

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY
EEE 414: Electrical Service Design

EXPERIMENT NO.3: FITTINGS, FIXTURES AND CONDUIT LAYOUT

OBJECTIVE:

To familiarize with various fittings and fixtures and to draw the conduit layout of a residential home.

INTRODUCTION:

Fixture: An electrical fixture is a product that is used for fitting various electrical devices like lights, fans etc. They can be thought of as “fixed” and not easily replaceable. **Example: wall brackets, switchboards, power sockets.**

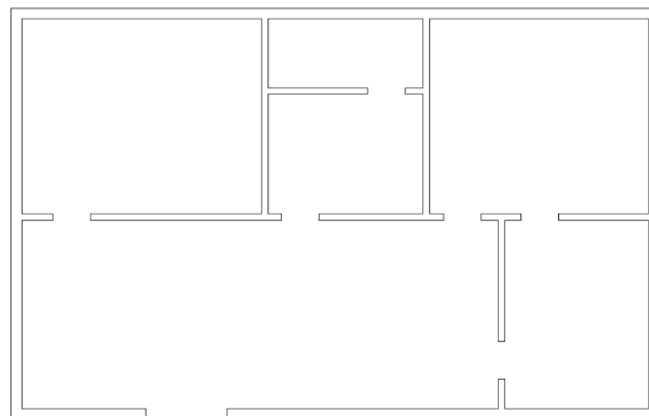
Fittings: An electrical fitting is **any electrical appliances** that fit in various fixtures. They are usually easily **replaceable by users** and are more prone to changes compared to fixtures. **Example: Tube lights, TV, electric fan etc.**

Although fitting and fixtures do not mean the same thing, it can often be difficult to differentiate between them perfectly and there may be different definitions in the law in different countries. Thus, for all intents and purposes, **we will mention them together to remove any ambiguity.**

Conduit: Conduit means channel. **An electrical conduit is a tube used to protect and route electrical wiring in a building. They can be made of metal, wood or plastic (PVC). They can be primarily classified into two classes: 1) Surface/exposed conduits, 2) Concealed conduits**










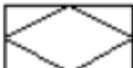



PROCEDURE:

For this experiment we will be using the floor plan that we have made in Experiment 2.



Creating Fittings and Fixtures Layout:

1. Using the various tools, we have learnt in the previous experiments draw the following symbols for fittings and fixtures.

Symbol Description	Fittings and Fixture
Wall Bracket Light at Lintel Level	
2-Pin 5A Socket at SB Level	
3-Pin 5A/15A Socket	
2-Pin 5A Socket at Table Height	
2-Pin 5A Socket at Skirting Level for TV	
2-pin TV Antenna Socket	
Switch Board	
Fluorescent Wall Light Fitting	
Ceiling Light Fitting Type k	
Meter Board	
Main Distribution Board	
Exhaust Fan	
Ceiling Fan	

Note: There are various levels of height that are of interest inside a home. 1) Lintel level, 2) Switch board level, 3) Table height and 4) Skirting level

2. Place the fittings and fixtures into the floor plan in a logical way.

Some things to keep in mind:

- a) Place power sockets by thinking about the kind of appliances they might be connected to. For example, for a fridge or an oven a 3-pin 15A power socket might be necessary, while for a bed side lamp a 2-pin 5A socket at Table height might be good enough.
- b) Each room should have at least one switchboard, place them in a such a way so that they are easily accessible.
- c) There must be a Main Distribution board in your design.
- d) Place the lights keeping in mind the purpose of the room and what sort of activity will be happening there. Adjust the amount and type of lighting to fit the room's purpose.

Below is an example fitting and fixture layout of our design:

