

Verbal Communication – Use of spoken words as a communication media.

Examples: **Speech, Lectures, Meetings, Discussions, Demonstrations, Telephone, Tannoy (Public broadcasting system), interviews, Consultations etc.**

Written communication – Use of written documents as a communication media

Examples: **Letters, Reports, Notices, Memos, Posters, Banners, Broachers, Manuals etc.**

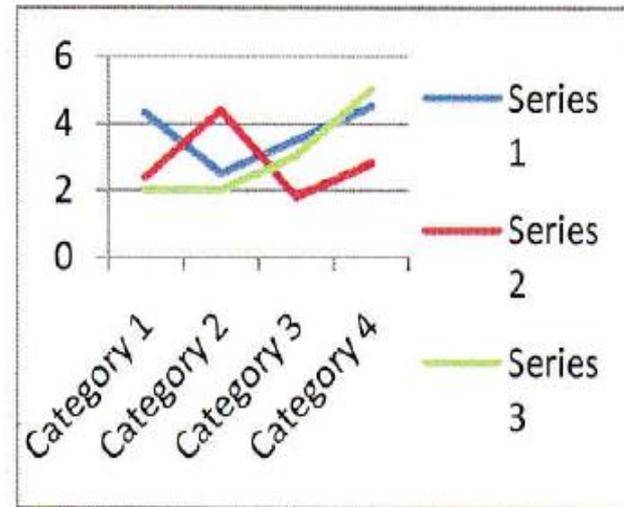
Drawings and diagrams – Use of standard graphics as a communication media.

Examples: **General arrangement drawings, Detail drawings, Assembly drawings, Installation drawings, Block diagrams etc.**

Signs – Use of standard symbols as a communication media.

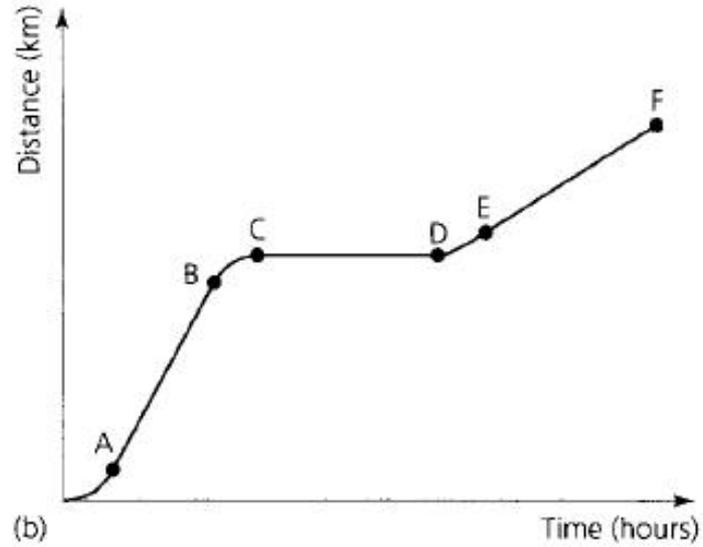
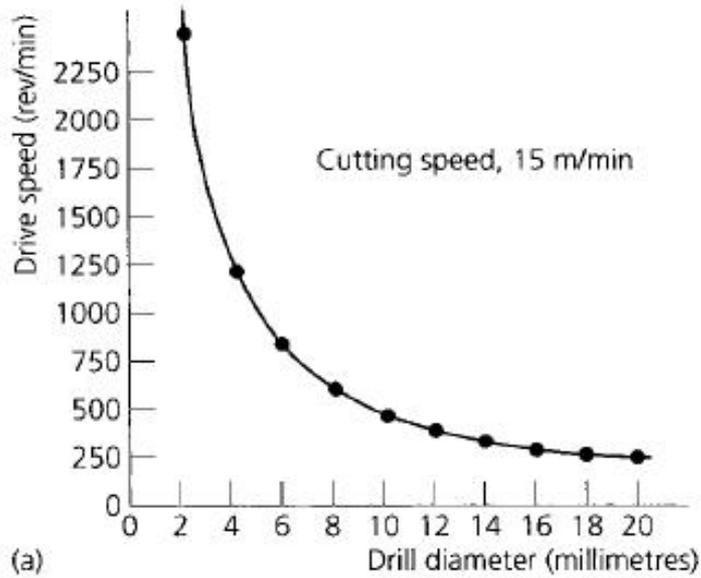
Examples: **Safety signs, Workshop floor signs, Toxic signs, Signs for electricity, fire and etc.**

- i) **Line graph** – A graph illustrated by using lines. Line graph shows the change of a situation
- ii) **Bar Graph** - A graph illustrated by using Bars or columns. Bar graph shows the comparison of the change of a situation with other situations
- iii) **Pie Graph**-A graph illustrated by using parts of a circle. Pie graph shows the comparison of each situation with the whole situation.

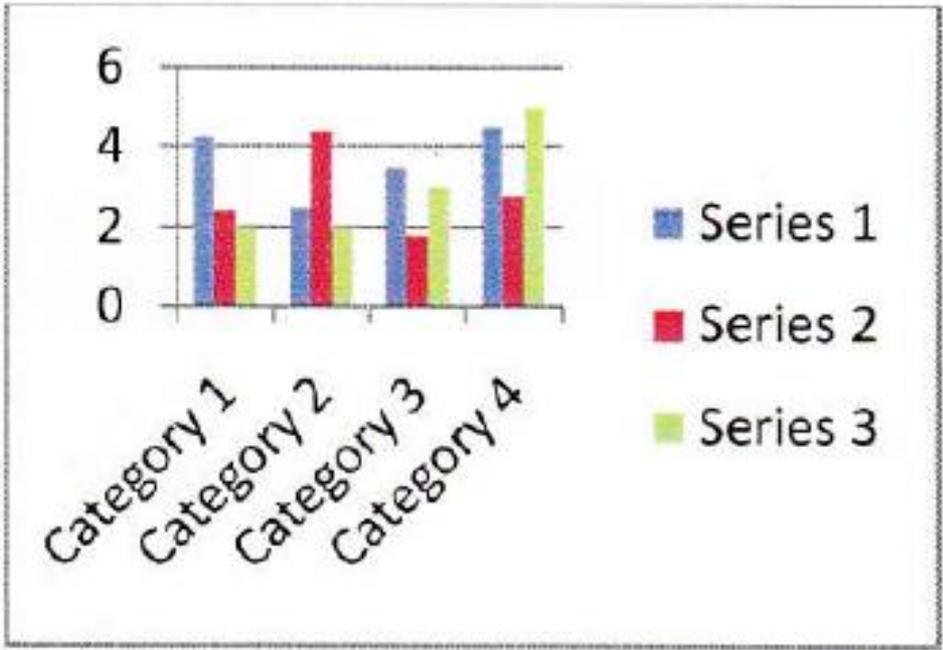
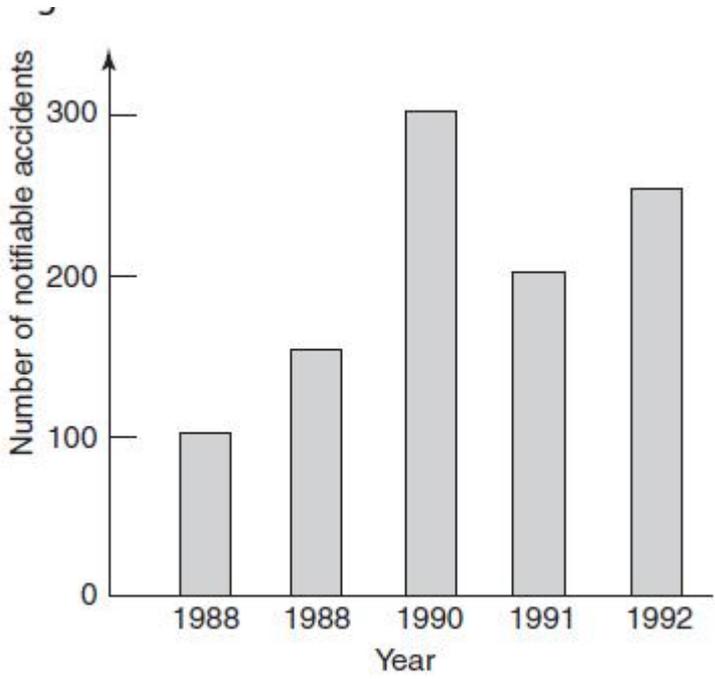


