SRI SHANMUGHA COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved By AICTE, Accredited by NAAC, Affiliated to Anna University)

Tiruchengode – Sankari Mani Rd, Pullipalayam, Morur (PO), Sankari (Tk), Salem 637304.

AI8612 – DRAWING OF FARM STRUCTURES

DEPARTMENT OF AGRICULTURE ENGINEERING

Anna University - Regulation: 2017

B.E AGRICULTURE ENGINEERING – VI SEMESTER

AI8612 –DRAWING OF FARM STRUCTURES

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RECORD NOTE BOOK

REGNO. _____

Certified that this is a bonafide observation of Practical work done by Mr/Ms/Mrs……of the…… Semester……. Branch during the Academic year……in the……laboratory.

Staff–in–Charge **Head of the Department**

Internal Examiner **External Examiner**

GENERAL INSTRUCTIONS

- All the students are instructed to wear protective uniform and shoes before entering into the laboratory.
- Before starting the exercise, students should have a clear idea about the principles of that exercise
- All the students are advised to come with completed recorded and corrected observation book of previous experiments, defaulters will not allowed to do their experiment.
- Don’t operate any instrument without getting concerned staff member’s prior permission.
- All the instruments are costly. Hence handle them carefully, to avoid fine for any breakage.
- Almost care must be taken to avert any possible injury while on laboratory work. In case, anything occurs immediately report to the staff members.
- One student from each batch should put his/her signature during receiving the instrument in instrument issue register**.**

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AI8612 – DRAWING OF FARM STRUCTURES

Ex. No: 1 **Date:**

CODE OF PRACTICE FOR ENGINEERING DRAWING

AIM

To study the code of practice for Engineering Drawing.

i) STANDARD CODES

Sl.no	IS –code	Description
1	IS:9609-1983	Lettering on Technical Drawing
2	IS:10711-1983	Size of Drawing Sheets
3	IS:10713 -1983	Scales for use on Technical Drawing
4	IS:10714-1983	General Principles of Presentation
5	IS:10715-1983	Presentation of Threaded Parts on Technical Drawing
6	IS:10716-1983	Rules for Presentation of Springs
7	IS:10717-1983	Conventional Representation of Gears on Technical Drawing
8	IS:11663-1986	Conventional Representation of Common Features
9	IS:11664-1986	Folding of Drawing Prints
10	IS:11665-1986	Technical Drawings- Title blocks
11	IS:11669-1986	General Principles of Dimension on Technical Drawing
12	IS:11670-1986	Abbreviations for use in Technical Drawing.

ii) ABBREVIATIONS AND SYMBOLS

Term	Abbreviations	Term	Abbreviations
Across Corners	A/C	Long	LG
Across Flats	A/F	Machine/Machinery	M/C
Alteration	ALT	Manufacturing	MFG
Approved	APPD	Material	MATL
Approximate	APPROX	Maximum	Max.
Arrangement	ARRGT	Mechanical	MECH
Assembly	ASSY	Minimum	Min
Auxiliary	AUX	Miscellaneous	MISC
Bearing	BRG	Modification	MOD
Cast iron	CI	Nominal	NOM
Centers	CRS	North	N
Centre Line	CL	Number	NO.
Centre of gravity	CG	Opposite	OPP
Centre to Centre	C/C	Outside Diameter	OD
Chamfered	CHMED	Pitch Circle Diameter	PCD
Checked	CHKD	Quantity	QTY

Cheese Head	CH HD	Radius	RAD
Continued	COND	Reference	REF
Constant	CONST	Required	REQD
Counter Bore	C'BORE	Right hand	RH
Counter Sunk	CSK	Round	RD
Counter Sunk Head	CSK HD	Screw	SCR
Cylinder/Cylindrical	CYL	Serial Number	SL NO.
Diameter	DIA	Sheet	SH
Dimension	DIM	Sketch	SK
Drawing	DRG	South	S
East	E	Specification	SPEC
Excreta	Etc.	Spot Face	SF
External	EXT	Standard	STD
Figure	FIG	Symmetrical	SYM
General	GEN	Temperature	TEMP
Ground level	GL	Thick	THK
Hexagon/Hexagonal	HEX	Thread	THD
Horizontal	HORZ	Through	THRU
Hydraulic	HYD	Tolerance	TOL
Head	HD	Typical	TYP
Indian Standard	IS	Undercut	U/C
Inspection/ed	INSP	Weight	WT
Inside diameter	ID	West	W
Insulation	INSUL	With reference to/With respect to	WRT
Internal	INT		
Left Hand	LH		

RESULT

Thus the code of practice for Engineering Drawing was studied

Ex. No: 2 **Date:**

STUDY OF WELDING SYMBOLS, LIMITS, FITS AND TOLERANCE

AIM

To study the welding symbols.

1.0 INTRODUCTION

Welding is a process of fastening the metal parts together permanently by the application of heat (fusion welds) or pressure (pressure or forge welding) or both (resistance welding). Both ferrous (steel, cast, iron) and nonferrous metals (like brass copper and alloy) can be jointed by welding.

The welding is cheaper, stronger, easier and faster than riveting.

The various types of welding process are

a. Gas welding
b. Arc welding
    i. Metal Arc Welding (MAW)
    ii. Gas metal Arc Welding (GMAW)
    iii. Submerged Arc Welding (SAW)
    iv. Tungsten Inert Gas Welding (TIG)
    v. Metal Inert Gas Welding (MIG)
c. Forge Welding
d. Resistance Welding
e. Thermit Welding
f. High Energy Welding

