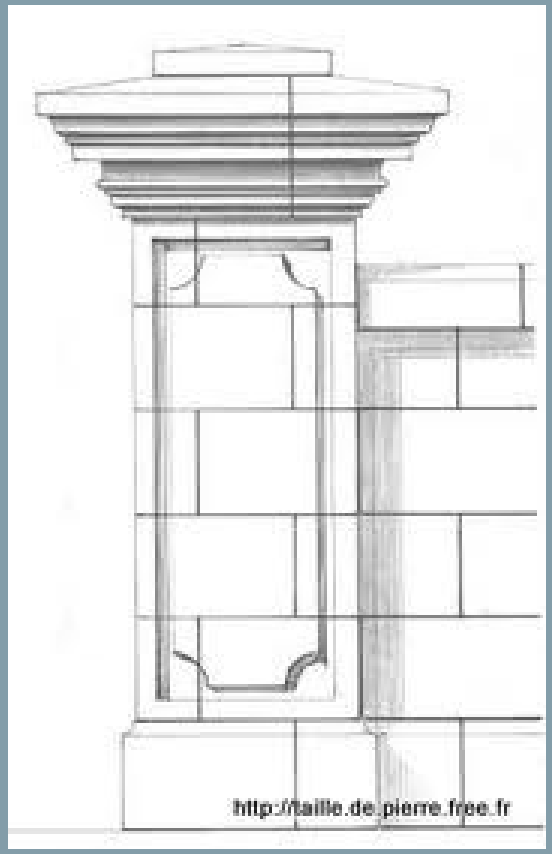
Introduction to Artistic &Technical Drawing In Architecture

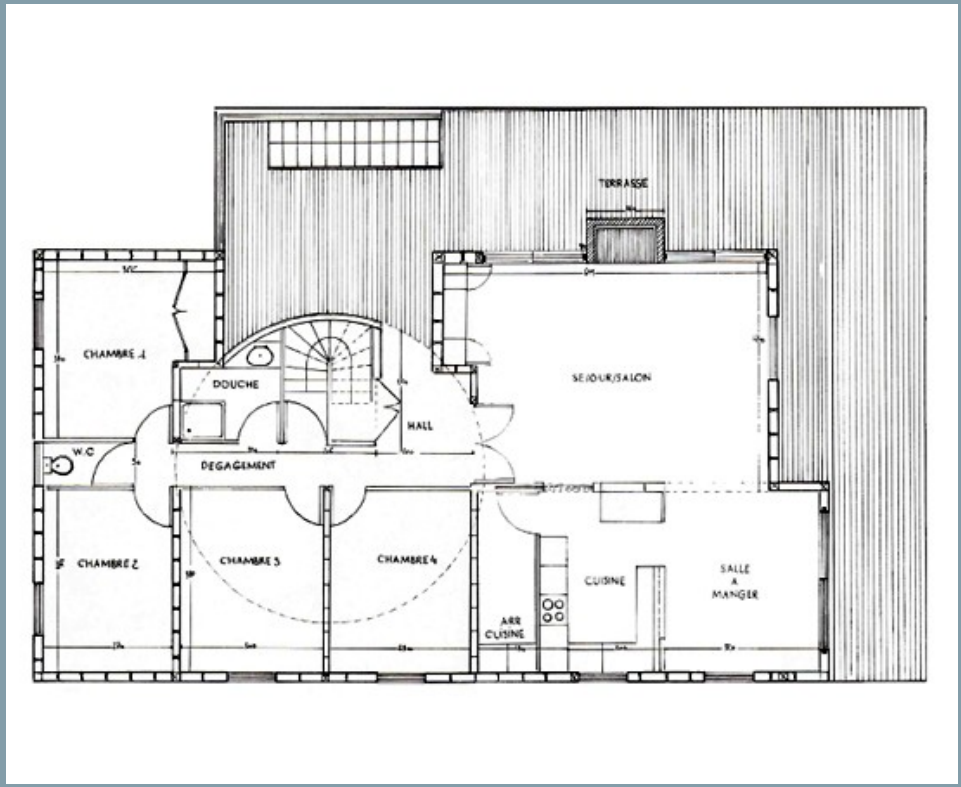
Technical drawing

- **Technical drawing** is a figurative language for representation, technical communication, design and for systemic analysis.
- It is mainly used for the representation of the different components of the Architecture project



Technical drawing

- Defined as : **a set of conventions for representing objects**
- These conventions ensure that the object built is as it is imagined in the drawing by its designer.