I) Line graph

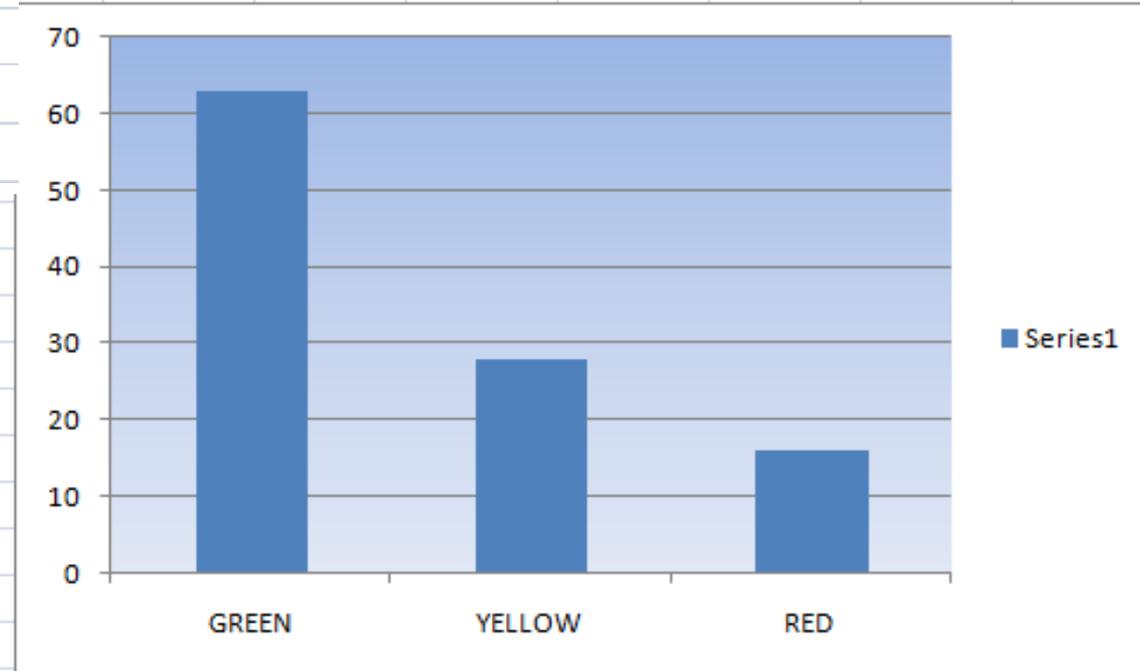
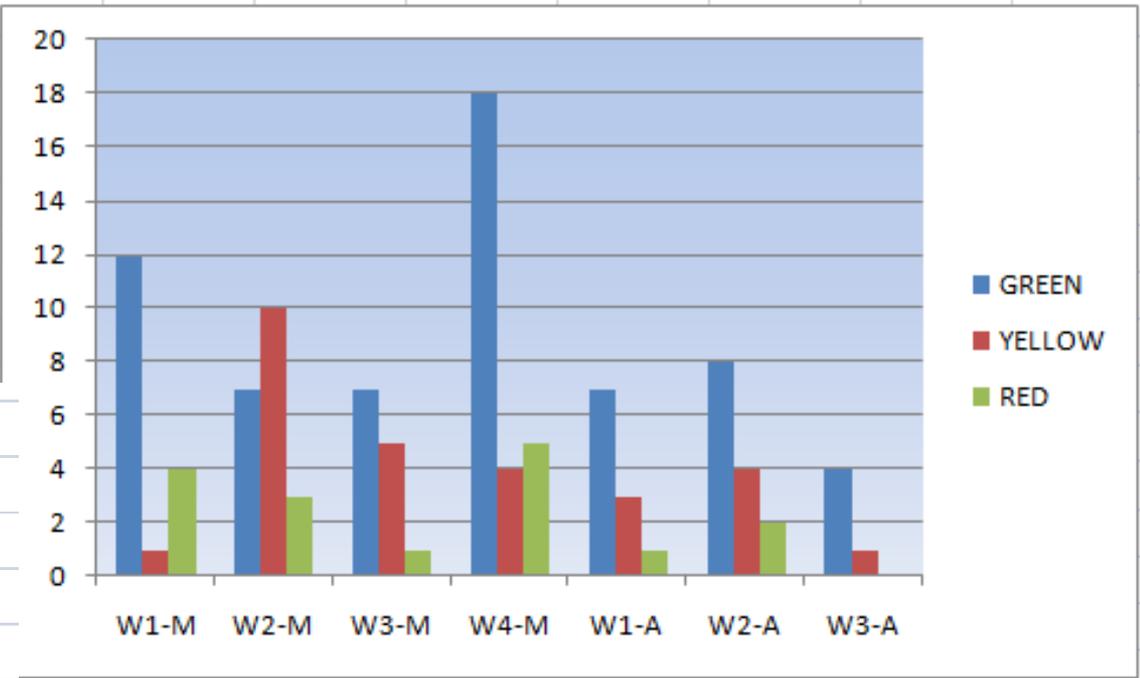
Line Graph



