TECHNICAL DRAWING

Chapter III : Descriptive Geometry

Points — Lines — Planes — Projections

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Section 1

Introduction

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- Practical solid geometry or **descriptive geometry** deals with the representation of points, lines, planes and solids on a flat surface (such as a sheet of paper), in such a manner that their relative positions and true forms can be accurately determined.

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- Straight lines are drawn from various points on the contour of an object to meet a plane; the object is said to be **projected** on that plane. The figure formed by joining, in correct sequence, the points at which these lines meet the plane is called the **projection** of the object. The lines from the object to the plane are called **projectors**.

Four methods commonly used in Technical Drawing

1. Orthographic projection

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1. Orthographic projection
2. Oblique projection

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3. Isometric projection

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Methods (2), (3) and (4) represent the object by a **pictorial view** as the eye sees it — a three-dimensional object is represented on a projection plane by **one view only**. In **orthographic projection**, an object is represented by two or three views on mutually perpendicular projection planes.

Section 2

Planes of Projection

2

- The two planes employed are called **reference planes**. The **vertical plane** (in front of the observer) is denoted V.P. and is often called the **frontal plane** (F.P.).

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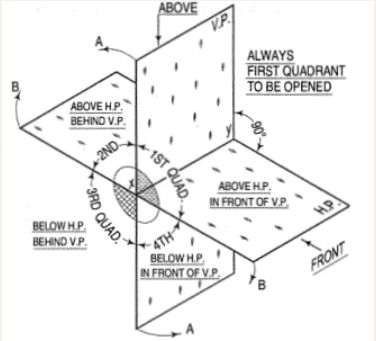
- The other plane is the **horizontal plane**, known as the H.P. The line in which they intersect is termed the **reference line**.

When the planes of projection are extended beyond the line of intersection, they form **four quadrants** (dihedral angles), numbered as shown. The object may be situated in any one of the quadrants; its position relative to the planes is described as "above or below the H.P." and "in front of or behind the V.P.".

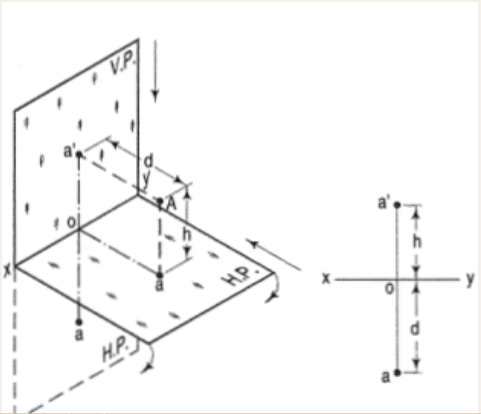


Section 3

Projection of a Point

3

A point *A* situated **above the H.P. and in front of the V.P.** (i.e. in the first quadrant). *a'* is its **front view** and *a* the **top view**. After rotation of the H.P., these projections appear as shown in the figure.

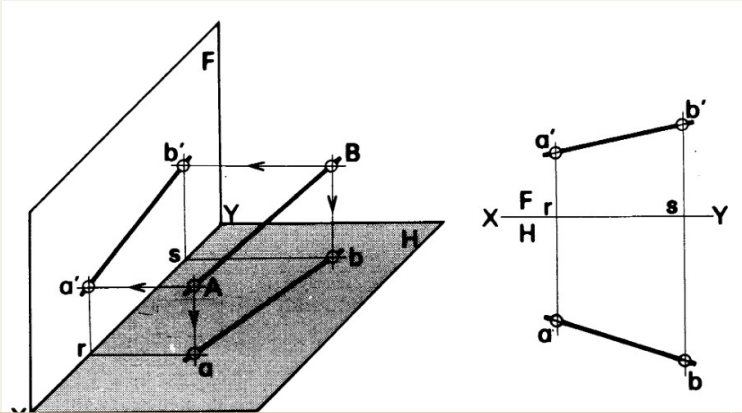


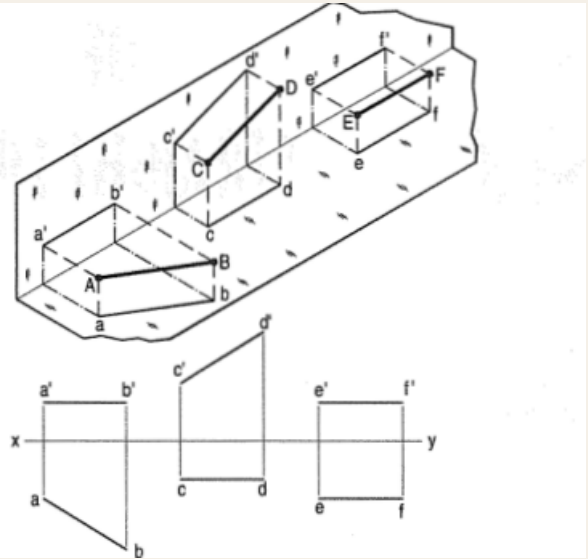
Section 4

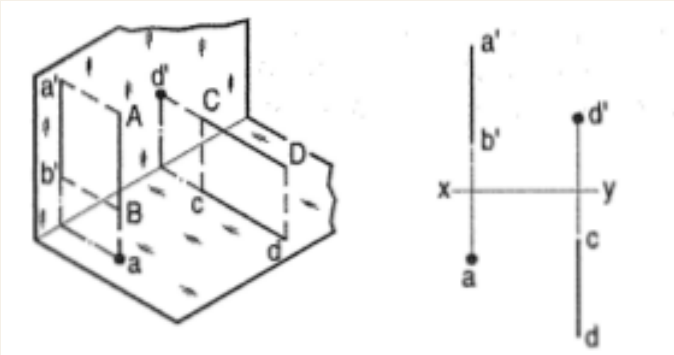
Projections of Straight Lines

4

The projections of a straight line may be drawn by joining the respective projections of its end points. The position of a straight line may also be described with respect to the two reference planes.