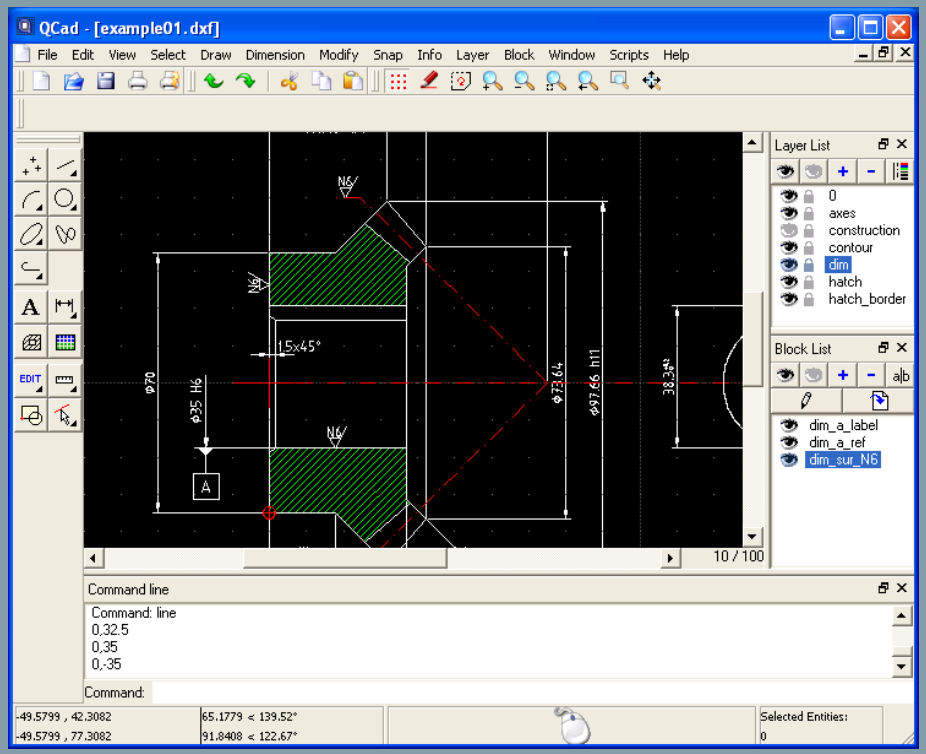


Technical Drawing Mode of Execution

Currently we can distinguish two possibilities for executing the technical drawing of the building:

1 Hand and Instrument Drawing

2 Computer Aided Drawing/Design (CAD : CAO-DAO)

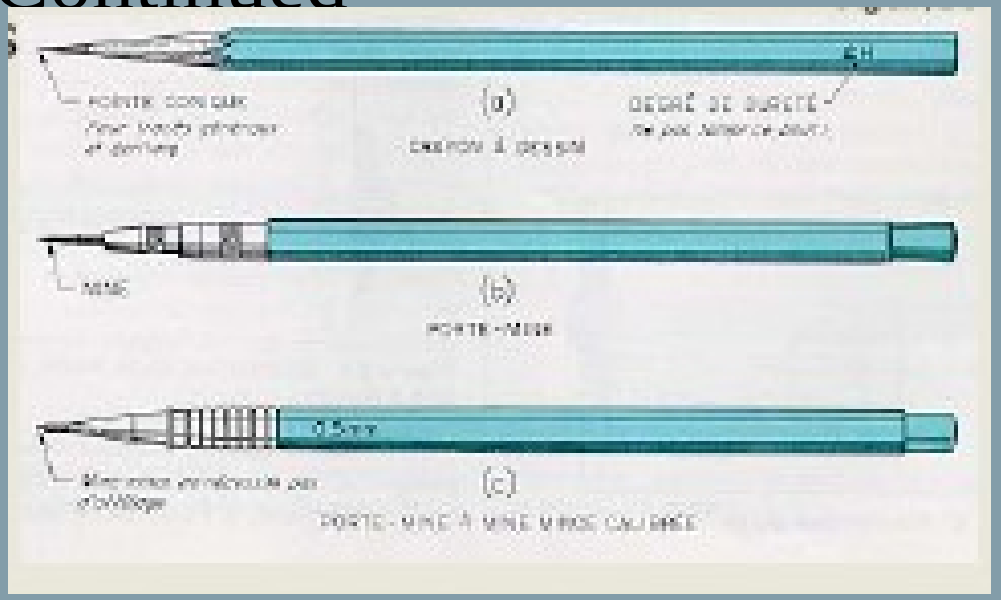


Drawing with Traditional Tools Instruments

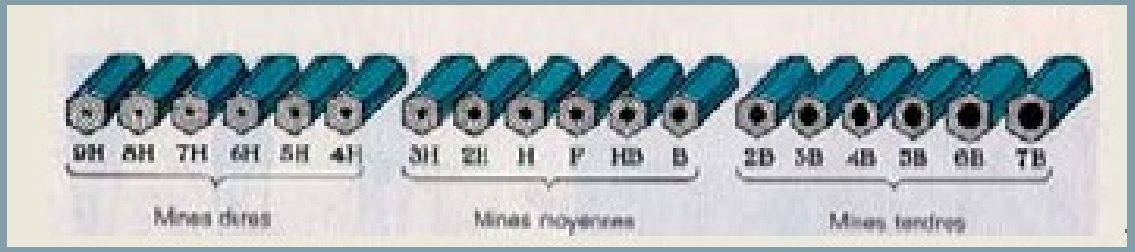
- Drawing table
- Rulers, squares,
- Pencils, pens, erasers
- Templates
- Compass
- Etc.