Bar Graph

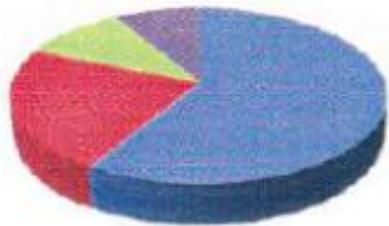


	GREEN	YELLOW	RED
W1-M	12	1	4
W2-M	7	10	3
W3-M	7	5	1
W4-M	18	4	5
W1-A	7	3	1
W2-A	8	4	2
W3-A	4	1	0
	63	28	16

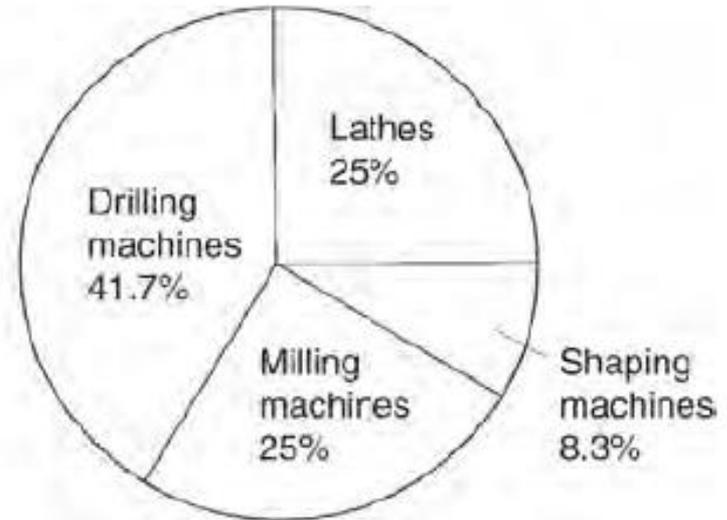


Pie Chart

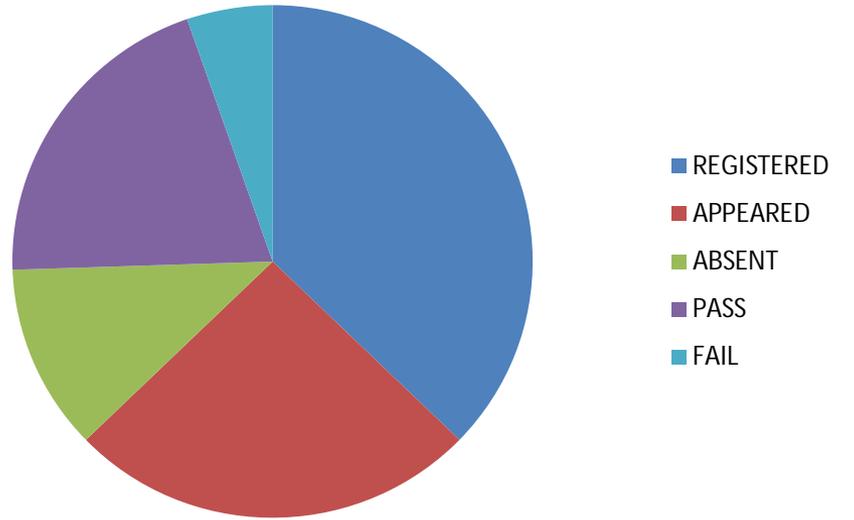
Sales



- 1st Qtr
- 2nd Qtr
- 3rd Qtr
- 4th Qtr



SUMMARY		
REGISTERED	35	100%
APPEARED	24	69%
ABSENT	11	31%
PASS	19	54%
FAIL	5	14%
Note:- Minimum passing criteria is 60% and above.		



Information Technology

Information Technology can be defined as the use of various technologies (Computer, Micro Electronics and Telecommunication) for storing, retrieving, and sending information. Comparison of a system with or without information technology can be given as follows.

Comparison factor	System with Information Technology	System without Information Technology
Time	- Save time as a fast system	- Waste time as slow system
Cost	<ul style="list-style-type: none">- Capital cost very high- Maintenance cost very high- Long term cost benefits are very high	<ul style="list-style-type: none">- No capital cost- No maintenance cost- Long term cost benefits are very low
Efficiency	- High due to use of Computer and electronic technology	- Low due to use of human energy
Accuracy	- High due to use of Computer and electronic technology	- Low due to use of human energy

Reference tables and charts

There are a number of ‘pocket books’ published for the different branches of engineering. A typical ‘pocket book’ for use in manufacturing workshops would contain tables of information such as:

- Conversion tables for fractional to decimal dimensions in inch units, and conversion tables for inch to metric dimensions.
- Conversion tables for fractional (inch), letter, number and metric twist drill sizes.
- Standard screw-thread and threaded fastener data tables.
- Tables for spacing holes around pitch circles as an aid to marking out.
- Speeds and feeds for typical cutting-tool and work-piece material combinations for different processes.

This list is by no means exhaustive but just a brief indication of the sort of useful data provided. In addition, many manufacturers produce wall charts of similar data as it affects their particular products. These are not only more convenient for the user than having to open and thumb through a book with oily hands, but they are also good publicity for the manufacturers who issue them.

Computer aided Drafting (CAD) - The use of Computer technology in the creation and modification design. CAD is mainly consists of 3 sections:

- a) **Drafting** – Creating 2D – Drawings
- b) **3D modelling** – Creating 3d models
- c) **Analysing** – Technical and mathematical analysing of design

Computer aided Manufacture (CAM) – The use of computer technology for plan, manage and control the operations of manufacture. CAM is mainly consists of 2 sections:

- a) **Production planning and Control** – Process planning, Production control and part programming
- b) **Manufacture** – Controlling CNC equipment, Robotic, Material handling and Quality control

Computer Numerical Control systems – A system or machine with built in microprocessor (Computer system) with Numerical control or system in which actions are controlled by direct insertion of numerical data at some point CNC systems are more accurate, more user friendly, more powerful and more flexible. Due to the versatility of the CNC system , it can be applied to many processes including machining, metal fabrication, metal cutting, component assembling and precision measurement.

