
Chapter 1

2.0 TYPES OF BUILDINGS.

The types of building practices adopted in our localities varies according to the cultural diversity of South Sudan ethnic groupings, for example the methods of constructing houses in Lotuho land is different to that practice by the Azande tribe, the skills practice in the Dinka tribe is also different to that practice in the Bari tribe, the Lotuho in Eastern Equatoria; The Toposa also have quite unique in which females are the builders in their cultural beliefs. In urban towns that we called them modern skills of building. And the skills that I am able to do and demonstrates to students as a teacher.

To describe the traditional buildings demands a research to other tribes to exactly find out how they move about in their way of building houses and I am sure that the research that started in this studies may expand to that extent of visiting the local communities to research on their types and skills for building their houses.

My own cultural skills for building houses involving using materials such as mahogany wood poles or ebony wood pole, bamboos, fiber, grass, mud, and cow dung.

Construction is being done by a group of age mate in winter as routine activities during which when rain is not there. This is because in rain season these age mates' groupings are busy in the farm, cultivating in their age mate farming activities.

My challenge is to carry out research to identify other skills that are practice in all the parts of South Sudan that I can document and share with others to improve my professional practice.

2.1 IDENTIFICATIONS OF MY PROFESSIONAL SKILLS.

The different skills that I am able to apply in my professional practices are as narrated below.

Among very many craft skills practiced by a builder, I have some basic skills competences which are:

1. Our traditional buildings using poles, grass, fibers, bamboos and 3 mudding the walls with soil,
1. Basic skills in reading the modern house sketches or drawings,
1. Setting out building plans
1. Casting reinforced concrete foundation
1. Building brick walls using different types of bonds
1. Building stone wall (masonry work) using different types of stone bonds

- 1. Building cement block walls using different types of cement blocks
- 1. Building retaining walls
- 1. Building drainage system
- 1. Flooring
- 1. Plastering
- 1. Building decorative features
- 1. Pointing and jointing
- 1. Casting columns and pillars etc.

The above skills listing of different skills as a builder are those acquired through my formal skill learning and those learned in the workplace.

Those skills built up my competences in the craft that I can demonstrate and lecture to students and evaluate them in their performances.

There is a great need to make improvement on them and add more to have the real professional technical vocational practices and share the competences with other professionals in the world of works.

I must reflect what I have learned and practice to improve them to make me acquire experiences as written in the book Title: (Reflective practitioner by Donald A. Schon) Through reflection he can surface and criticize the tacit understandings that have grown up around the repetitive experience of a specialized practice and can make new sense of situations of uncertainty or uniqueness which he say may allow himself to experience.

2.2 DESCRIPTION OF MY COMPETENCES AS A BUILDER:

The below are some of my competences within my professional practice as a builder.

2.2.1 SETTING A (4X4) H 2.5 SINGLE ROOM HOUSE:

As a builder by my professional practices, I can set out a plan of one room building using a Pythagoras theorem of 3-4-5 method.

3-4-5 means that when the length of the building is 4 meters and the width is 3 meters; then the hypotenuse should be 5 meters. It was a proved of the right angle that it is 90 degrees. Therefore the builders' square for setting right angles in building is 90 degrees.

So the use of 3-4-5 method is without using the 90 degrees builders' square.

Why do I prefer this method better than using builders square?

This method is more accurate than using builders square, because sometimes the builder square becomes

bent due to poor management of the tools.
Secondly when that builder square is not available.

REQUIREMENTS:

I have to secure tools, equipment and materials for carrying the setting out building.

The building tools, equipment and materials used in the setting out building plans comprised of the following; pick Axe, spade, hammer, saw, line and pin, pegs, tape measure, hoe, builders' square wheel barrow, timber, nails, pincher, etc.

Procedure of setting building plans.