Drawing with Instruments Traditional Tools Continued

- Pencils

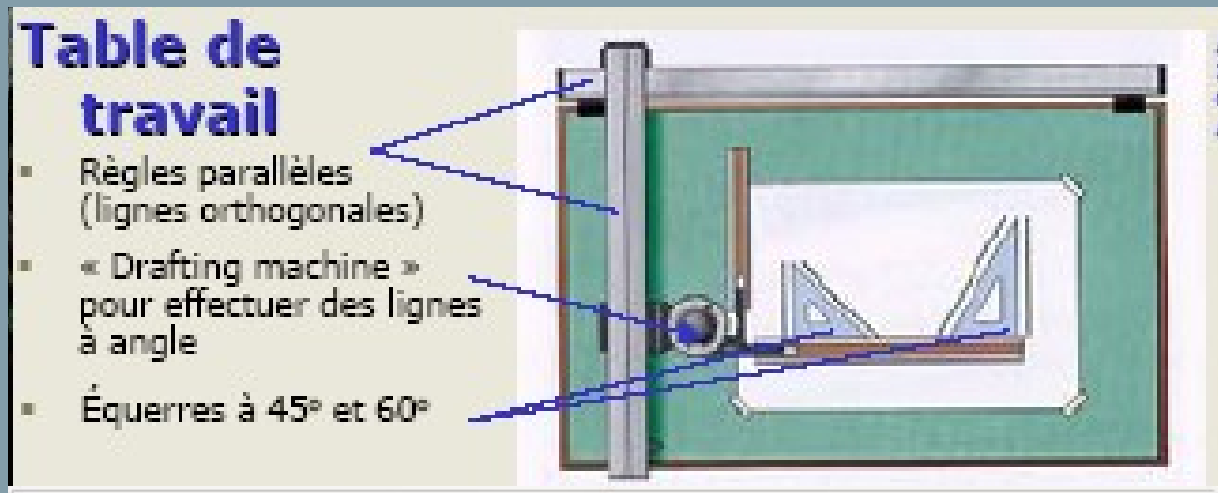


- Leads (Mines)

