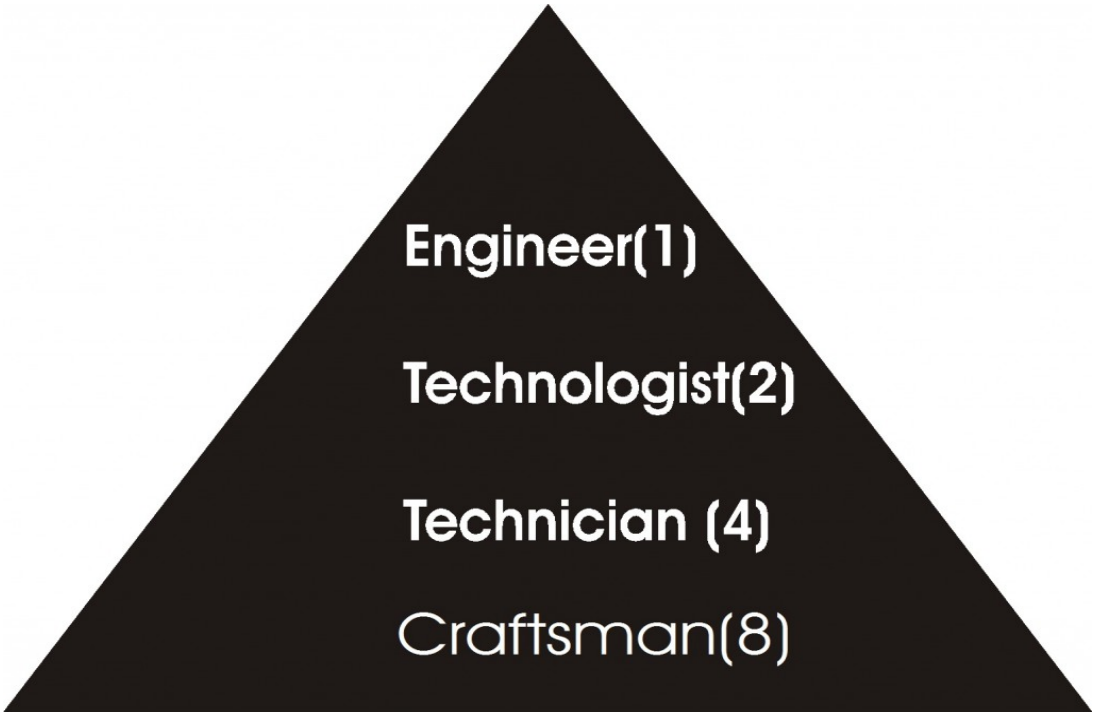
ENG 104.2: ENGINEER IN SOCIETY (1 UNIT)

THE ENGINEERING FAMILY:

- **INTRODUCTION**

Engineering is a family that is made up of some members. In this family, each member has a specific function or function(s) to perform. In other words, engineering is a family that is made up of division of labour. The reason for the division is to make work easy and for maximum efficiency.
Engineering is a well respected area of study apportioned for men of greatness and societal changers. An engineer is change a maker. He makes effort to effect positive change wherever he or she finds himself/herself.

Engineering practice is carried out by the following as shown in the chart below;



- **CRAFTSMEN:**

The craftsmen are the lowest in the engineering family. They are the first and the oldest members of the engineering family, because they existed before the modern-day engineers. The craftsmen did not attend any school and used their brains to make impact in the society. They are known as the ancient engineers. In the modern time, the craftsmen usually obtain Senior Secondary School Certificates or any certificate that proves that they are trained before they are allowed to work with professional engineers during finishing operations. Examples of craftsmen in our society today are the carpenters, mechanics, electricians, masons, plumbers, welders, and some others. Among all these examples, each of the members of the groups has their roles in making engineering works to be completed.

The roofing level of a building cannot be complete without the proper work of the carpenter. There is no way a professional engineer will climb on top of the building he is supervising to perform the function of craftsmen unless he had already acquired the skill before his engineering profession, apart from that, the person to perform the carpentry work becomes the carpenter. The carpenter must have been trained in carpentry to perform the job neatly. That is the reason craftsmen must be highly skilled to carry out their duties effectively.

The welders on the other hand have their own roles in engineering field. Metallurgical or Materials Engineers in most cases supervise them on the nature of the material they are to use to perform a task. It is after the strength of the material and the weldability has been ascertained that the welder will be called to perform his tasks. He acquires welding skills while the metallurgical or Materials engineers understand the structure-property- application relationship of the materials that the welder uses in welding.

There are many mechanics that are situated in many places where they repair faulty vehicles. They are doctors to most machines and automobiles. When cars develop faults, it is the duty of the mechanic to critically examine the cars and find out the problems with such cars and repair them at the end of the discovery. Good mechanics usually receive lots of works and they make good profits from the work they perform.

- **THE TECHNICIAN:**

The technicians are the principal members of the engineering family. They play their own roles in making engineering family complete. As there are duties for a father, mother, and children in a family, so are the duties performed by the technicians as one of the members of the engineering family. The engineering family will not be complete without the technicians taking their place in the field of engineering. A professional engineer cannot be playing and dancing at the same time and that calls for the membership of technicians to help in solving some engineering challenges.