1. After making site clearance and leveling
- 2.
3. Provide the setting tools which include working drawing, pegs, hammer, tape measure, line, saw etc.
- 4.
5. Check the directions by use of compass – N-S-W-E directions.
- 6.
7. Set out the base line which is the first line determining the length of the building measurement and should be two meters away from the boarder lines and boundary.
- 8.
9. Bisect it to form the right angle using the 3-4-5 method
- 10.
11. Checking from the drawing, take the measurement of the length and the width and mark them respectively
- 12.
13. Check the first diagonal to determine that 3-4-5 method had produced that right angle of the base line and the bisector.
- 14.
15. Create the third line by repeating the 3-4-5 method to create another right angle to produce diagonal two
- 16.
17. Check diagonal two if it is reading the same measurement to diagonal one; then the 3-4-5 method in determining the second angle is correct.
1. Joining the fourth line to form the triangular or square block that produces the shape or foundation plan of a building structure.
- 2.
3. Re-checking all the lengths, widths and diagonals to determine that the setting of the building plan is perfectly done with good experience in using professional practices.
- 4.
5. The last step may be determining the width of the foundation to be excavated to start the casting of the foundation concrete.
- 6.
7. First check if the first measurement were carried out in centre to centre or overall or in

between measurement and set out the secondary line for creating the width of that foundation.

Measurements: Take care in recognizing what units is use in the measurement. i.e. centimeters, inches
The measurements:

1. $AB=DC$ lengths must be equal
- 2.
3. $BC=AD$ widths must be equal
- 4.
5. $AC=BD$ diagonals must be equal

Why did you need builder's square to aligned with the line in setting out building plans?

Builder's square should aligned in setting building plans to ensure that the required angle is 90 degrees and the return angle of the triangle is a right angle.

Why to follow procedures/ what is deciding to follow the procedure?

It shall be difficult to determine correct right angles for the corners without following up the way of the setting.

How do you fix the pegs across the corners to determine the angle?

During the setting process, the best way of keeping the spotted points of setting is by marking them and driving pegs (either wood or rod used as pegs) deep to stand firm for tying the lines during the process; this pegs shall be removed when the foundation has been built. They are called distant pegs and the pegs are called level pegs those determining the foundation levels.

Reasons for re-checking measurement/ why is measurements re-check?

It is necessary always to prove yourself when ever you did something, re-check your accuracy to enable a positive results and hence it is a job done; re-checking is necessary to prove if the dimensions are exactly like that in the working drawing, if not then re-adjustment must be done or else re-do.

Where will the timber be use in the setting of the foundation?

Timber in the setting process are very important for two main reasons; one of the function is they driven down as pegs which shall receive the profile boards as the boards are nails on the wooden pegs and this profiles boards nail across this two pegs for marking the heights of the foundations as well as the width of the foundation concrete and the brickwork thickness of the walls.

Why did you carry out excavation to trenches?

Excavation to trenches is carried out for foundations that has very poor soil which can not afford to resist the weight of buildings. So the poor soil is removed and replace with an artificial foundation made of foundation concrete.

Who is responsible in the excavation of the foundation trench?

The builder as the competent person takes the responsibility; this is simply because to determine the requirement or the needs to how deep and wide the trench is shoulder on the professional builder and the

accuracy need to begin from the excavation process.

2.2.2 CASTING AND BUILDING A CONCRETE FOUNDATION:

After I have completed the setting process, excavation take place immediately, in the sense that the lines or strings are not interrupted; otherwise when interrupted then the foundation trenches will change its dimensions. Excavation is the digging out of the soil to have the trenches for casting and building the foundation walling.

The following is my procedure for casting and building the concrete foundation.

