint system to be applied.
- b. Filling: Cracks and holes will be filled with fillers, sealers or grouting cements as appropriate for the finishing system and substrate, and sand smooth, to ensure all coats finish smooth.
- c. Drying - Surfaces are cured and dry before applying additional coats of paint;
- d. Removal of weld spatter, slag, burrs, or any other objectionable surface irregularities.
- e. Removal of any rust and application of rust primer;
- f. Application an oil-based primer to any bare timber surfaces;
- g. Light sanding between coats for the perimeter walls painting.

II. Paint Application

- a. Application of paint and related material with an undercoat plus two coats of selected finish colour or with the number of coats specified in accordance with the manufacturer's recommendations.
- b. Finish: Each coat of paint will uniform in colour, gloss, thickness and texture and free of runs, sags, blisters, or other discontinuities.

c. Wet Paint Warning – Notices will be placed and will not be removed until paint is dry.

III. Colours

a. Main colour to the exterior of house and perimeter walls will be the same as existing, weather guard white colour for the walls and black for skirting. Preferably “Galaxy Paint” or “Goldstar” manufacturers.

b. All balustrades, painted timber, and front entry doors and frames will be painted with the same colours as existing one.

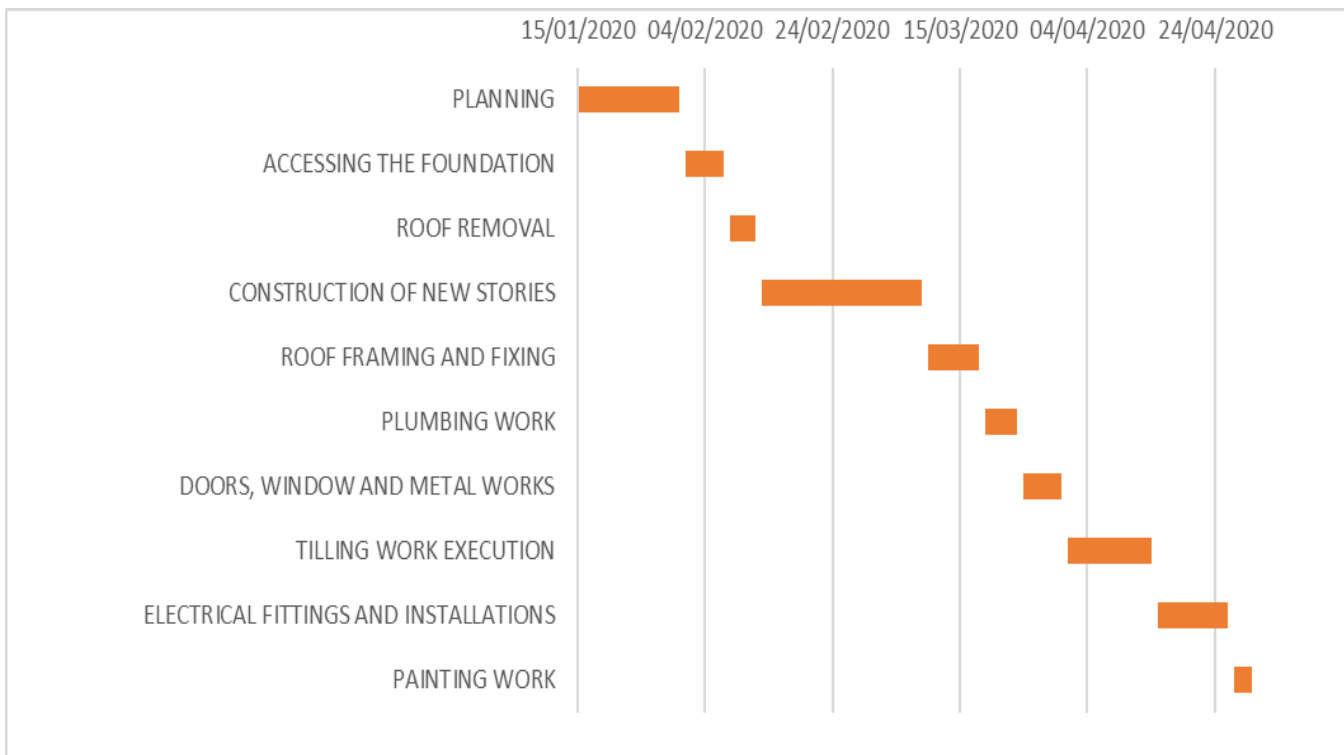
c. Repainting/Varnishing of all fascia and soffits, windows, window frames, doors and door frames with same colour.

d. Repainting downpipes, railings and gates on all buildings.

e. Repainting all cable runs, conduits and pipe work.

f. Final paint shall be applied in two coats and according to the specification of the project.