The welded joints are broadly classified into

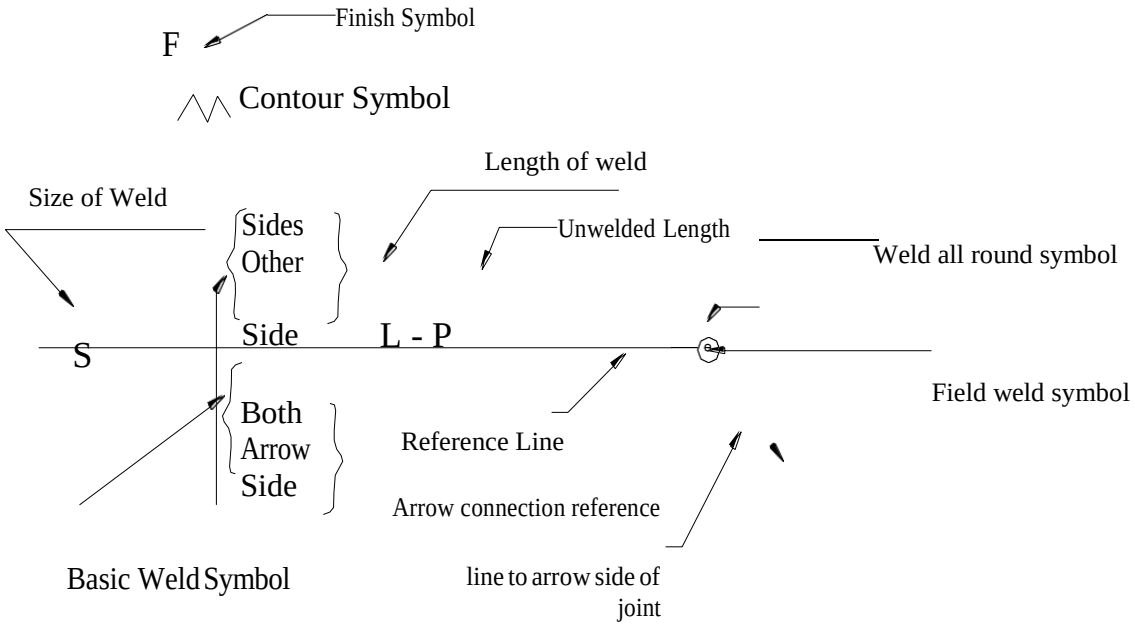
a. Butt joint b. Lap joint c. Corner or Fillet joint
d. Tee joint e. Edge joint

1.1 SYMBOLIC REPRESENTATION OF WELD

The standard welding symbol is given below.

1.1.1. Arrow Line and Reference Line

The position of the arrow line with respect to the weld is of no special significance. The side of the joint on which the arrow line is drawn is called “arrow side”. The side of the joint remote to the arrow line is called “other side”.



The reference line has significance on the weld side. If the weld symbol is placed BELOW the reference line, the welding should be done in the “ARROW SIDE”. If the weld symbol is placed ABOVE the reference line, the welding should be done in the “OTHER SIDE”. If the weld symbol is placed both ABOVE and BELOW the reference line, the welding should be done in both the “ARROW AND OTHER SIDES”.

1.1.2. Basic weld symbol

The basic symbols recommended by the Bureau of Indian Standards (BIS) for specifies

1.1.3. Size of weld

The size of the weld is height of the isosceles triangle in the case of filet welds. In other cases, the size will be the minimum distance from the surface of the part of the bottom of penetration.

1.1.4. Finish and contour symbol

The contour symbols are

a. Flat (flush)
b. Convex
c. Concave

Finishing welds other than cleaning shall be indicated by finish

Symbols.

Chipping – C Grinding – G Machining – M

1.1.5. Welded and unwelded length

Length of weld means it is the length to be welded once; after that a pitch equal to unwelded length is not welded and this process is continued for the whole length of the side.

1.1.6. Weld all round

If the weld should be made all round the joint, a circle should be placed at the point connecting the arrow and the reference line.

1.1.7. Site weld

When some of the welds (the welded structures) are required to be made on site during erection. They should be designated by a filled in circle at the point connecting the arrow and the reference line.

2.1 LIMITS FITS & TOLERANCE

It is not possible to work to an exact size nor is it possible to measure to an exact size. Therefore dimensions are given limits of size. Providing the dimensions of a part lie within the limits of size set by the designer, and then the part will function correctly. Similarly the dimensions of gauges and measuring equipment are given limits of size. As a general rule, the limits of size allocated to gauges and measuring

instruments are approximately 10 times more accurate than the dimensions they are intended to check (gauges) or measure (measuring instruments).

The upper and lower sizes of a dimension are called the *limits* and the difference in size between the limits is called the *tolerance*. The terms associated with limits and fits can be summarized as follows:

● ***Nominal size*****:** This is the dimension by which a feature is identified for convenience. For example, a slot whose actual width is 25.15 mm would be known as the 25-mm wide slot.

● ***Basic size*****:** This is the exact functional size from which the limits are derived by application of the necessary allowance and tolerances. The basic size and the nominal size are often the same.

● ***Actual size*****:** The measured size corrected to what it would be at 20°C.

● ***Limits*****:** These are the high and low values of size between which the size of a component feature may lie. For example, if the lower limit of a hole is 25.05 mm and the upper limit of the same hole is 25.15 mm, then a hole which is 25.1 mm diameter is *within limits* and is acceptable. Examples are shown in Fig.7.1

● ***Tolerance*****:** This is the difference between the limits of size. That is, the upper limit minus the lower limit. Tolerances may be bilateral or unilateral as shown in Fig. 7.1

● ***Deviation*****:** This is the difference between the basic size and the limits. The deviation may be symmetrical, in which case the limits are equally spaced above and below the basic size (e.g. 50.00 _ 0.15 mm). Alternatively, the deviation may be asymmetrical, in which case the deviation may be greater on one side of the basic size than on the other (e.g. 50.00 _ 0.25 or _0.05).

● ***Mean size*:** This size lies halfway between the upper and lower limits of size, and must not be confused with either the nominal size nor the basic size. It is only the same as the basic size when the deviation is symmetrical.

● ***Minimum clearance (Allowance)*:** This is the clearance between a shaft and a hole under maximum metal conditions. That is, the largest shaft in the smallest hole that the limits will allow. It is the tightest fit between shaft and hole that will function correctly. With a *clearance fit* the allowance is positive. With an interference *fit* the allowance is negative. These types of fit are discussed in the next section.