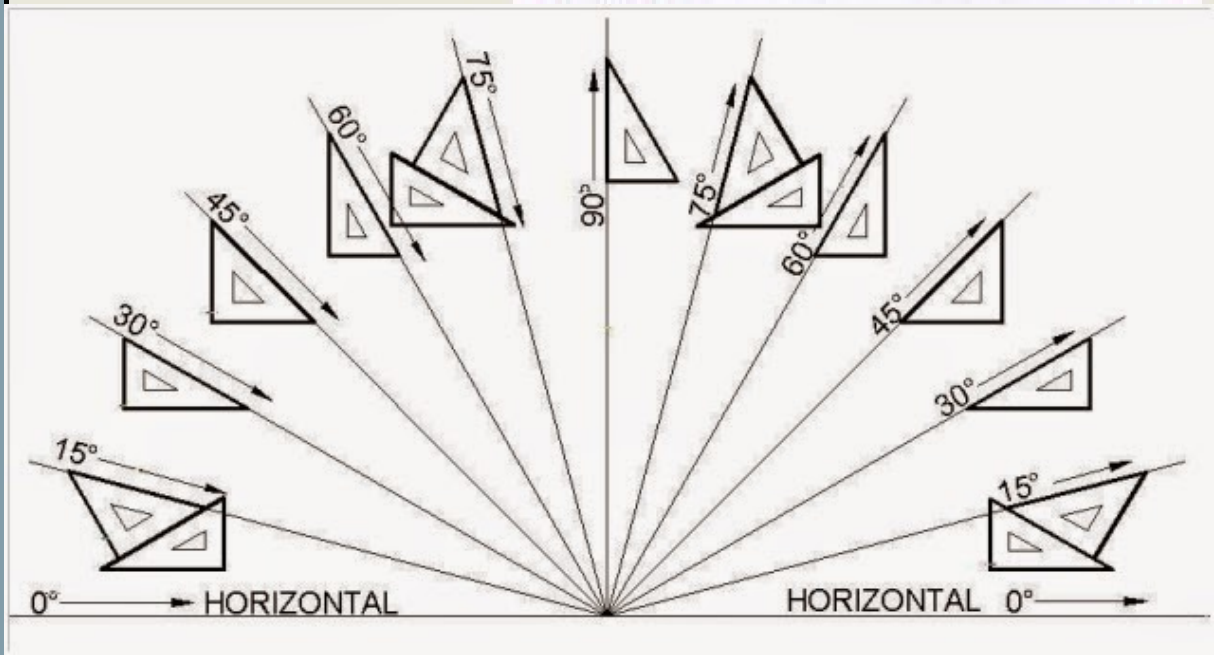


Drawing with Instruments Traditional Tools Continued

- Drawing Table



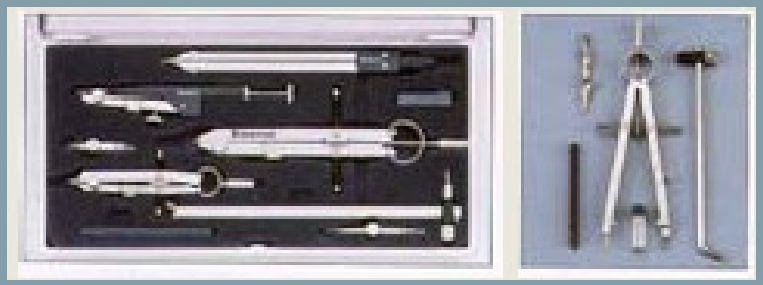
- Use of Te and squares



Drawing with Instruments Traditional Tools Continued

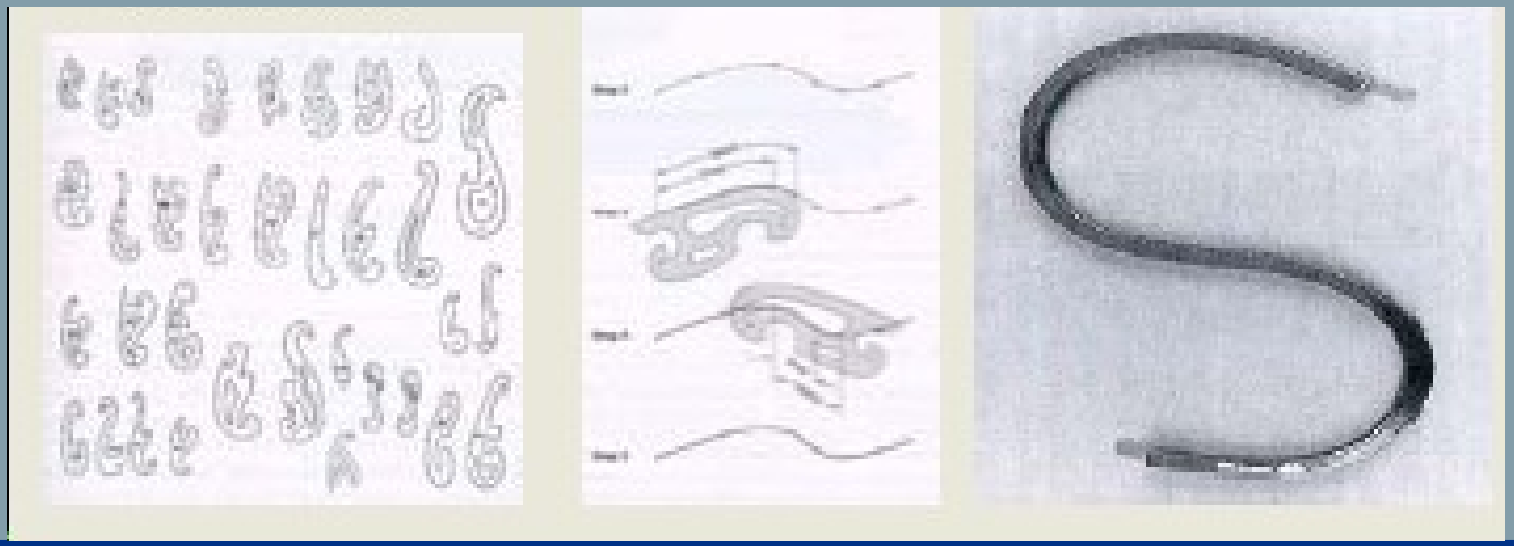
- Circles and Arcs :

Compasses and dry points for distance measurement



- Curves

Fixed Guns and Deformable Guns

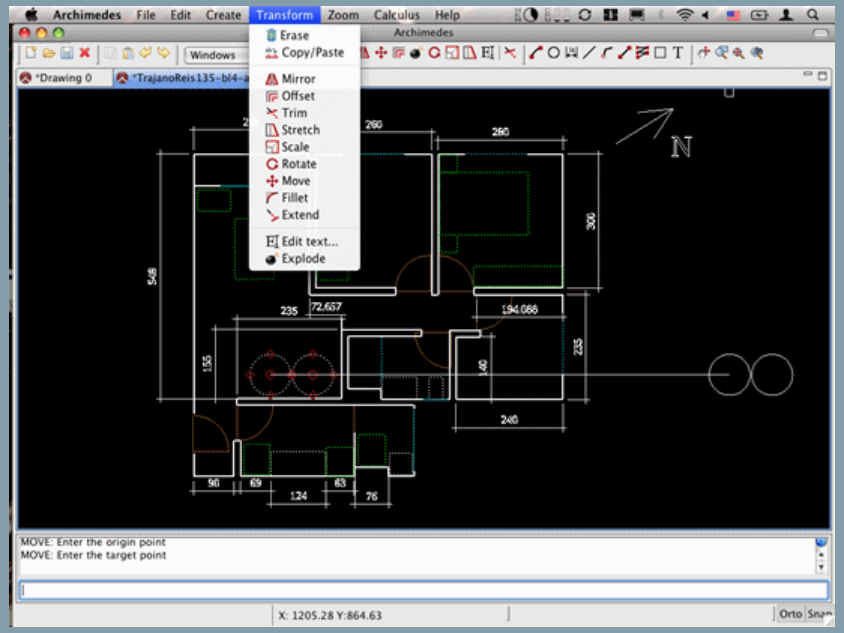


Computer Aided Drawing (CAD)

CAD software

Drawing by:

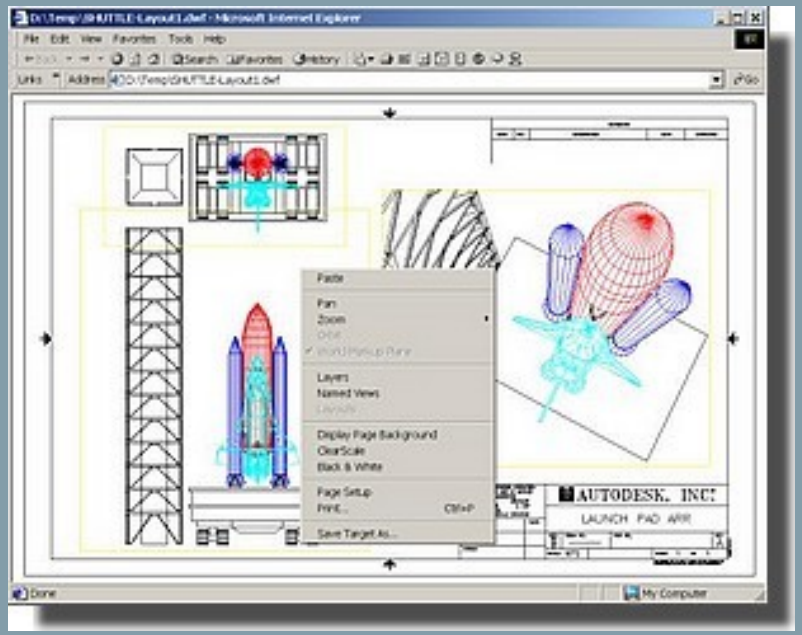
- Lines (Solid lines, hidden discontinued lines, etc.)
- Circles/Arcs
- Entities/Hatches
- 2D/3D objects