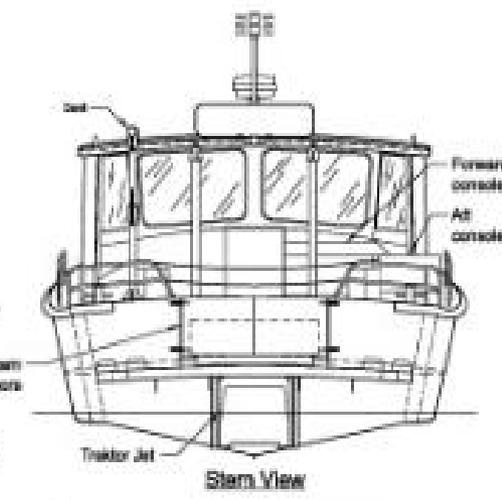
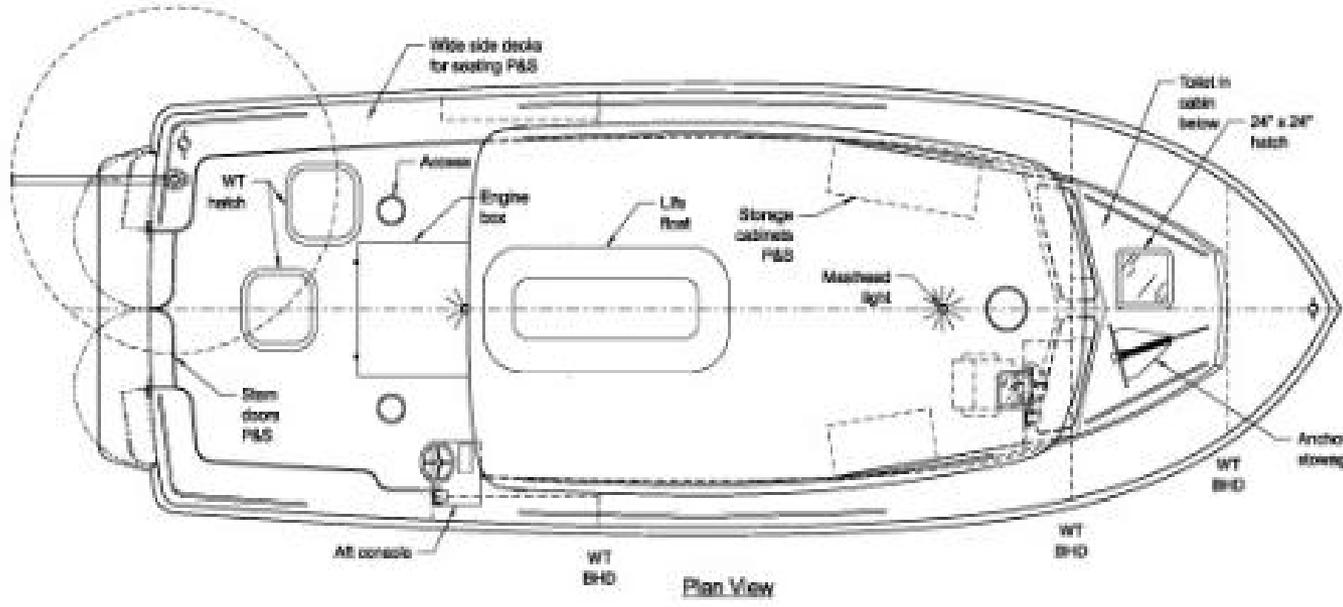
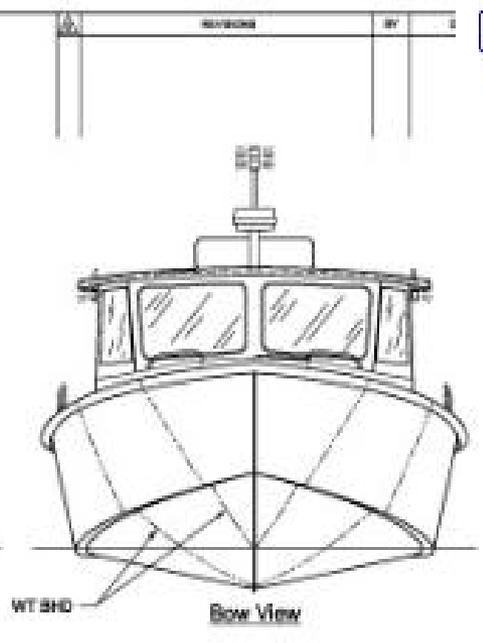
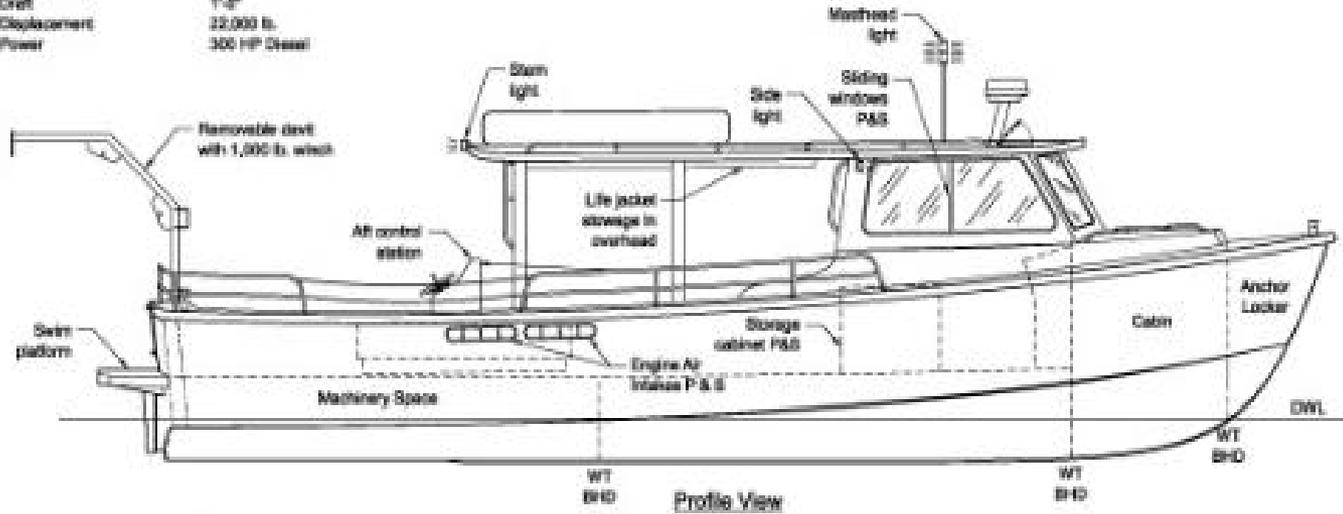
Robotic – Robot is a reprogrammable, multi-functional, manipulator designed to move materials, parts, tools or special devices through variable programmed motions for the performance of variety of tasks. The accurate and flexible characteristics of motion enable robots to replace human operations in, **repetitive tasks, hazardous working conditions, multiple shift operations and difficult tasks.** Major application of industrial robots are **material handling, manufacturing, assembly and inspection**

General Arrangement Drawing

General Arrangements are simply views created from the most appropriate direction on the model, and include setting out and check reference dimensions, assembly references and section sizes as required. They can also include enlarged views of complicated areas or details and any other additional information which will be helpful for the clients approval and the installation on site.

Since they are only views on the model, they can be isometric, 3D views which look impressive and give a crystal clear, unambiguous view which anyone can easily understand.