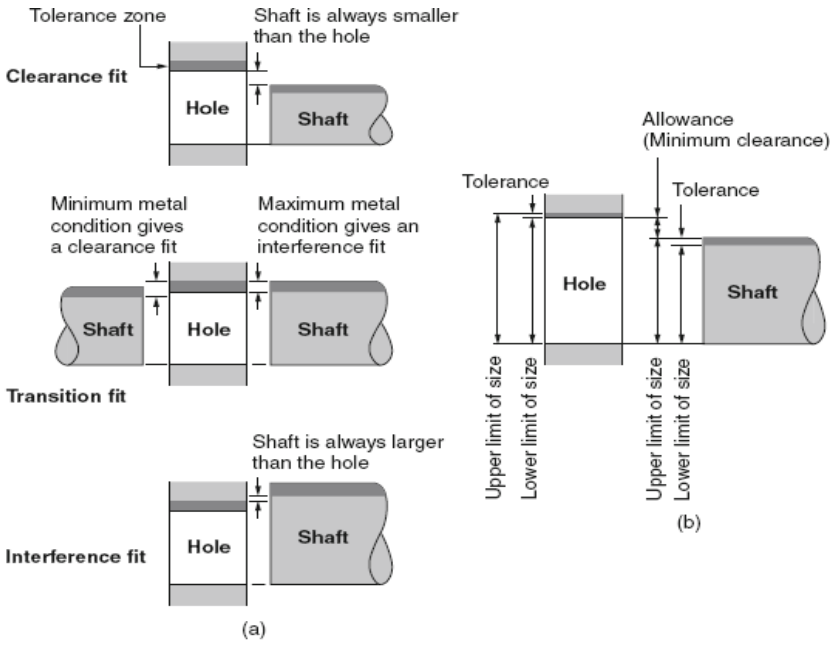
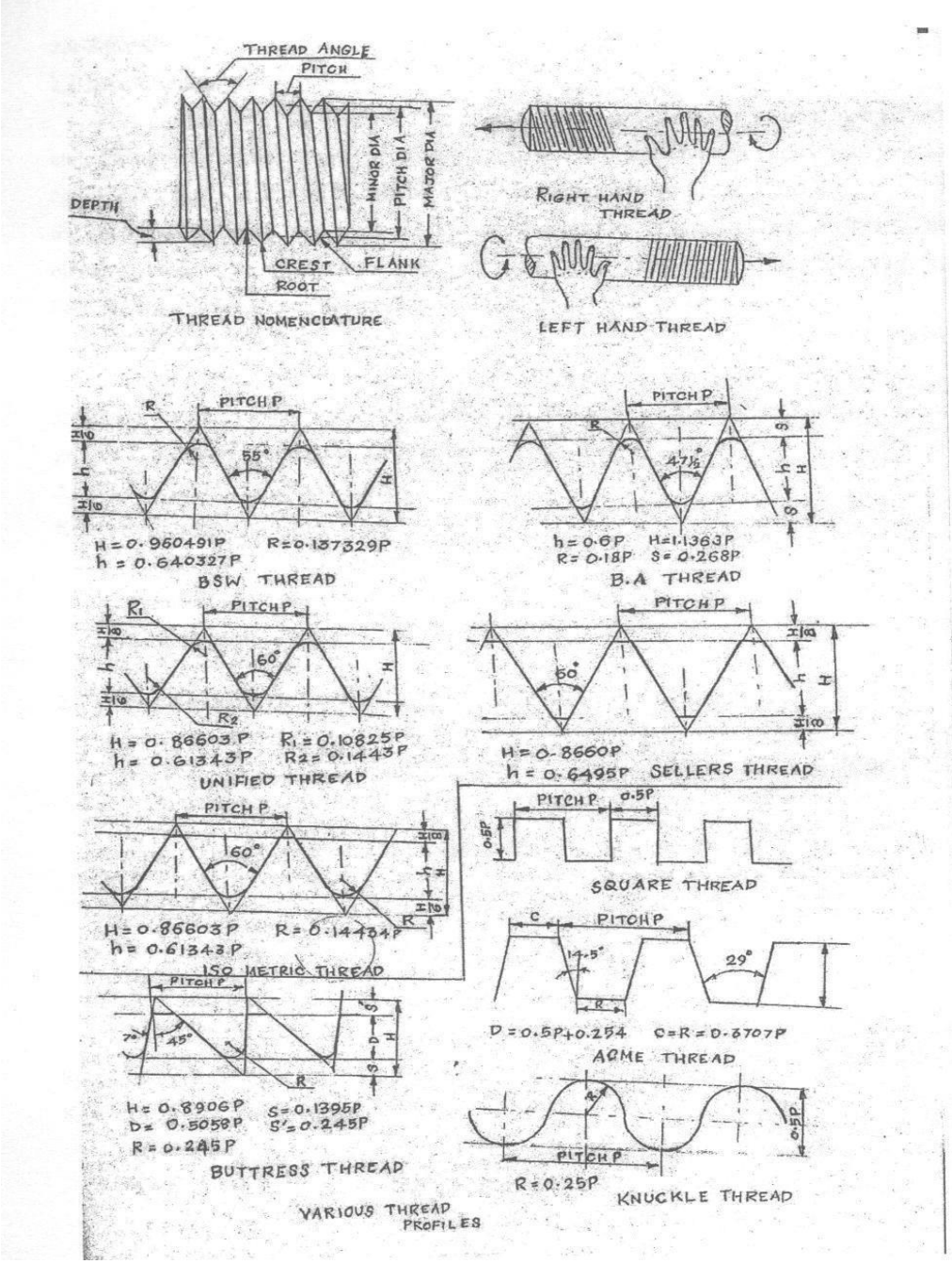


Figure 7.2 Classes of fit (a) terminology of limits and fits and (b) allowance.

2.2 CLASSES OF FIT

Figure 7.2(a) shows the classes of fit that may be obtained between mating components. In the *hole basis system* the hole size is kept constant and the shaft size is varied to give the required class of fit. In an *interference fit* the shaft is always slightly larger than the hole. In a *clearance fit* the shaft is always slightly smaller than the hole. A *transition fit* occurs when the tolerances are so arranged that under maximum metal conditions (largest shaft: smallest hole) an interference fit is obtained, and that under minimum metal conditions (largest hole: smallest shaft) a clearance fit is obtained. The hole basis system is the most widely used since most holes are produced by using

standard tools such as drills and reamers. It is then easier to vary the size of the shaft by turning or grinding to give the required class of fit. In a *shaft basis system* the shaft size is kept constant and the hole size is varied to give the required class of fit. Again, the classes of fit are *interference fit transition fit* and *clearance fit*. Figure 7.2(b) shows the terminology relating to limits and fits.



RESULT

Thus the welding symbols and techniques was studied

Ex. No: 3 **Date:**

STUDY OF DRAFTING SOFTWARE (AutoCAD)

Aim: To study AutoCAD Software.