Computer Aided Drawing (CAD)

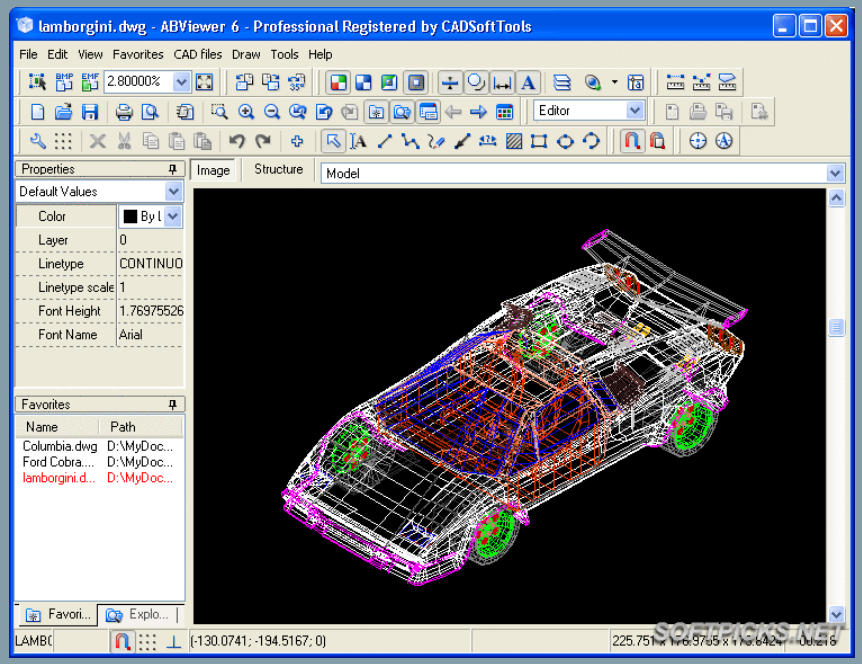
Functions

- Scale control
- Calculations (distances, dimensions, areas, etc.)
- Group entities (blocks)
- Manipulate text
- Copy, move, correct, modify, etc.
- File manipulations, import; export
- Print, Publish, Forward, Web, etc.



Computer Aided Drawing (CAD)

- The drawings produced are produced in vector mode.
- CAD software assigns coordinates (X,Y for 2D plans and X,Y,Z for 3D models).
- Each element of a drawing is called an entity and each entity therefore contains properties of color, thickness, layer, line type, etc.



Computer Aided Drawing (CAD)

Material

Workstation-PC.

- ***Data entry:***

Mice, Tablets; Touch screens, styluses, etc

- ***Backup:***

Rigid disk

Other: CD/DVD/Cards, etc.

- ***Impression:***

Printers (laser, inkjet, etc.)

Plotters (inkjet, thermal, etc.)

Conventions in Technical Drawing

Paper Size

Architectural drawing paper formats are designed so that the proportions of the sheet are preserved when it is folded or cut in half lengthwise.

The ratio between length and width must therefore be equal to the square root of two, √2, or approximately 1.414.

Conventions in Technical Drawing

Paper Size

The most used formats are:

A4 = 210 x 297 mm

A3 = 297 x 420 mm

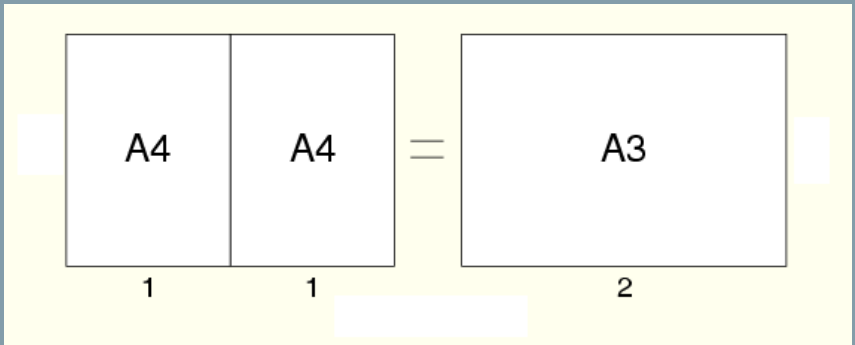
A2 = 420 x 594 mm

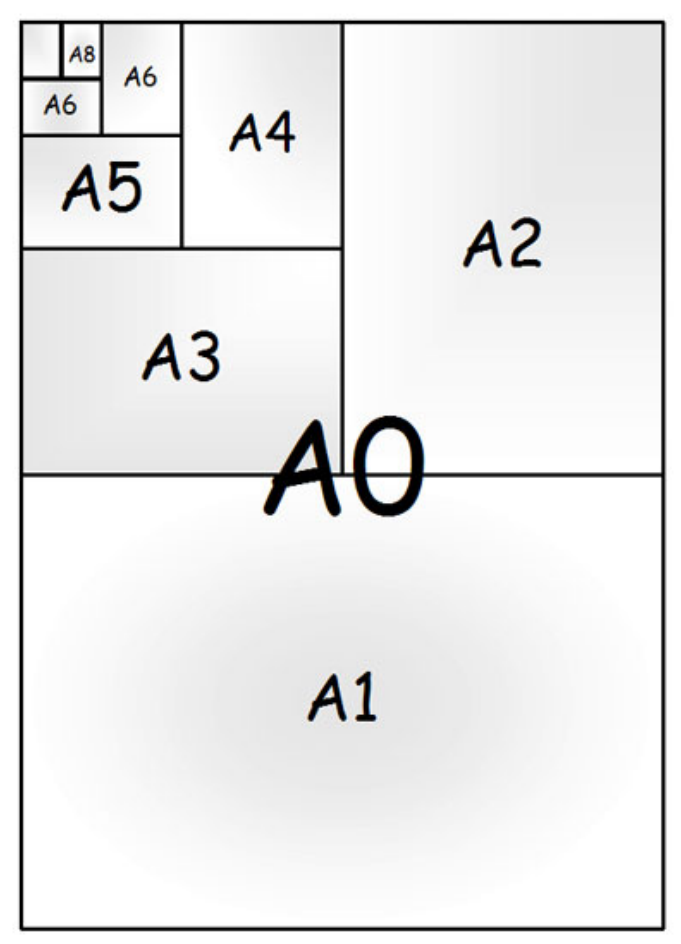
A1 = 594 x 840 mm

A0 = 840 x 1189 mm

Conventions in Technical Drawing

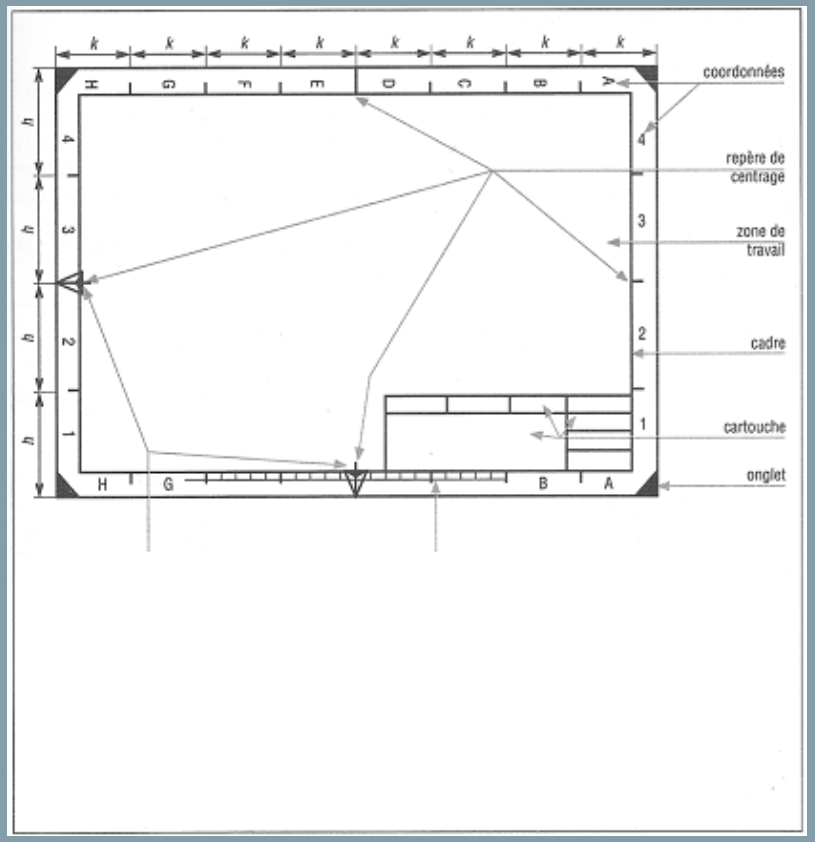
Paper Size





Conventions in Technical Drawing

Permanent graphic elements



The framework

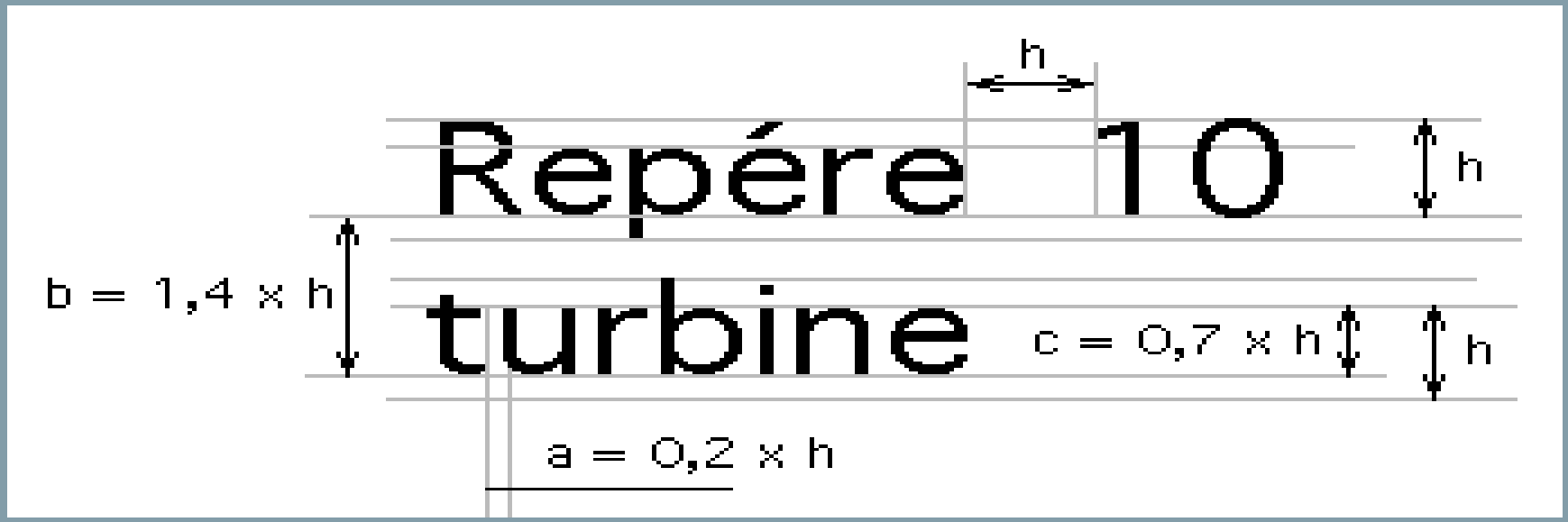
NOM:	Notation	Barème	Titre:
SECTION:	Présentation:		
Date :	Exactitude:		
DESSIN TECHNIQUE	Cotation:		Echelle : Format:
	Note :		N° Folio :