Specifications:
 Length Overall 40'-0"
 WL Length 35'-10"
 Beam (max.) 14'-0"
 Draft 1'-0"
 Displacement 22,000 lb.
 Power 300 HP Diesel

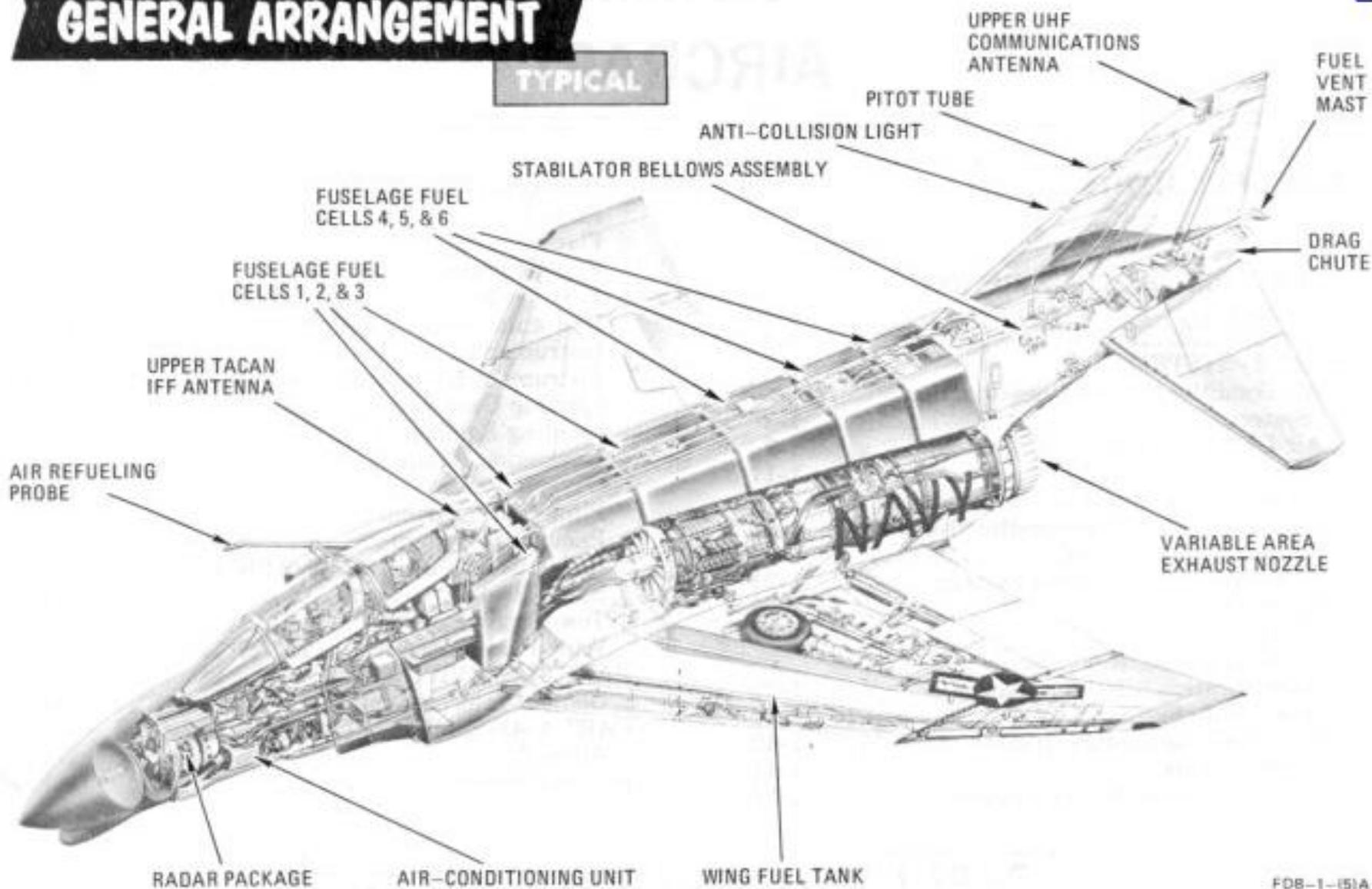


General Arrangement
Chesapeake Bay Foundation
 Oak Hill Marine Design, LLC
 PO Box 1288 Southwest Harbor, Maine 04979 (207) 284-6881

SCALE 1/4" = 1' PL	FILED IN General Arrangement.dgn
PLT BY B. 13" x 17"	DATE 20 Oct 2000
DRAWN BY S. Hulse	DESIGNED BY A8826-001
	NO. 0

GENERAL ARRANGEMENT

TYPICAL



Detail Drawing

- The detail drawing should include all of the necessary information to enable procurement, manufacture and should identify all of the relevant codes and standards. The item weight/mass should also be included for reference.

Depending on the level of detail, a detail drawing can comprise one drawing on a sheet or a number of separate drawings on one sheet.

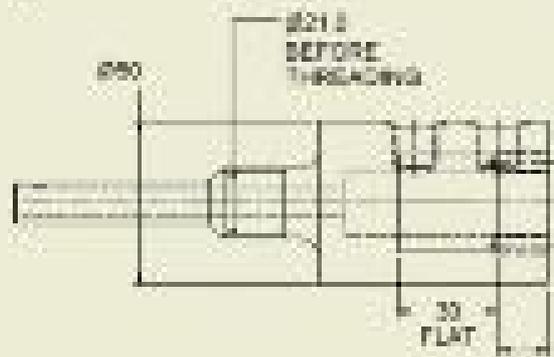
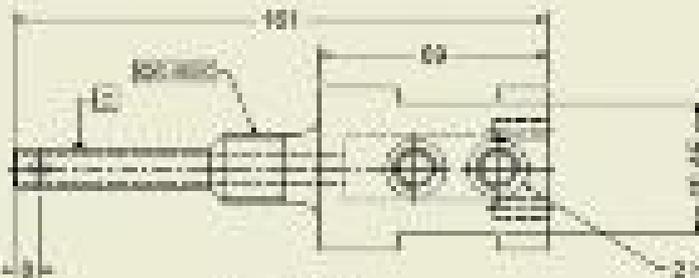
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THIRD ANGLE PROJECTION