d'
D
e'
f'
F
E
f
e
c'
C
d
c
b'
a'
B
A
b
a
x
y

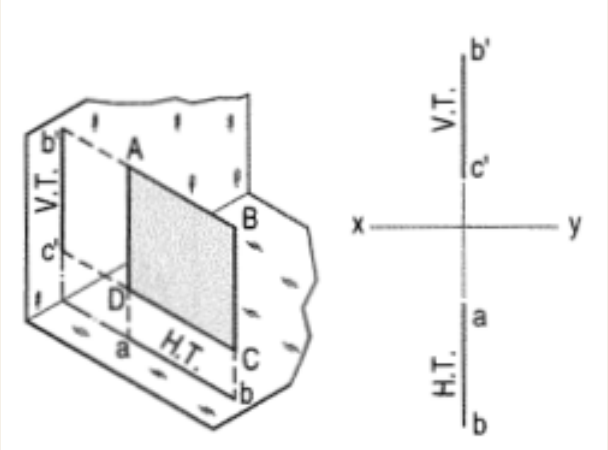

a'
d'
A
C
D
b'
B
c
a
d
a'
d'
b'
x
y
c
a
d

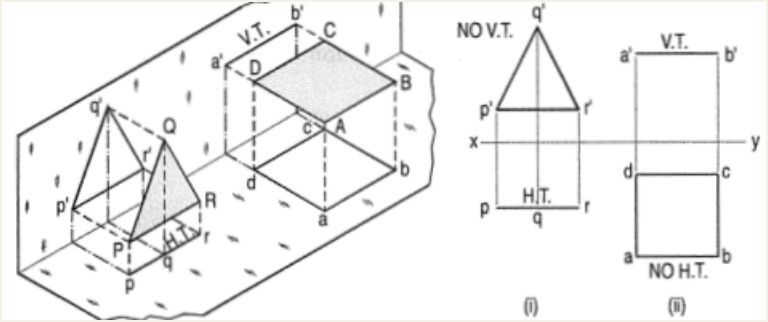
Section 5

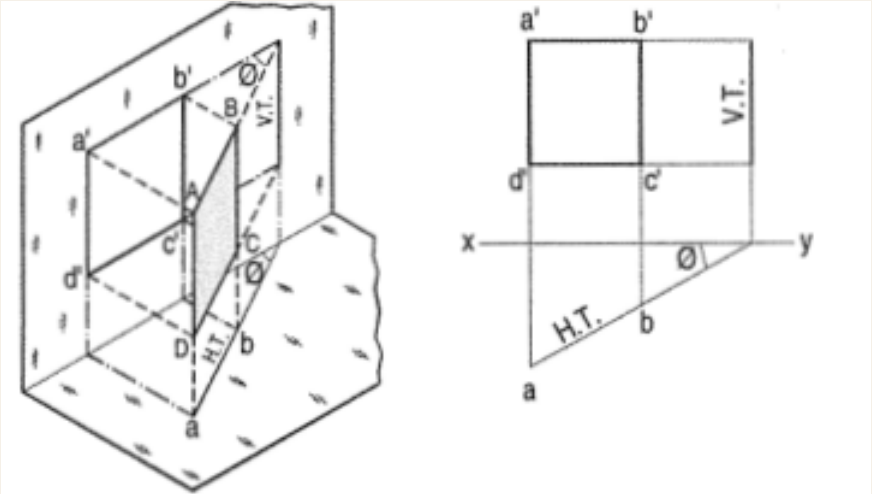
Projections of Planes

5

- Plane figures have only two dimensions: length and breadth — no thickness. A plane figure's projections can be drawn when the position of its plane with respect to the principal planes of projection is known.
- Planes are divided into two main types:
  1. **Perpendicular planes**
  2. **Oblique planes**
- Topics covered:
  1. Types of planes and their projections
  2. Traces of planes


b'
V.T.
c'
A
B
D
C
a
H.T.
b
x
y
b'
V.T.
c'
a
H.T.
b


V.T.
b'
C
a'
D
B
q'
Q
A
c
r'
d
b
p'
R
a
P
H.T.
r
q
p
NO V.T.
q'
p'
r'
x
y
p
H.T.
r
q
(i)
V.T.
a'
b'
d
c
a
b
NO H.T.
(ii)


a'
b'
Ø
V.T.
B
A
c'
C
d'
Ø
D
H.T.
b
a
a'
b'
V.T.
d'
c'
x
y
Ø
H.T.
b
a

Thank you for your attention.

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