Commands:

Sl No	Command	Description
1.	OPEN	Opens an existing drawing file
2.	ARC	Creates an arc
3.	ARRAY	Creates multiple copies of objects in a pattern
4.	BHATCH	Fills an enclosed area or selected objects with a hatch pattern
5.	BLOCK	Creates a block definition from objects you select
6.	BREAK	Erases parts of objects or splits an object in two
7.	CHAMFER	Bevels the edges of objects
8.	CHANGE	Changes the properties of existing objects
9.	CIRCLE	Creates a circle
10.	COLOR	Defines color for new objects
11.	COPY	Duplicates objects
12.	DIVIDE	Places evenly spaced point objects or blocks along the length or perimeter of an
13.	DONUT	Draws filled circles and rings
14.	ELLIPSE	Creates an ellipse or an elliptical arc
15.	ERASE	Removes objects from a drawing
16.	HATCH	Fills a specified boundary with a pattern
17.	HATCHEDIT	Modifies an existing hatch object
18.	EXTEND	Extends an object to meet another object
19.	INSERT	Places a named block or drawing into the current drawing
20.	LAYER	Manages layers and layer properties
21.	LINE	Creates straight line segments

22.	LINETYPE	Creates, loads, and sets line types
23.	OFFSET	Creates concentric circles, parallel lines, and parallel curves
24.	FILLET	Rounds and fillets the edges of objects
25.	MIRROR	Creates a mirror image copy of objects
26.	MOVE	Displaces objects a specified distance in a specified direction
27.	MSLIDE	Creates a slide file of the current view port in model space, or of all view ports in paper space
28.	LTSCALE	Sets the line type scale factor
29.	PAN	Moves the drawing display in the current view port
30.	OOPS	Restores erased objects
31.	PLINE	Creates two-dimensional polylines
32.	POINT	Creates a point object
33.	POLYGON	Creates an equilateral closed polyline
34.	PROPERTIES	Controls properties of existing objects
35.	ORTHO	Constrains cursor movement
36.	OSNAP	Sets object snap modes
37.	REDRAW	Refreshes the display in the current view port
38.	REGEN	Regenerates the drawing and refreshes the current view port
39.	ROTATE	ROTATE
40.	SCALE	Enlarges or reduces selected objects equally in the X, Y, and Z directions
41.	SCRIPT	Executes a sequence of commands from a script
42.	SKETCH	Creates a series of freehand line segments
43.	SPLINE	Creates a quadratic or cubic spine (NURBS) curve
44.	TEXT	Displays text on screen as it is entered
45.	UNDO	Reverses the effect of commands
46.	ZOOM	Increases or decreases the apparent size of objects in the current view port
47.	AREA	Calculates the area and perimeter of objects or of defined areas
48.	LTSCALE	Sets the line type scale factor
49.	BACKGROUND	Sets up the background for your scene
50.	BASE	Sets the insertion base point for the current drawing

51.	BLIPMODE	Controls the display of marker blips
52.	BLOCKICON	Generates preview images for blocks created with Release 14 or earlier
53.	CHPROP	Changes the color, layer, line type, scale factor, line weight, thickness, and plot style of an object
54.	CLOSE	Closes the current drawing
55.	DBLIST	Lists database information for each object in the drawing
56.	DDEDIT	Edits text and attribute definitions
57.	DDPTYPE	Specifies the display mode and size of point objects
58.	DELAY	Provides a timed pause within a script
59.	DIM AND DIM	Accesses Dimensioning mode
60.	DIMALIGNED	Creates an aligned linear dimension
61.	DIMANGULAR	Creates an angular dimension
62.	DIMBASELINE	Creates a linear, angular, or ordinate dimension from the baseline of the previous dimension or a selected dimension
63.	DIMCENTER	Creates the center mark or the centerlines of circles and arcs
64.	DIMCONTINUE	Creates a linear, angular, or ordinate dimension from the second extension line of the previous dimension or a selected dimension
65.	DIMDIAMETER	Creates diameter dimensions for circles and arcs
66.	DIMEDIT	Edits dimensions
67.	DIMLINEAR	Creates linear dimensions
68.	DIMORDINATE	Creates ordinate point dimensions
69.	DIMOVERRIDE	Overrides dimension system variables
70.	DIMRADIUS	Creates radial dimensions for circles and arcs
71.	DIMSTYLE	Creates and modifies dimension styles
72.	DIMTEDIT	Moves and rotates dimension text
73.	DIST	Measures the distance and angle between two points
74.	DWGPROPS	Sets and displays the properties of the current drawing
75.	FILL	Controls the filling of multi-lines, traces, solids, all hatches, and wide polylines
76.	FILTER	Creates reusable filters to select objects based on properties

77.	GRID	Displays a dot grid in the current view port
78.	ID	Displays the coordinate values of a location
79.	LIST	Displays database information for selected objects
80.	MASSPROP	Calculates and displays the mass properties of regions or solids
81.	MENU	Loads a menu file
82.	MENULOAD	Loads partial menu files
83.	MENUUNLOAD	Unloads partial menu files
84.	OPTIONS	Customizes the AutoCAD settings
85.	PLAN	Displays the plan view of a user coordinate system
86.	PLOT	Plots a drawing to a plotting device or file
87.	SHADEMODE	Shades the objects in the current view port
88.	SNAP	Restricts cursor movement to specified intervals
89.	SPELL	Checks spelling in a drawing
90.	VLISP	Displays the Visual LISP interactive development environment (IDE)

RESULT

Thus the commands of AutoCAD was studied

Ex. No: 4 **Date:**

PLANNING AND LAYOUT OF FARMSTEAD

Aim: To Study about the planning and layout of farmstead

LOCATION OF FARMSTEAD:

A farmstead is satisfactory, if individual buildings are properly designed for function they serve primary objective of good planning are sanitation and will bring of human being and animals. The most convenient location of farmstead is,

- The farmstead should be located near the centre of farm or in middle of long side.
- Location at one side or even at corner near a road is helpful in processing farm supplies and in disposing farm produce.
- A site having high elevation and good drainage.
- It should be located near permanent source of water supply.
- Sites which have trees around will provide shade and protection against high wind.

SIZE AND ARRANGEMENT OF THE FARMSTEAD:

The farmstead area is occupied by residential buildings, dairy barn, bullock shed, poultry house, etc. and area varies from 3 to 5 %.