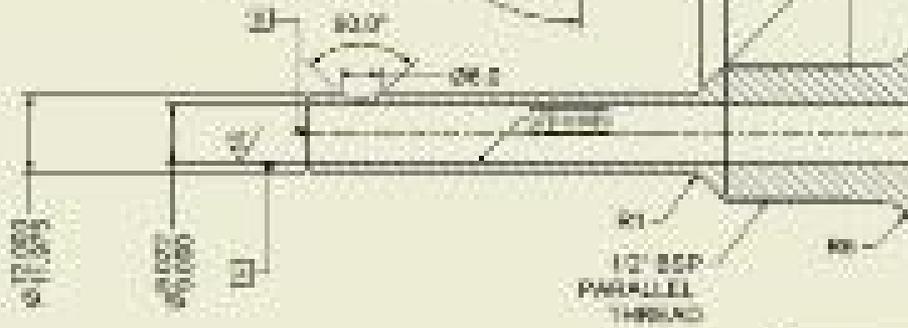
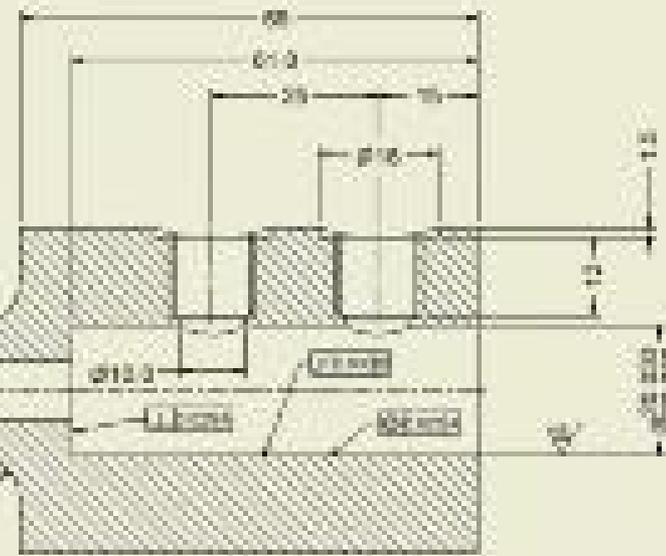
RSD Rob Spacer Design

REV 001



2 HOLES Ø1.5 THROUGH LENGTH 0.69
TAP 1/8 BSP X 1/2 DEEP

Ø21.5 PCD
1 HOLES Ø0.1 X 1.0 DEEP EQUISPACED ON Ø21.5 PCD



INTERNAL BORES SMOOTH AND PARALLEL AFTER MACHINING

SECTION A-A

USE THIS TOLERANCE SYSTEM UNLESS OTHERWISE SPECIFIED	UNIT
±0.005	INCHES
±0.01	MILLIMETERS
±0.02	MILLIMETERS
±0.05	MILLIMETERS
±0.1	MILLIMETERS

HOUSING FOR INJECTOR	
Rob Spacer Design	
1000 WALKER DRIVE	
LAKE CHARLES, LA 70601	
504-735-3347	

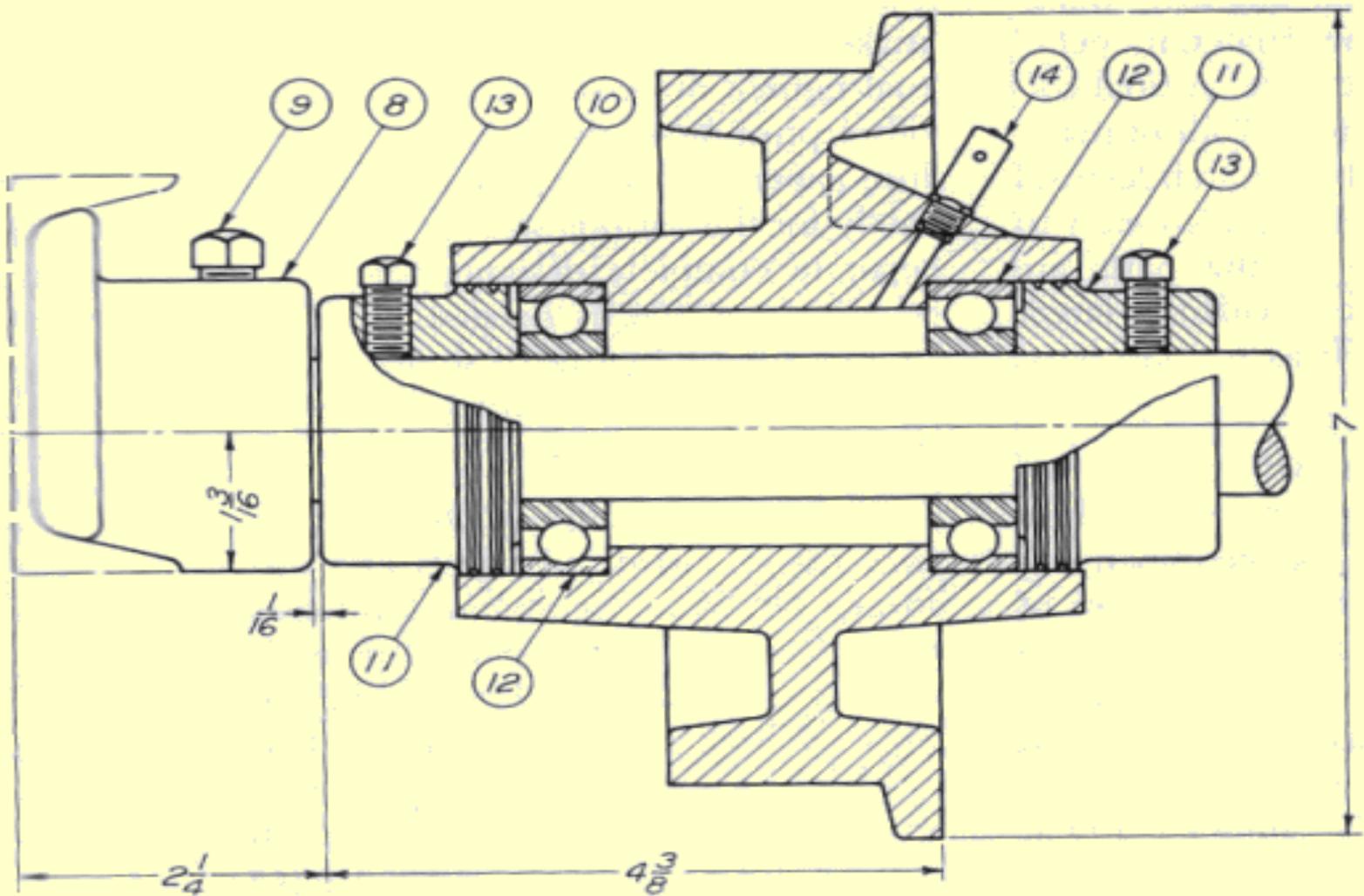
REVISIONS	
NO.	DESCRIPTION
1	ISSUED FOR MANUFACTURE
2	ISSUED FOR MANUFACTURE
3	ISSUED FOR MANUFACTURE
4	ISSUED FOR MANUFACTURE
5	ISSUED FOR MANUFACTURE
6	ISSUED FOR MANUFACTURE
7	ISSUED FOR MANUFACTURE
8	ISSUED FOR MANUFACTURE
9	ISSUED FOR MANUFACTURE
10	ISSUED FOR MANUFACTURE