PROJECT GANTT CHART



PROJECT TEAM

1. Civil Engineers (which will include the lead consultant)
2. Structural Engineers
3. Quantity Surveyors
4. Electricians
5. Carpenters
6. Tilers
7. Mechanical Engineers
8. Geotechnical Engineer
9. Construction Manager
10. Site Supervisor
11. Bricklayers
12. Artwork Designers
13. Painters
14. Masons

REASON FOR SECURING THE SITE

The site of the rehabilitation project is located at the middle of the University. This makes the site accessible to both students and outsiders who find themselves inside the university at the moment whereby the project is going on. This is a major reason why the site was secured because materials meant for work will be kept inside the hall during the rehabilitation and they can be stolen. Also, for the sake of the protection of students and passers-by the site will be demarcated because they may sustain injuries from falling materials or thrown materials.

BILL OF ENGINEERING MEASUREMENT AND EVALUATION(BEME)

The development of the BEME for the project by lump projection including 10% of Total Estimated Cost(TEC) as miscellaneous, 15% TEC as consultancy fee, 5% TEC for site preparation and clearing, 12% TEC as transport cost and 20% TEC as profit.

Item No.	Description	Unit	Quantity	Material Rate (₹)	Labour Rate (₹)	Cost (₹)
1	Cement	Bags	3000	2000.00	88,000.00	6,088,000.00
2	Blocks		4000	200.00	34,500.00	834,500.00
3	Sand	Truck (6-Tons)	6	20,000.00	4,000.00	124,000.00
4	Granite	Truck (6-Tons)	4	52,000.00	15000.00	223,000.00
5	Water	Trips (6-Tons)	45	2,500.00	10,000.00	122,500.00
6	Steel Rod (10 mm)	Tons	3	89,000.00	7,850.00	274,850.00
7	Binding Wire	Rolls	12	5,500.00	6975.00	72,975.00
	DOORS AND WINDOWS					
8	Door Frame, Doors and Locks		12	78,800.00	50,000.00	995,600.00
9	Window Frames and Window		20	10,000.00	25,000.00	225,000.00
10	Roofing Sheet	Square meters	146	3,200.00	32,220.00	499,420.00
	ELECTRICAL AND ELECTRONIC FITTINGS					
11	Air Conditioners		20	66000.00	32,000.00	1,352,000.00
12	Electrical Wires	Rolls	14	12,000.00	42,500.00	210,500.00
13	Electrical Fixtures(Bulbs,		33	2,500.00	30,000.00	112,500.00

	Fans, stage lights)					
14	PLUMBING (Drain water piping, Water closets, sinks, Hand driers)			1,200,000	245,600.00	1,445,600.00
15	CARPENTRY Woodwork Designs		23	16,000.00	28,000.00	396,000.00
16	Wall Finishes			89,000.00	19,000.00	108,000.00
17	INTERIOR DECORATION Flooring(Tiles)	Square meters	3400	1000.00	112000.00	3,512,000.00
18	Plaster Of Paris(POP)			580000.00	128500.00	708,500.00
19	Gold Plated Railings		25	14000.00	66000.00	416,000.00
20	TOTAL ESTIMATED COST					17,720,945
25	Miscellaneous	10%				1,772,094.50
26	Consultancy Fee	15%				2,658,141.75
27	Site Preparation and Clearing After Completion	5%				888,047.25
28	Transport Cost	12%				2,126,513.40