Residential building should be located away from the cattle shed. The silo pit and feed storages should be located near animal shelter. Milk room should be located 6m away from barn.

PLANNING OF FARM RESIDENCE:

The residential building is the heart of farmstead. It should be constructed and designed that the owner has the satisfaction of staying and to take maximum advantage of sunlight. The Traditional designs of village houses.

- Construction is unsatisfactory.
- Windows are too small.
- Rooms are too small.
- Kitchen is not properly constructed to remove smoke.
- Animals are kept in or around the house.
- Surroundings are used as waste disposal place.

A good house should have following facilities.

- BEDROOMS: The number depends on size of family.
- VARENDA: for both sitting out and house work.
- Food grain store.
- Fuel wood store.
- Animal shelter.
- Animal fodder store.
- Latrine cum urinal and bathing place.
- Sitting room cum DALAN.
- Open space inside or outside the house.
- Space for biogas plant and slurry dump.
- Space for kitchen garden.
- Space for washing purpose
- Space for farm tools and machinery storage.

WATER SUPPLY:

Water is mainly used for household, livestock, processing of milk products and irrigation.

WATER SUPPLY AND HEALTH:

Water is need met by wells, ponds, streams, and rivers. If water is need more than 20000 litres per day or hour, open walls ponds or river are necessary to meet the need. If Water rate is less than half of water requirement per hour then there is adequate supply. If water exceeds by 25% a large capacity storage tank may be used at peak demand.

LINKAGE BETWEEN WATER AND HEALTH:

Water and health are linked in more than one ways. Poor quality of water causes diseases and death. The cost of safe drinking water is testimony to the economic loss.

EXAMPLE: 1

Determine the size of an overhead water tank for a farmstead demanding a maximum of about 40,000 litres of water per hour for two hours during noon and only about 25,000 litres per hour during rest of period. The tube will is capable of supplying at the rate of only 28,000 litres per hour.

Sol;

- Total quantity of water demanded during peak period = 40, 000*2 = 80,000 litres
- Total quantity of water supplied during peak period = 28,000*2 = 56,000 litres
- Storage capacity of overhead tank = 80,000-56,000 = **24,000 litres**

Result

Thus the planning and layout of the farmstead was studied.

Ex. No: 5 **Date:**

DESIGN OF SMALL BARN

Aim: To Study the design aspects of small barn

DAIRY BARN:

When planning a new dairy barn size and location with relation to farm fields. Roads should be considered. The requirement of dairy cows and calves should be considered location of folder and feed storage location expansion of business should be considered milk house should be located on clean well drained site near barn but separated by 6m long paved passage in tropical countries like India. It is better to have enclosed barn in east must direction topography determine the drainage pattern.

TYPES OF DAIRY BARN:

There are three types of dairy barns such as,

- The stanchion barn
- Loose housing barn with milking parlour.
- Open air barn.

STANCHIAN BARN:

It is a modern dairy farms in which large number of cattle can be handed in one barn unit individual feeding and management and management of animals are possible for eight or more cows a two row barn with either face in or face out arrangement may be selected by keeping central drive unit the farm tractor with manure cart can be driven the manure alley can be eliminated in face in type, which saves about 20% compared to face out type.

GUTTER:

It is usually 45cm wide and 15cm deep slope of 2% should be provided.

COW STALL:

The surface of floor may be lift rough but it should not accumulate water slope may be provided to allow drainage of water into gutter.

MANGERS:

Mangers width ranges from 75 to 90cm. The back of mangers is about 60cm above the floor. Feed alley is passage between outer wall and mangers and it is 102cm wide is sufficient.

WALLS AND CEILINGS:

The height of wall may be 204m cable roof is used height of ceiling vary between sand 505m for barn to 10 to 11 wide. Walls are made of good quality bricks. The roof trust is constructed of timber span of 10 to 11m steel trusses are preferred cement asbestos sheets are lighter but tiles are insulator concrete roof is costly. Thatch roof should be avoided because there is chance of fire.

DOORS AND WINDOWS:

Door should be 204m to 207m wide on both side sliding doors should be used. In hot climates doors are avoided 0. 37sq.m of window area per cow is desirable.

Loose Housing Barn:

In this cows are housed in a covered or partially covered yard they are milking in batches special milking house called milking parlour or milking house system.

Open Air Barn:

They do not have cover, cows are fed and milked in field they live. This is called open air barn.

Result

Thus the design aspects of small barn

Ex. No: 6 **Date:**

DESIGN OF LOOSE HOUSING AND MILKING PARLOUR

Aim: To Study the design of loose housing and milking parlour

LOOSE HOUSING BARN:

It is not commonly practiced in India. It permits animals to move freely, it is simple and economical construction of feeding and shelter places barn is kept unpaved under hot climate it is not necessary to cover entire barn, a small shed can be constructed. The area required per cow depends upon climate. The floor space for both loafing and feeding is 9-11sq.m per cow. Manage space range between 70 and 75cm wide.

MILKING PARLOUR:

The milking parlors or milking room is a room where cows are milked but not housed, it is essential part of most of barn including sanction barn or stall barn. Provision must be made for cows to pass easily from feed area. The milking room in common use is known as tandem with angle or two string state arrangement it is possible to milk as many 10 to 15 cows in each stall.

The herring bone milking parlor is widely used when a milk housing consisting of compressor room, cold room, snilk room, wash room and loading platform, it is located 2.4m away from the barn.

Result

Thus the loose housing and milking parlor was design successfully

Ex. No: 7 **Date:**

HOUSING OF POULTRY HOUSE

Aim: To Study the housing of poultry house

POULTRY HOUSE:

The object of poultry housing is to keep of comfortable it aims at removing excess moisture the bird's breath out from lungs with moisture it causes diseases. Draft in poultry house affect their health so it avoids draft site should be at height not more protected from prevailing winds. Light is essential window area should be at height not more than 75cm from floor level window area should be about 1/4th total floor area.

HOUSING REQUIRMENTS:

The floor area for hen varies with size of breed, number 0.046sq.m per bird.

TYPES OF POULTRY HOUSE:

- Wire floored poultry house.
- Deep litter poultry house.
- Cage house.

A. WIRE FLOORED POULTRY HOUSE:

It make use of 12.14 gauge expanded metal or welded wire mesh for making their floors. The floor is 45cm above ground level and shape of 15% floor of nest may be made wood or cloth with 12-15% slope.The roosts are placed for birds to take rest 20% slope in roof.