HA-25375-0

Assembly Drawing

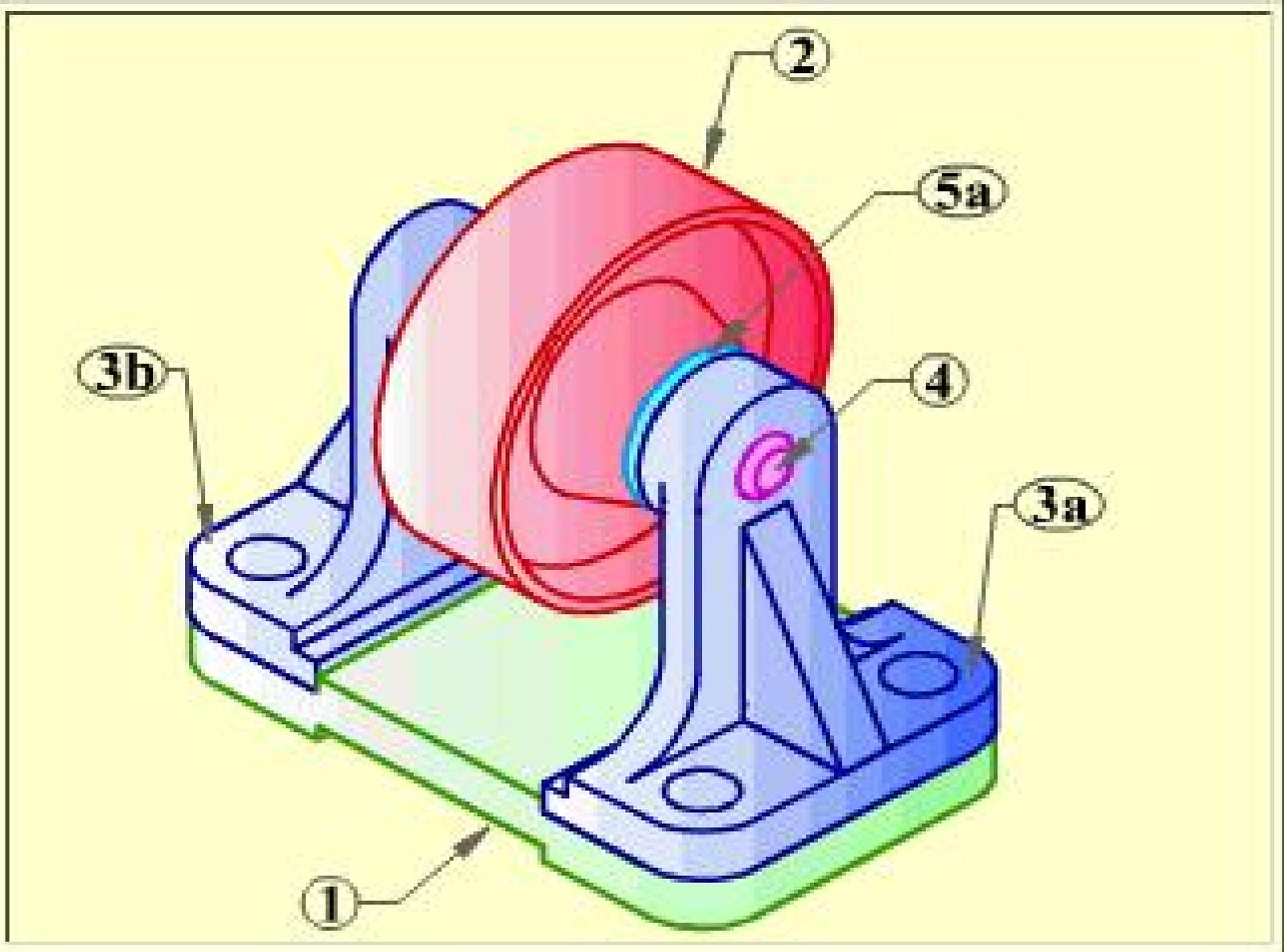
- The assembly /sub-assembly drawings are drawings of discrete sub-systems showing in some detail how the component items fit together.

The assembly drawing will generally include at least three orthographic views with sections as needed to clearly show all of the details and their relative positions. Overall and detail dimensions will be shown. The drawing will include a parts list identifying all of the component details with quantities and materials and supply details. The assembly drawing will include a list of reference drawings and notes identifying the relevant codes and specifications and testing requirements.



ERJ.	3-1-81	LIMITS, UNLESS OTHERWISE NOTED: FRACTIONAL $\pm \frac{1}{2}$, DECIMAL ± 0.010 , ANGULAR $\pm \frac{1}{2}^\circ$			REVISION	DATE	CHANGE OR ADDITION		
GN.	3-9-81	PART NO.	REQD.	NAME	MATERIAL		STOCK SIZE	HEAT TR.	FINISH
TEA	3-18-81			WHEEL ASSEMBLY	SCALE	COMPANY NAME			
	3-20-81	UNIT OR ASSEMBLY		OVERHEAD CRANE	1" = 1'-0"	CITY			
					ASSEMBLY NO.	DRAWING NO.			
					25014	NO. OF			
						25016-1			