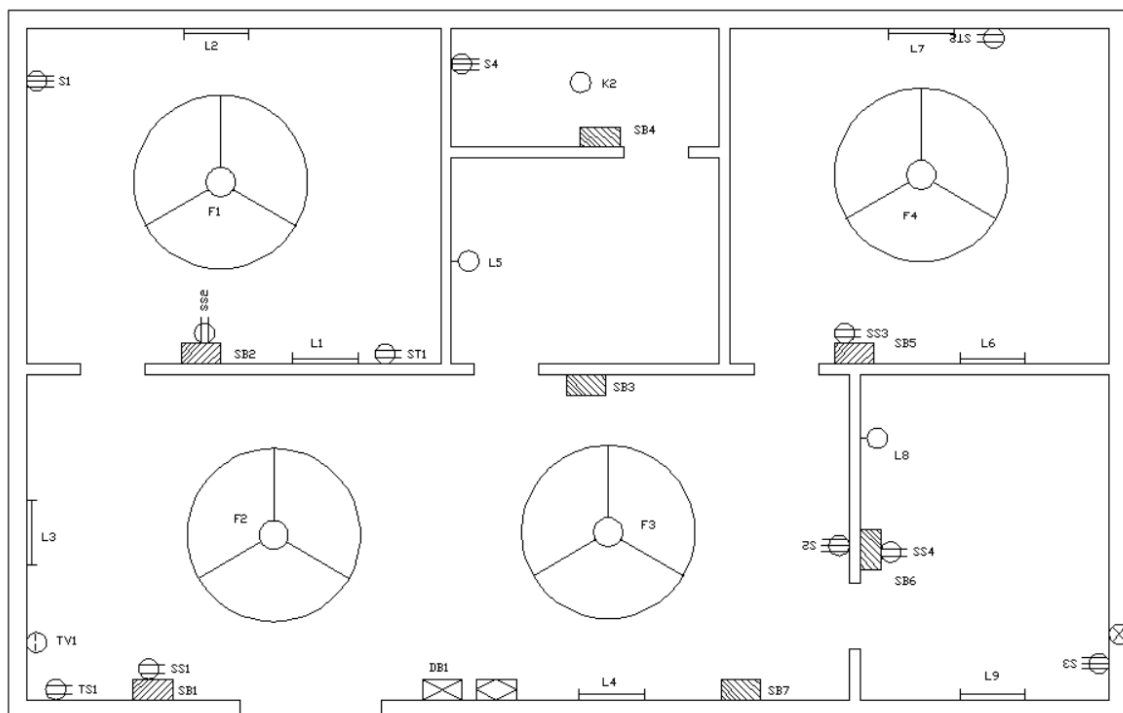


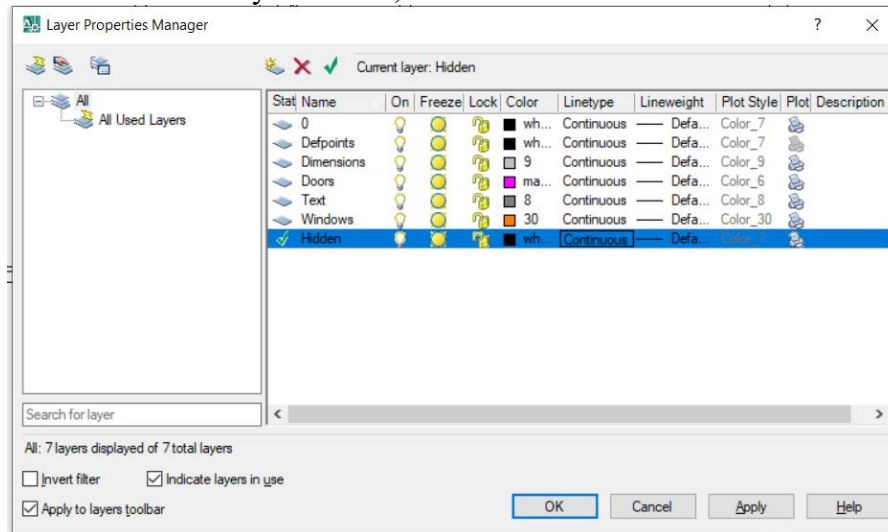


Figure: Fittings and Fixtures Layout

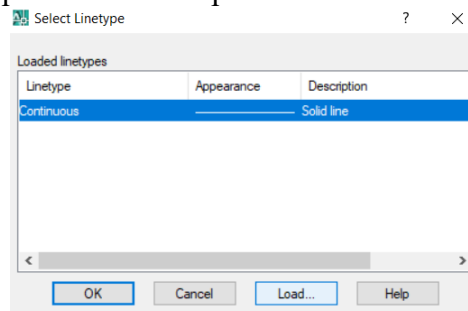
Creating Conduit Layout:

1. In a residential home, conduits are usually concealed type, meaning they are not visible from inside the home, i.e. they are hidden inside the ceiling and walls. In drawing, we represent hidden features with “hidden lines” or dotted lines. Thus, we shall draw conduits using hidden lines in AutoCAD.
2. To create hidden lines, first create a new layer.

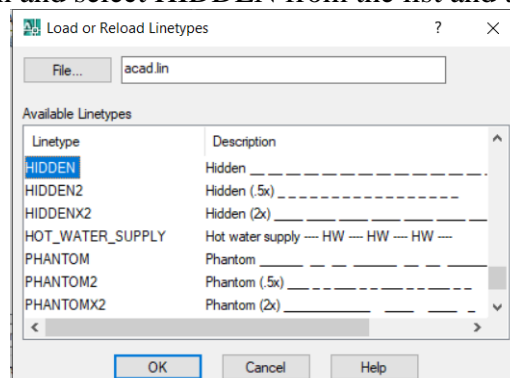
- a. Go to the Layer Properties Manager ()
- b. Create a new layer () or press (alt + N) and name it as “Hidden”
- c. In the Hidden layer created, click on the “Continuous” under Linetype.



- d. A new pop-up window will open. Click “Load...”



- e. Scroll down and select HIDDEN from the list and then finish by pressing OK.



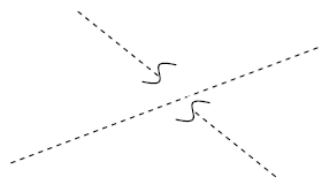
3. Make sure the “Hidden” layer is selected in the layers pane.
4. Now type LTS and press enter. Specify a value of around 20. This will control the spacings between the dotted lines.
5. Using the Line tool draw the conduits.