1. After digging and removing out the soil from the trenches, I re-check the foundation measurement to ensure that it has to correspond with that in the drawing and the dimensions includes the length, the width, the diagonals and the depth of the foundation.
1. Right after finding that all the measurements are correct, the next step is that, I take 10cm measurement from the bottom of the foundation and filled it with mortar and that mortar should be a mixture of one part of cement to six parts of fine aggregates (1:6) poured all around the trenches of the foundation and consolidated to its level and this layer is called blinder. It is applied to bring a level bed for the reinforcement stirrups to align with the base of the foundation trench and also to bridge the pockets or holes in the foundation trench that would eventually absorb the concrete grout to escape through and cause poor setting of the concrete.
1. I carry into the foundation trench the reinforced stirrups which had been tied together, that is after assuring that the first layer poured has perfectly set and placing this reinforced stirrup centrally to the foundation trench width and run throughout its length of the trench and organize those stirrup that will include the columns and the pillars vertical stirrups.
1. When I finish with the arrangement of placing the reinforcement stirrups; then I prepare the concrete mixing one part of cement to two parts of fine aggregates to four parts of coarse aggregates (1:2:4) with sufficient water to facilitate the mortar to be pliable.
1. In the process of pouring the concrete by the co-worker, I continue to consolidate with the use of the trowel the concrete to enter inside the reinforced stirrups and later compacted it using a straight edge to bring a level bed as well as making the grout to come on the surface of the concrete for final floating using wooden or steel float.
1. After I had completed the casting throughout the foundation trench; making sure that the vertical reinforcement bar for the columns and pillars stand vertical.
1. Curing process shall start from the following day of the casting and continue for period one

week and sacks needs to be put on the concrete to maintained and regulated the temperature when water poured on it.

1. After I had finished with the curing, I begin to build up the foundation walling using either stones, bricks or blocks and build up to the height of 15 cm above the ground level. Remember that the 15 cm is measured from the highest level of the ground and in the process of the construction; the lowest level can be determine by the use of the spirit or tripod level.
1. During the construction or building of the foundation walling, I shall continue to pour water on the newly built walls to ensure that setting takes places, strength and durability of the wall is achieved.
- 2.
3. Finally, I have to level the surface of the foundation walling and cover with cement mortar to avoid water penetrates through the material joints before putting on the walls of the house.

What will happen when the process of setting is not all covered?

If you fail to follow the procedures well, the result of your skill practiced in that task my not obtained the strength and quality of the foundation required as designed.

Why do you choose the strip foundation rather than the raft, piled, column or pad foundations?

A type of foundation is selected depending on the nature of soil suitable for that particular foundation for example black cotton soil can not take a strip foundation underground beam or foundation concrete.

But needs complete casting of the whole area as raft foundation.

Why does the type of soil get tested before determining the depth of the foundation?

It is necessary to carry trial pits or soil test before approving or recommending any depth for a foundations because the ground have different types of the soil depending on individual geographical locations. For instance when the soil is hard ground- the depth of the foundation is shallow than when the soil is a clay and water lodge type.

How to choose the ratio of concrete/ what is deciding the ratio of the concrete?

The choice of the concrete ratio depends on the type of work to be perform and for reinforced concrete work, the rich concrete must be use and that the ratio 1:2:4 which is very strong and use for walls that needs strength and encounter tensile force resting on or ground movement like moving water.

Where do you use concrete materials?

Concrete materials are usually used in building foundations, columns, pillars, ring- beams, floors, slabs, bridges, retaining walls, water reservoirs and any other walls that require strength and durability.

Since concrete had been added in the reinforced rods, it resist confronting forces that tends to overturn it, for example the retaining walls, when the materials used are weak, it tends to overturn from its toes and falls to the opposite side where the forces are directed.

2.2.3 ERECTING THE BUILDING WALLS:

The walls of a building are always erected once the foundation walling is cured and has set and before

erecting the building walls; I as a builder have to carry survey at the site to determine if materials are available and equipment such as scaffolds, wheel barrows, mortar platform is build and many other necessary equipment are ready at the site.