The title block – Le cartouche

Conventions in Technical Drawing

Standardized writing

- **readability**
- **homogeneity**
- **suitability for reproduction and microcopy**



Conventions in Technical Drawing

Standardized writing

- Height of capital letters (mm):

h = 2.5 3.5 5 7 10 14 20

- Height of lowercase letters (mm):

c = 0.7 * h

- Character spacing

a = 0.2 * h

- Minimum line spacing:

b = 1.4 * h

Conventions in Technical Drawing

Main types of traits

Nature: Continuous , Interrupted , Mixed, axis.

Width: Strong or Thin (by mm).

TYPE de TRAIT	DESIGNATION	APPLICATIONS
	Trait continu fort	Arêtes et contours vus. Cadre et cartouche
	Trait interrompu court fin (ou pointillé)	Arêtes et contours cachés
	Trait mixte fin (ou trait d'axe)	Axes Plan de coupe ou de symétrie
	Trait continu fin	Lignes d'attache de repères et de cotes. Hachures.
	Continu fin ondulé Ou Rectiligne en «zigzag»	Limites de vues ou de coupes partielles
	Trait mixte fin à deux tirets	Contours de pièces voisines Parties situées en avant du plan de coupe

Conventions in Technical Drawing

Scales

Drawn dimension / Real dimension

- **Reduction**
- **Enlargement**
- **Recommended scales in Architecture:**
  - **1/10, 1/20 : Details**
  - **1/50, 1/100, 1/200 : Architectural drawings**
  - **1/500, 1/1000 : Site plan (plan de masse), urban and situation plans.**

Projection Systems in Architectural Drawing

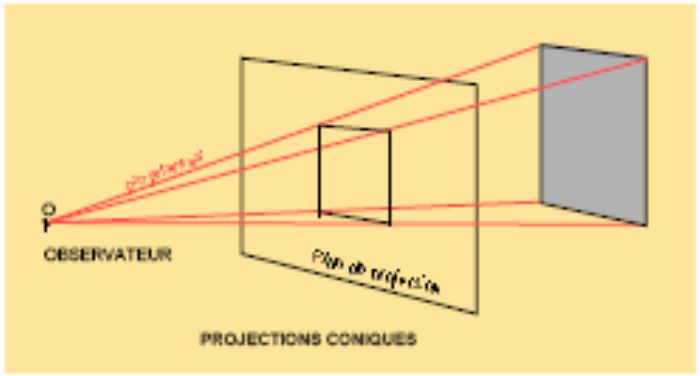
- In architectural drawing there are two types of projection:

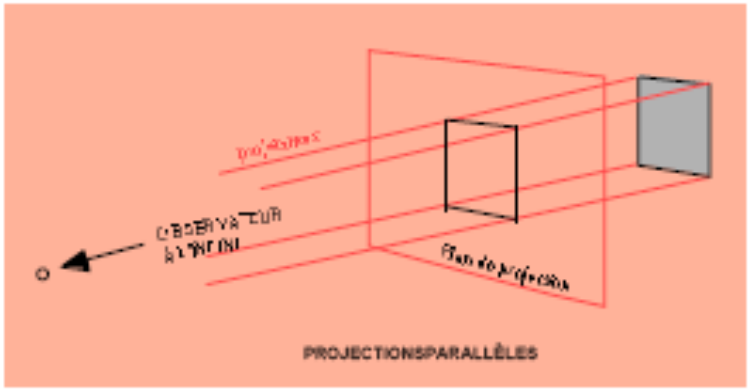
- ***Parallel or Cylindrical Projection known as Orthogonal and/or Oblique projection***