Tip: To change a visible line into a hidden line, first select the Hidden layer and then press the match properties button. Now, select the line you want to convert, and it is done!

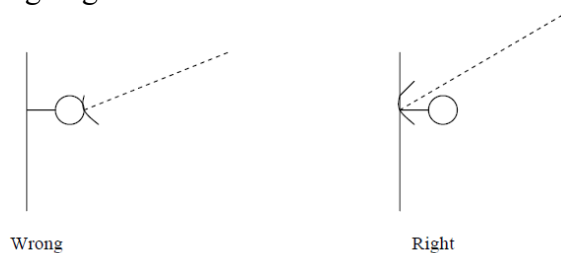


Some things to keep in mind:

- a) Conduits should be straight lines. In a room, they will always terminate at the Switch board of that room unless needed for other purposes.
- b) Avoid crossing conduits as much as possible. If it is unavoidable use the below symbol:



- c) Wire should be drawn from distribution board to each switchboard. It is not necessary to draw wires to every switchboard from distribution board, if there are several interconnected switchboards then only one needs to be connected to the distribution board. In this way several groups of switchboards are made, and each group is connected to the distribution board.
- d) Prime target of conduit layout is to use least length of conduit not least number of them. Try to take several wire pairs through each conduit as wires are cheaper than conduits.
- e) When a conduit has to be connected to something not on the ceiling level, indicate it by using the ‘conduit going down’ mark.

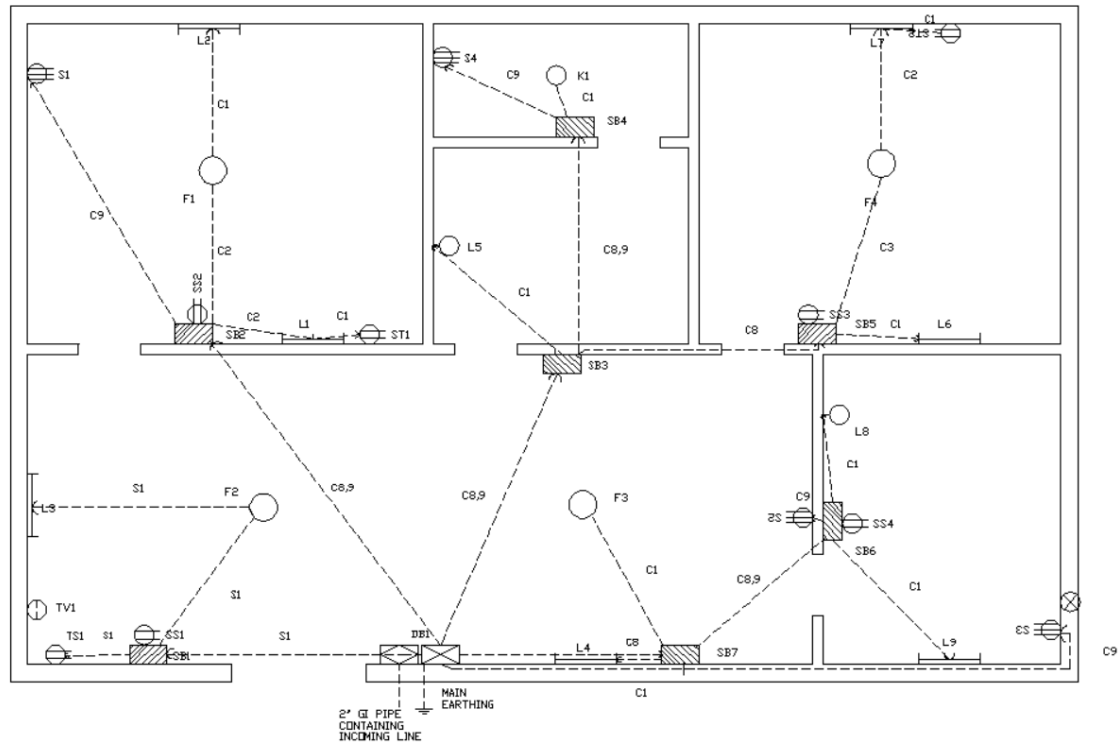


- f) Use the following wire legend for your conduits:

C1	2 x 1.5 mm ²
C2	4 x 1.5 mm ²
C3	6 x 1.5 mm ²
C4	8 x 1.5 mm ²
C5	10 x 1.5 mm ²
C6	12 x 1.5 mm ²
C7	14 x 1.5 mm ²
C8	2 x 2.5 mm ²
C9	2 x 4 mm ²
C8,9	2 x 2.5 mm ² and 2 x 4 mm ²

Note: 5A components are driven by 1.5 mm² wires and 15A components from 4 mm². 2.5 mm² wires are also used to drive some instruments but it is usual practice to use 4 mm² wires for high current rated instruments. 2.5 mm² wires are generally used to connect switchboards if a lot of load is connected to the switchboard and also for switchboard to distribution board connection.

An example conduit layout for the given fittings and fixture layout.



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