B. DEEP LITTER POULTRY HOUSE:

It aims at keeping poultry house inside shed all the time, litter of about depth of 15-20cm it may be chopped paddy straw and rise husk. Well-developed decomposed

litter after using good manure. Floor area of 0. 36sq.m per bird is provided 2.4*2.4m shed can accommodate about 16 birds.

C. CAGE HOUSE:

It is generally built in warm region cage are built in continuous rows. These may be one to four rows of these cages. Cages are made of metal steel wire and provided with slope 0.6*0.2*0.45 is dimension of cage to house on bird. Droppings are allowed to fall down earth or concrete floor. Cages are place at height between 75 and 90cm from the floor.

Result

Thus the design aspects of poultry house was studied

Ex. No: 8 **Date:**

DESIGN OF SHEEP HOUSE

Aim: To Study the design of sheep house

SHEEP HOUSING:

Sheep housing is primarily for wool, meat and skin sometimes for milk sheep barn should be located near pastures protection should be located near jackets and wolves. The earth floor is considered satisfactory for both shed as well as open yard concrete floor helps the shelter clean.

SPACE REQUIREMENTS FEEDING AND FEEDERS:

Sheep are allowed to graze pastures but provision is also made for stall. Feeding 2kg of roughage and 225gm of concentrate per animals 1: 12 sq. m floor area per animal water through should be properly placed in barn when large animal is raised on farm an efficient drafting yard is required for handling and the lamps. Silage in superior to hay. Cows about 20kg silage is fed and for sheep and goat.

Silage of 3.5kg per animal per day is fed. Feeding through and manager should be suitably designed. Free standing feeders are in use of Indian dairy farms. But improved design ensures proper feeding and least wastages. Even balls can be made to rest on bars of feeders such design discourage trapping and would not make feeding difficult.

Result

Thus the design of sheep house was studied

Ex. No: 9 **Date:**

DESIGN OF VENTILATION SYSTEM FOR DAIRY POULTRY HOUSE

Aim: To Study the design of ventilation system for dairy poultry house

VENTILATION:

Ventilation system in live stock housing serve an important function, maintaining a comfortable animal environment typically a manure dairy cow will breath out four to fir gallons of water per day water vapour and produce 600 to 700 watts of heat.

VENTILATION SYSTEM REQUIREMENTS:

AIR EXCHANGE:

Sufficient air exchange is accomplished by the material driving forces of wind and buoyancy.

FLEXIBILITY:

Ventilation needs continuous minimum an exchange is required to remove moisture constantly produced by the animals. This minimum air exchange is vital during the sub-freezing weather.

PROPER BARN CONSTRUCTION:

During hot weather condition a property constructed dairy barn should act as sunshade ventilation opening provide air movement pass the animals to remove extra heat reduce typical drops in milk production during extremely high temperature of fans may require to increase the air flows in cross cows.

NATURALLY VENTILATED BULIDING COMPONENTS:

Several keys feature and characteristics are required in a proper functioning material ventilation system. These features include the building site, separation and orientation ridge or peak openings and are required to manage the building.

During cold winter, some continuous air inlet openings that allows fresh air to enter the building is required. Locate the openings under the laver on the size openings equal to one half the ridge opening, and locate on both sides of building.

Additional side wall openings and end wall openings at animal level provide cross ventilation through animal zone. During the summer the barn serves as a sum shade to complete or full wall openings are optimal.

NATURAL VENTILATION BUILDING MANAGEMENT:

Management of naturally ventilated building is important to operation proper management and adjustment of ventilation openings are important to assure comfort during these periods.

WINTER:

- Ridge and eave inlets open.
- Air inlets maybe partially closed.
- Side walls and end walls are closed and fastened.

MILD WINTER / SPRING:

- Ridge and eave inlets fully open.
- Upper side wall and end wall openings adjusted to maintain comfortable environment.

SUMMER:

- Ridge and eaves open.
- Side walls and end walls completely open to provide air movements.

Result

Thus the design of ventilation system for dairy poultry house was studied

Ex. No: 10 **Date:**

DESIGN OF SILOS OVER GROUND AND UNDER GROUND AND HEY STORAGE

Aim: To Design of Silos over ground and underground and hey storage

THE SILOS:

It is used to store and protect animal fodder in an ideal condition. The target for length should be 6-12 mm. silos may be classified into two types

- Tower silos
- Horizontal silos

PERMANENT TOWER SILOS:

It is cylindrical shape made up of wood or metal loading is difficult either mechanical loader or a large capacity is essential wall must be strong to avoid cracking. The cost is higher than horizontal silos.

HORIZONTAL SILOS:

It is used as a temporary permanent storage structure

- Pit
- Trench
- Surface sios

Thus the silos can be easily filled unloaded without special treatment. The spoilage of silos ranges 20-30%

FILLING AND PACKAGING:

Trench and pit silos can be easily filled by storage chopped silos should be levelled spread and packed through packing, provide good silos. Silos should be covered by dry paddy

SILAGE EFFLUENT:

It is serious as pollutant of ground and surface water the bio chemical oxygen demand be a greater of 150 times than domestic sewage BOD ranges from 250 to 400 mg/l. The standard BOD is 20 mg/l.

PIT SILO:

It is circular deep well which is lined all along side and sealed from bottom. It is made in area where soil is deep and water table level is slow. When silo is opened for removing the silage no body showed enter till the gas are removed.

FEEDING:

Silo is fed by hand and moved silage push cart. The size of cart should be such that in one trip half the member of animals may be supplied with silage. A cow is feed 3kg of silage. Silage nation is 14-18 kg per cow per day.

SIZE AND CAPACITY OF SILO:

The correct diameter of silo depends on the quantity of silage to be fed daily to prevent spoilage. Silage should be removed at rate of 10 cm day. The diameter is 6m and depth is 2-3 times of dia.

TRENCH SILOS:

It is made easily without any investment on which cement and sand. Unlined silo give meter spoilage filling and packing and scaling must be carefully done. the silo should be roofed and located on sloping ground.

Result

Thus the silos over ground and underground and hey storage was designed

Ex. No: 11 **Date:**

DESIGN OF FARM FENCING SYSTEM

Aim: To design the farm fencing system

FARM FENCING:

A Fence is a barrier which is used either for animal to definite area on keeping them out of particular area. Dead on live hedges, earth or masonry walls ditches are widely used as fences. Fencing is classified into five types.