The technicians are usually the direct supervisors to the craftsmen in the engineering work places. They are the group that comes after the craftsmen from the bottom of the engineering family hierarchy. The qualifications of technicians are usually higher than that of craftsmen. They either have Ordinary National Diploma (OND) from technical college or polytechnic, or Full Technological Certificate (FTC).

The level of skill a technician acquires is usually more than that of craftsmen. The reason is because a technician supervises many craftsmen that work under his care. He needs to have knowledge on the diverse areas of work carried out so that he can correct any craftsman that makes mistake in carrying out the duties assigned to him.

In the construction sites, the technicians are there to supervise the functions being performed by the masons and the labourers that assist them. He is there to direct the masons on what they should do at any moment to get things right. In a layman's language, these men are being addressed as contractors or the foremen in certain locations.

The technician or engineering aid is the person who assists the engineer by translating his designs into practical form. He must be sufficiently trained to be able to read engineering drawings and understand them. He should be able to perform inspection and supervision of works carried out by craftsmen and artisans. He is the link between the engineer and the craftsman.

The technician (Draughtsman) produced working drawings of the projects.

- **THE TECHNOLOGIST:**

The technologists come third in the ranking of the engineering team from the bottom of the hierarchy. It can also be put that they are the second from the top of the hierarchical ranking after the engineers.

In terms of academic qualifications, the technologists have higher academic qualifications than the technicians and the craftsmen. In Nigeria for instance, a technologist is expected to obtain Higher National Diploma (HND) certificate from any engineering programme in Polytechnics or technical colleges. The curriculum of HND is designed for middle manpower development. In the engineering duties, they stand to supervise the technicians in the duties assigned to them.

Technologist acts as interface between the engineer and the technician. He sends the information derived from the technician to the engineer for the engineer to take note and sort out ways to solve any challenge encountered in any of the projects being carried out. For instance, if there is a construction work on going in a particular site, and the technicians are lacking some materials they need in completion of their own part of the work, the information is taken to the technologist who later takes it to the engineer to make provision of such materials.

In some locations, there is usually controversial argument between the technologists and the professional engineers. In some cases, the technologists want to be addressed as professional engineers without acknowledging the obvious existing ranking in the Engineering family tree.

For a technologist to qualify to be addressed as an engineer, he must obtain a higher degree or at least a post graduate Diploma in engineering in order to make up the deficiency inherent in his previous qualification. Without sentiment, the curriculum of an engineering programme in the university is designed to supersede that of same engineering in the polytechnic.

- **THE ENGINEER:**

The engineers are the topmost level in the hierarchy of the engineering family. In terms of educational qualification, an engineer is expected to acquire a degree, Bachelor of Engineering (B.Eng) in any engineering fields from a recognized University. Some of the engineers go further to acquire higher degrees (Masters and PhD) in engineering. By training, engineers are equipped with creative minds for mathematical, analytical, and managerial skills, hence known as “problem solvers”. The engineer is the head in any engineering firm and gets day-to-day report directly from the technologist.

The engineer designs the project.

Among these classifications or divisions, the engineer stands out as the headman to direct and organize the activities of the other team members.

All the cadres are inter-dependent. If the engineer does not design, the technician and artisans have no work to do. On the other hand if the artisans and technicians are not existing, the engineer may still produce his design but it will remain perpetually on paper.

SAMPLE QUESTION:

ASKUMO Konsult Engineering Limited is an engineering consultancy firm based in Warri, Delta State where technical workforce personnel total 540 exclusive of administrative and unskilled labour personnel.

i.) Determine the number of each cadre of the personnel that are in the firm.

ii.) Determine the percentage of each cadre of personnel that are in the firm.

iii.) Represent your answer in a pie chart.

SOLUTION

i.) Determine the number of each cadre of the personnel that are in the firm.

Using the **1:2:4:8 ETTA** ratio and the total sum of ETTA ratio,

then, **1+2+4+8 =15**

so for,

- Engineers; $\frac{1}{15}$ x $\frac{540}{1}$ = **36 Engineering Personnel**
- Technologists; $\frac{2}{15}$ x $\frac{540}{1}$ = **72 Technologist Personnel**
- Technicians; $\frac{4}{15}$ x $\frac{540}{1}$ = **144 Technicians Personnel**
- Artisans/Craftsmen; $\frac{8}{15}$ x $\frac{540}{1}$ = **288 Artisans/Craftsmen Personnel**

ii.) Determine the number of each cadres of the engineering profession that are in this firm in a pyramidal structure.

To represent the result of the computation of the various personnel of the Engineers, Technologists, Technicians, Artisans/Craftsmen in a pie chart, first convert all the number of personnel to degree as shown below;

- Engineers; $\frac{36}{540}$ x $\frac{360}{1}$ = **24°**
- Technologists; $\frac{72}{540}$ x $\frac{360}{1}$ = **48°**
- Technicians; $\frac{144}{540}$ x $\frac{360}{1}$ = **96°**
- Artisans/Craftsmen; $\frac{288}{540}$ x $\frac{360}{1}$ = **192°**

TOTAL = 360°

ii.) Represent your answer in a pie chart.

With the use of a protractor, carefully draw the pie chart to precision of the above results as shown below,