29	Profit	20%			3,544,189.00
	TOTAL COST				28,709,931

Payment Schedule

S/N	ITEM	Percentage	DUE DATE	AMOUNT
1	Mobilisation	30%	15/01/2020	₦ 8,612,979.30
2	Payment at 50% Completion	30%	13/03/2020	₦ 8,612,979.30
3	Final Payment at Completion and Handover	40%	02/05/2020	₦ 11,483,972.40
4	Total Cost:			₦ 28,709,931.00
5	Capital Retained for Defect Liability:	10%		₦ 2,870,993.10
6	Total Amount in Words	Twenty-Eight Million Seven Hundred and Nine Thousand Nine Hundred and Thirty-One Naira Only		

DEFINITIONS

BEME

Bill of Engineering Measurement and Evaluation (BEME) also referred to as 'Bill'; is a tool used before, during and post-construction to assess and value the cost of construction works. This includes the cost of materials, labour, equipment and all/any other resource(s) required for the success of any construction endeavour based on a pre-determined scope and specification.

The objectives of a BEME are:

- (i) To provide sufficient information during construction planning, for tendering and contracting purposes or for the purpose of knowing the estimated cost of the proposed project (If the estimated cost is greater than the available funds to execute the project, then attempts are made to reduce the estimated cost by reviewing the scope and/or specification).
- (ii) To Facilitate the comparison of rates and prices between bidders.

(iii) To provide priced Bill of quantities for use in the periodic evaluation of Works executed for the purpose of payments and project control, during and on-completion of a project for disputes and compensation or to determine if the project was completed on-budget or otherwise.

(iv) To provide rates and prices which can be used in the variation of additional works instructed by the Clients.

(v) To enable the Clients to assemble actual tendered rates and prices to prepare for future estimating and budgeting

DEFECT LIABILITY PERIOD

A defects liability period is a period of time following practical completion during which a contractor remains liable under the building contract for dealing with any defects which become apparent. Depending on the form of contract you are reading, it may also be referred to as a rectification period or defects correction period. (DLP) is a fixed period of time, starting from the date of practical completion, during which the contractor has an express contractual right to return to the site to rectify defects.

LEAD CONSULTANT

The lead consultant is the consultant that directs the work of the consultant team and is the main point of contact for communication between the client and the consultant team, except for on significant design issues where the lead designer may become the main point of contact. The lead consultant is simply an entity (company or personnel) appointed by the client to manage and administer the services of all consultants on multi-disciplinary projects where more than one professional service provider is appointed on a project. In multi-disciplinary engineering projects where these services are provided they are often called "Engineering Management Services".

The lead consultant's role might include:

- Arranging consultant team meetings and planning work stages.
- Preparing progress reports.
- Seeking instructions from the client.
- Advising the client on the choice of procurement route.
- Advising the client on the need to appoint additional advisers, consultants or specialist designers.
- Establishing change control procedures at key stages, for example when the project brief is frozen or when detailed design is frozen.

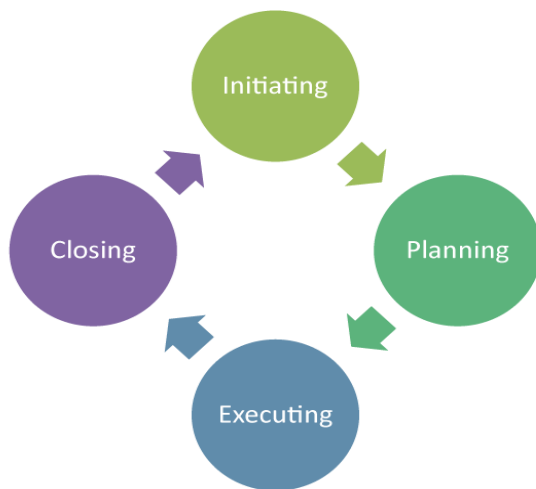
PROJECT LIFE CYCLE

A project life cycle is the sequence of phases that a project goes through from its initiation to its closure.

Characteristics of the Project Life Cycle

Although projects are unique and highly unpredictable, their standard framework consists of same generic lifecycle structure, consisting of following phases:

1. **The Initiation Phase:** Starting of the project
2. **The Planning Phase:** Organizing and Preparing
3. **The Execution Phase:** Carrying out the project
4. **The Termination Phase:** Closing the project



ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment (EIA) is a systematic analysis tool used to identify and evaluate the likelihood of environmental impacts as a result of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the environment and present the predictions and options to decision-makers.