1) Woven Mesh Type

   a) Large Mesh Type

   b) Close Mesh Type

   c) Hexagonal

2) Barbed wire fencing

3) Plain wire fencing

4) Welded Plain wire fencing

5) Electric Fencing

WOOVEN MESH TYPE:

It is used for large animal's cattle's horse's buffalos etc. space between vertical wire is 15 and 30 cm and horizontal wire is closed at bottom and increases towards top of fence close mesh type is used for poultry house rabbits and goats. Horizontal woven type wires are uniform all through their height.

BARBED WIRE FENCING:

It is generally made up of two stands of wire twisted together spacing between varies

b/w 7.5 to 15 cm. It is made of 14 gauge wire and in roll of 50 kg stretching to 160 m long. The spacing of wire is in following order

1) Ground and first wire = 15 cm

2) First and second wire = 15 cm

3) Second and Third wire = 15 cm

4) Third and Fourth wire = 22.5 cm

5) Fourth and Fifth wire = 30 cm

6) Fifth and Top wire = 30 cm

It is effective than plain wire and cheaper than wooven wire fencing.

PLAIN WIRE FENCING:

It is used for large cattle fencing spacing is same. It is available in various diameter.

WELDED WIRE FENCING:

It is similar to woven and available in rolls of 100 m having height varying from 1 to 15 m.

ELECTRIC FENCING:

An electric fencing consists of one or more stands of bar wire supported by insulator connected to fence emerging unit to form a barrier to cattle. The fence controller applies a high voltage current b/w fence wire and earth the voltage varies from 6000-15000 volts. Under different condition. It is low cost. Current should not exceed 0.008 amp.

FARM GATES:

Careful consideration should be given to type of gates to be selected. The ideal gate is of simple construction .easy to operate and of sufficient height and maximum strength.

FENCING POST:

Fence post are made of wood angle iron pipes depending upon cost and availability of materials wooden posts are best suited for cheap and temporary fencing.

Result

Thus the farm fencing was designed successfully

Ex. No: 12 **Date:**

DESIGN OF FARM TRUSSES

Aim: To design the farm trusses.

FARM TRUSS

A truss is a pre-assemble fabrication of woods, steel, or aluminum embarked to form the building. The weight of the roof is transferred to the side walls as from the ground or building foundation.

DESIGN OF TRUSS

It can be seen from the stress distribution of a loaded Bram that the greatest stress occurs at the top and bottom extremities of the bram. This led to the improvement on a rectangular section by introducing the I-section by which the large flanges curve situated bam. In effect the flanges are carried the bending in the form of the tension stress in one flange and compression stress in other while the shear was carried. A truss concentrates the maximum amount of the as far away as from the natural axis. As resulting from large material exist can be resisted.

Resistance of a truss at a section is provided by $M=C\times h=T\times h$

Where,

C=T in parallel cords

C= Compression in the top chord of the truss

T=Tension in bottom chord of supported truss

h=Vertical height of truss section

if either C, T or h can be increased from the truss will be capable of resisting heavier loads. The value h can be increased by making a deeper truss.

- A framework on truss can be considered as a bram with the major part of the web is removed.
- The pitched roof is the best example of this although the original shape was probably designed. They are used to support a roof covering in conjunction with

Purling which are members laid longitudinally across the rafters. The roof covering being attached to the purling. The arrangement of internal bracing depends on the span. Rafters are normally divided into equal heights and ideally, the purlins are supported at the joints to the axial forces.

- The internal bracing members of a truss should be triangulated and as far as possible. So that long members are in tension and in compression are short to avoid buckling problems. The thick line indicates struts. The lattice grinder is also called as truss at top and bottom.
- The following steps should be considered when designing a truss.
- Select general layout of truss members and truss spacing.
- Estimate external loads to be applied including self-weight of truss purlins and roof covering with loads.
- Determine critical loading. It is usual to consider dead loads alone.
- Analyse frame work to find forces in all members.
- Select material and section to produce in each member, a stress exceeds the permissible value.
- The pitch or slope of a roof depends on locality. Imposed loading and type of covering for corrugated steel and asbestos roofing sheets.

Result

Thus the farm truss was designed successfully

Ex. No: 13 **Date:**

DESIGN OF MACHINERY AND EQUIPMENTS

Aim: To design the machinery and equipment.

It is still a controversial issue whether it is economical to provide storage houses for farm machines and implements studies so far however indicate that is more economical to protect implements and machinery by means of sample type of storage structures then to the let those be exposed to weather

The machinery storage structure may be of either in front open type or may be open on both sides to make it convenient for tractors structures 10cm thick wall laid in cement sand mortal may be built to offer safe enclosure from the back.

FARM WORKSHOP

A farm workshop is desirable on a large farm for maintenance and repair farm equipment and buildings. A sustainable amount of time and money can be saved and extra work and inconvenience avoided on farm by moving a fully planned and well equipped workshop.

The types of power and machinery used as also important for there is no need for diesel pump fuel for calibration pump if diesel tractors or engines are not used on the farm.

FLOOR

A 10cm thick cement concrete or thick floor is considered to be satisfactory minimum 2percent slope across the shop for quick disposal of water the slope of the ramp can be 4percent of more if should rise from the ground level to the floor level of the shop.

WALLS

Walls may be made of either bricks laid in cement mortar or metal sheet. Brick wall thickness of is usually 22.5cm large hemispherical sheds are sometimes constructed and three have no side walls only in the front and at the back walls are provided with gates for the entrance and for exit.

ROOF

For large size workshop, corrugated galvanized iron roof is widely used. It is reasonably economical and lighter uncomfortable heat during summer days can be avoided either placing the roof at great height of fixing layer of insulation board below the roof of by fixing few exhaust fans to promote air exchange.

Result

Thus the equipment and machinery were designed successfully.

Ex. No: 14 **Date:**

DESIGN OF SEPTIC TANK AND SANITARY

Aim: To design the septic tank and sanitary

SANITATION:

Safe disposal of all human sewage and domestic waste is necessary to protect the health and prevent disease. It should not make surroundings ugly and unhygienic. It should not be disposed of in stream on pond. These criteria can be met by discharge of domestic sewage into septic tank and soakage pit.