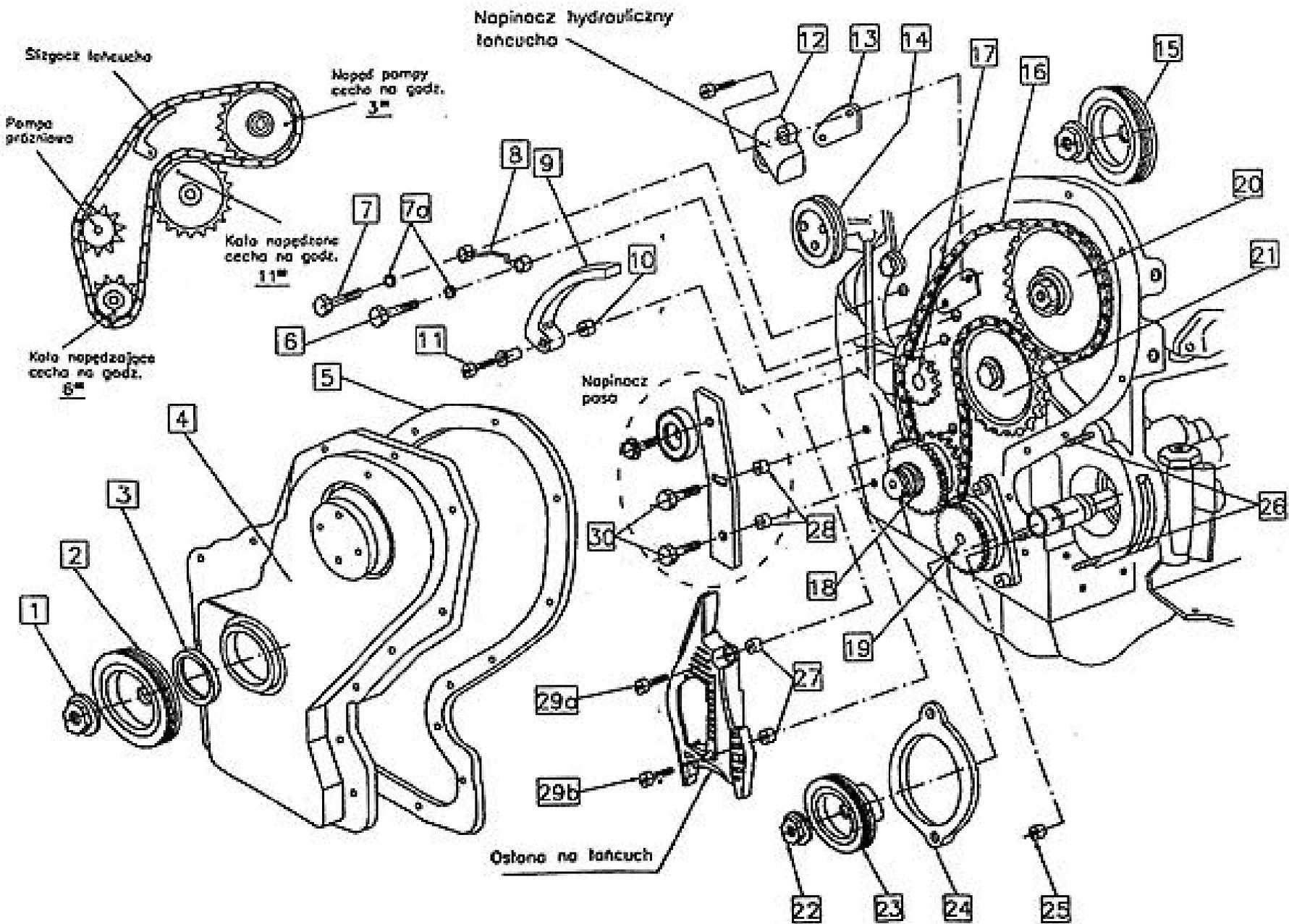
A unit assembly drawing.



An example of assembling parts.

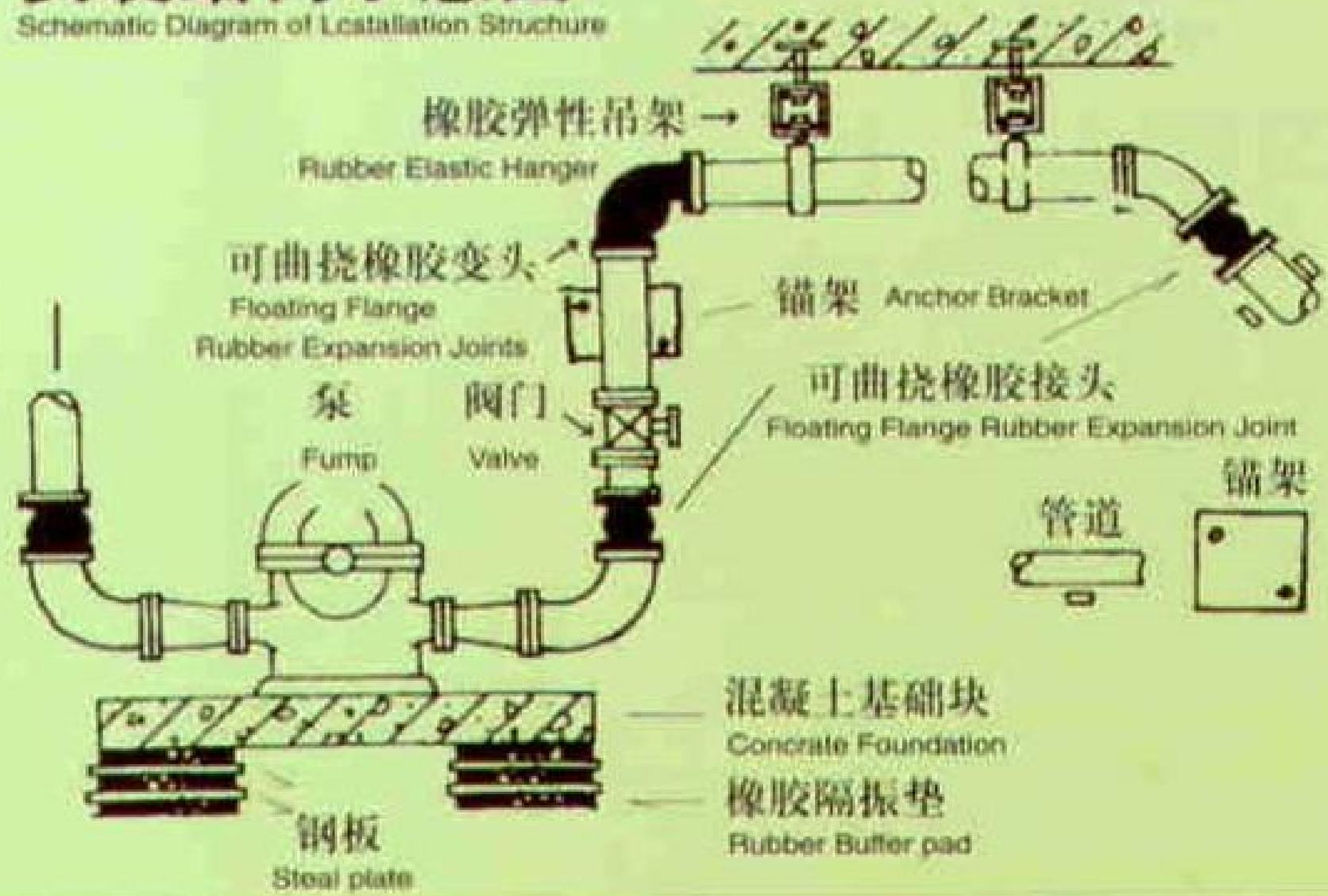
Installation drawing

- *An Installation Drawing provides information for properly positioning and installing items relative to their supporting structure and adjacent items, as applicable. Information may include; Dimensional Data, Hardware Descriptions, and General Configuration information for the installation site. An installation drawing does not establish item identification except for a work package or kit.*



安装结构示意图

Schematic Diagram of Installation Structure



Block Diagram

- Block diagram is a diagram of a system, in which the principal parts or functions are represented by blocks connected by lines, that show the relationships of the blocks. They are heavily used in the engineering world in hardware design, electronic design, software design, and process flow diagrams.

Mass Spectrometer