I carry the following procedures in erection of walls:

1. My first step is to re-check the measurements of the foundation walling in the length, width, diagonal and the height of the foundation above the ground level.
1. After I have re-checked the measurement s and found them correct in comparing with the one in the drawing. Then I can begin marking the wall thickness and subtracting 5cm in every thickness of the foundation width in both sides (internal and external) as the foundation projections. But if the measurements are less than that in the drawing, then I add mortar at all the foundation wall faces to make the foundation width to meet the exact measurements in the drawing.
1. The third step to check in the working drawing plan the positions of the doors and windows and its measurements in order to assure one the positions where it lies.
1. I decide the type of the brick bond that will be use in the construction, for instance the English bond or the Flemish bond.
1. I have also to consider if I can apply three quarter bats at the corners and opening ends or queen closers.
1. I have to organize the areas for mixing the mortar, ways for rolling the wheel barrows to where I can build my walls and make availability of water at the site and the necessary hand tools.
1. To begin erecting the building, I started it at the corners, raising the corners using the gauge rod which can determine the brick courses equally in all the heights, this gauge rod is marked to the thickness of the brick courses and heights where windows and the ring beams commence.
1. After I have completed erecting the corners to one meter height, then tying the line and pins all around the walls of the corners in the first course to begin laying the bricks aligning with the line.
1. I have to remember that where the doors and windows shall be located need to be marked and re-check the dimensions from the drawing plan although the windows levels are above one meter from the foundation walling.
1. The wall shall continue to get build until the height where window openings are marked and until the end of the window levels where a form work is placed for casting the ring beam.

1. After completing casting and take curing for a period of one week and continue building the remaining part of the wall to the gable ends.
1. The gable ends must be determined by the Pythagoras theorem as described in setting the diagonal. The height of the gable ends must be equal and the leanings or the hypotenuse from the four ends also carrying the same measurements
1. Remember that the tools such as the spirit level should be use to determine vertical and horizontal accuracy; the brick trowel for picking and spreading the mortar on the brick course and builders square for finding the right angle accuracy.

Why did you use drawing plans in setting buildings?

Drawing plans are useful in setting building to bring an accurate buildings and enable the materials get calculated according to the requirements specified. This drawings are also in the construction process to follow during the craftsman work at the site. It is for easy supervision and assessment of the progress.

Why is it necessary to have the exact dimensions as drawn in the working drawing?

It is necessary to have exact dimensions as drawn in the working drawing to avoid failures in gaining the strength and durability of the construction and difficulties in the roofing process.

Who shall be the looser when the quality and strength failed to be achieved?

Both the client and the skills practitioner feel the consequences but at most the practitioner lost his competences and the good reputations that he previously deserved.

Why do the gable areas are calculated using Pythagoras theorem?

The areas of the gable are exactly the same to the areas of the room set except that in the gables the two triangles are set adjacent to each other by the height while in the room area the two triangles are adjacent to each other by their hypotenuses.

How to choose the bonds/ what is deciding the bond of the building?

When deciding the bond of the building; take the purpose of the building as it first factor, the materials use as the second factor and quality of the bond that you want to apply.

As mentioned earlier above; English bond is more stronger than the Flemish bond but demand mainly full bricks and takes more bricks while Flemish bond has a weak strength, takes many half bricks and less bricks but have a pleasant appearance.

Why did you build bricks to courses or layers?

Bricks in building walls are laid in courses to create the bonding by achieving the lap that ties the bricks together to form the walls. Secondly bricks are laid in courses to eliminate any joints that causes weakness in the brickwork.

Why do the walls be build when the foundation walling is cured?

It is necessary to first consider curing the major factor for gaining strength of the foundation. The stability

of the building rest on the strength and stability of the foundation and for this reason the curing is to ensure that the foundation concrete and foundation walling is perfectly cured.

How do you survey the site after casting the foundation?

The survey of the site after casting the foundation is to determine the materials for the superstructure that needs to be build and the equipment necessary for carrying the job.

Why did the wall heights check for its levels?

Wall which are built without its levels not check always have a different heights that causes the loads resting on it to localize the wall weight settlement process and eventually cause undue settlement.

Why did you apply a ring- beam when the reinforced concrete has been casted in the foundation?

The underground reinforced concrete is mainly countering the challenges of the ground weakness while the ring beam deals with the challenges of the loads resting on the walls such as the roof coverings, the ceiling joist and other loadt rest on the wall.s tha