SEPTIC TANK:

The principal on which a septic tank works in a bacteria until liquify and organic material into liquids and gases for most part. The three important functions of septic tank are,

a. The removal of solid from sewage as it from the tank. Solids are discharge and remaining as discharge.
b. The decomposition of solid sewage under anaerobic condition.
c. The storage of sludge and scum.

LOCATION:

Sewage disposal should not cause contamination of any stream or other source. It should be located downhill from source of water supply. It generally that septic tank should never be than 30m from source of water supply if water is expected to rise about 1.2m to ground surface. It should be located in areas liable to be flooded.

CAPACITY OF TANK:

Capacity determines the dimensions of tank for family of five members the tank capacity may be kept about 2.8cm for additional member capacity should not be smaller than 21cm tank is divided into two (or) more compartments. Bricks should be laid in good

Cement and should led laid plastered. At least 1.25cm thick cement plaster shape may be either rectangular or square depth may be range between 0.75 and 15m.concrete about 7.5cm thickness they are placed about 15 to 22.5cm away side walls. Usually provide at 15cm below ground level.

CLEANING:

The tank should be inspected at least once in two years and cleaned before sludge level reaches the bottom of outlet. Depth of sludge should be measured.

Result

Thus the septic tank and sanitary was designed successfully.

Ex. No: 15 **Date:**

DESIGN OF RURAL/FARM ROADS AND CULVERTS.

Aim: To design the rural farm roads and culverts

INTRODUCTION:

This manual offers highway engineer a comprehensive set of guidelines to assist and simplify the process of desiring small bridges and culverts. These structures are an essential part of every road networks. They are few more common them large bridges are simpler to design and construct for the purpose of manual small buildings (i.e) talking are sperm to bridge a two have highway to bridge a dual car wage way.

PLANNING:

The first part of manual is concerned with planning site navigation. Planning involves site also necessary at this stage of the available resource are thus has having on the material to be mud and hence the type of structures.

SITE SURVEY:

For a river crossing, the cheapest bridges site and the one that has the largest potential service life is that which is an straight reach of river has well defined bricks has reasonable straight approach roads permits a square as crossing as possible has good foundation condition.

SUBSTRUTURES AND FOUNDATIONS:

The essential features are, foundation slabs that transmit the weight of the animals and directly supporting soil. Front walls with bearing shelves that support the super structure soil of the embankment wing walls or retaining walls.

SUPER STRUCTURES:

It is further divided into reinforced concrete. Reimposed are reinforced concrete and steel blames and timber.

REINFORCED CONCRETE SUPER STRUCTURE:

This section presents standard design for concrete slab decks from 4m to 12m spans.

BEARINGS:

The simplest form of bearing is made by casting the concrete slabs on to the abutment felt separating the two concrete surfaces.

COMPOSITE SUPER STRUCTURES:

The advantages are,

ii. The deck weight can be less than of equally all concrete structures.

iii. The offsite prefabrication of the main load reduced the work necessary on site resulting rapid construction.

iv. Steel is a reliable material which is supplied of consistent reliability to be produced.

PARAPETS:

Circular section has been selected for the rails that are readily made for badly damaged post or rails.

TIMBER:

Seasoned logs should be used whenever possible. They should be closely matched and positioned same way. Five further chapter in manual discuss,

- Low level water crossings culverts
- Emergency and temporary structures
- Bridge building materials

Result

Thus the rural farm roads/culverts was designed successfully.

Ex. No: 16 **Date:**

DESIGN OF BIOGAS PLANT.

Aim: To design the biogas plant.

BIOGAS.

Plant matter created by process of photosynthesis is called biomass, it includes all plant life, trees, agricultural plants, bush grass, algae and livestock waters photosynthesis is a naturally occurring process which desires its energy requirement from solar radiation.

$$H_2O+CO_2 \rightarrow CH_2O+O_2$$

It is seen that in the process, water and carbon-di-oxide are converted into organic material the gas produced by biomass is called biogas. Biogas is obtained through the fermentation of animal waste and other biomass in a digestion chamber. Biogas is a mixture of methane(45-75%) and CO_2 the production of biogas is a particular significance for India because large cattle population.

TYPES OF BIO-GAS PLANT.

The Indian design of biogas plants have the following arrangement for gas storage and hence plants are classified as,

- Floating dome type.
- Fixed dome type.
- Plants with separate digests and gas holder(Buller math design).
- Flexible bag biogas plants.

IMPROVED INDIAN BIOGAS PLANTS.

- Kachacha-Pacca biogas plant (PAV Ludhiana model).

- Capsule plant of $3m^3$ capacity (HPAVI Palampur model).
- Janatha biogas plant (Govt implement factory Bhuvaneshwar model).
- IARI biogas plant (Pusa,Delhi).
- Bharat plant (GEDA,Vadadara).
- Ganesh plant (Rampur).
- Deena bandhu plant (Lucknow).
- Kamdhena plant (Maharashtra).

PROBLEM:

Design the $3m^3$ digester of KVIC biogas plant assume retension time as 40 days and diameter depth ratio as 0.7.

SOLUTION:

Given:

Gas production/day = $3m^3$

Retension period = 40 days

Height and diameter of digester ratio = 0.7

Assume:

Density of slurry = $1000kg/m^3$

$1m^3$ of gas = 25 kg of dung

Volume of digester = $\frac{Weight\ of\ slurry}{Density\ of\ slurry}$

$= \frac{75+75}{1000} * 40$

$= \frac{150}{1000} * 40$

$= 6\ m^3$.

Actual volume of digester, add 10% = 6/10 = 0.6

Actual volume = 0.6 + 6 = $6.6m^3$.

$\frac{\pi}{4} * D^2H = 6.6$

$\frac{D}{H} = 0.7$

D =0.7H

$\frac{\pi}{4}$ * $(0.7H)^2$ H =6.6

H^3 =17.14

H =2.6m.

Therefore,

D =0.7H =0.7*2.6

=1.8m.

Diameter of gas holder= Diameter of digester – 0.2

= 1.8-0.2

D = 1.6m.

Height of gas holder

$\frac{\pi}{4} * D^2H = 1.5m^3$

$\frac{\pi}{4}$ * $(1.6)^2$ * H=1.5

H=0.746m.

RESULT:

- Height of digester = 2.6m.
- Diameter of digester = 1.8m.
- Diameter of gas holder = 1.6m.
- Height of gas holder = 0.746m.