- ***Conical projection known as Perspective***

Projection Systems in Architectural Drawing

PROJECTIONS PARALLÈLES ET CONIQUES



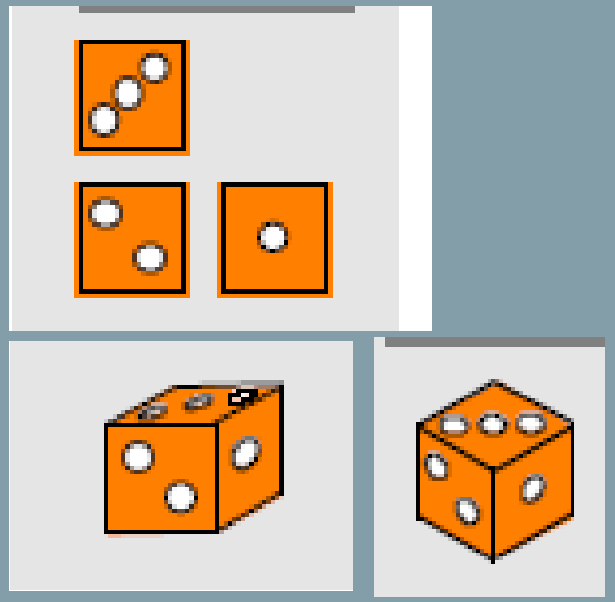


Projection Systems in Architectural Drawing

Parallel projections :

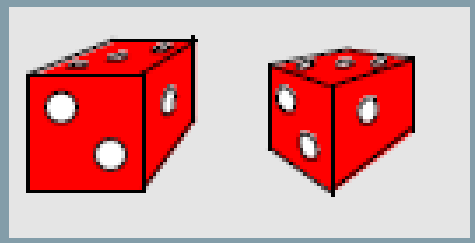
1. ***Orthogonal projections :***
   Plans,
   Sections,
   Elevations.
2. ***Axonometric projections :***

For 3D representation of the project.



Conic projections :

- ***Perspectives.***



Projection Systems in Architectural Drawing

CLASSIFICATION PAR PROJETANTES

Classe de projection	Distance de l'observateur au plan de projection	Distance des projetantes
Coniques	Finie	Convergentes vers le centre de projection (observateur)
À un point de fuite	Finie	
À un deux de fuite	Finie	
Cylindriques	Infinie	Parallèles entre elles
Obliques	Infinie	Parallèles entre elles et obliques par rapport au plan de projection
Cavalière	Infinie	
Orthogonales	Infinie	Perpendiculaires au plan de projection
Axonométriques	Infinie	
Isométriques	Infinie	
Vues multiples	Infinie	

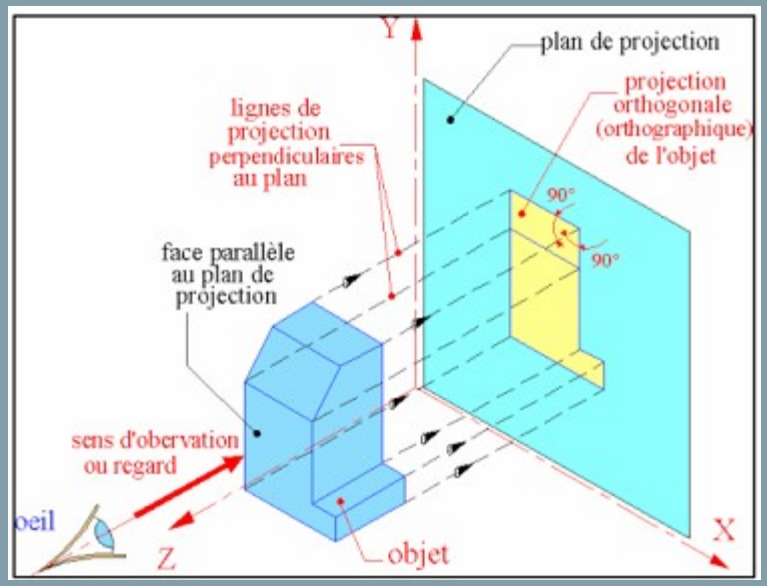
Introduction to Orthogonal Projection

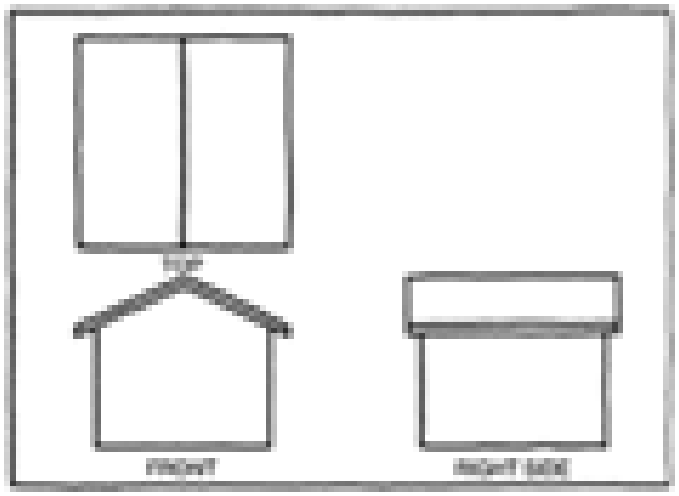
- The transition from a 3-dimensional object to a 2-dimensional scale graphic representation that requires **respecting accurate dimensions and angles**. This is the purpose of the orthogonal representation
- The **orthogonal (orthographic) projection** allows to represent an object in several views and to define it completely without ambiguity

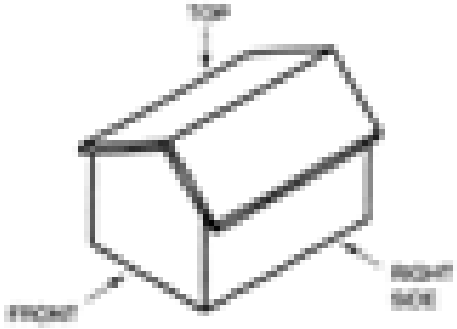
Introduction to Orthogonal Projection

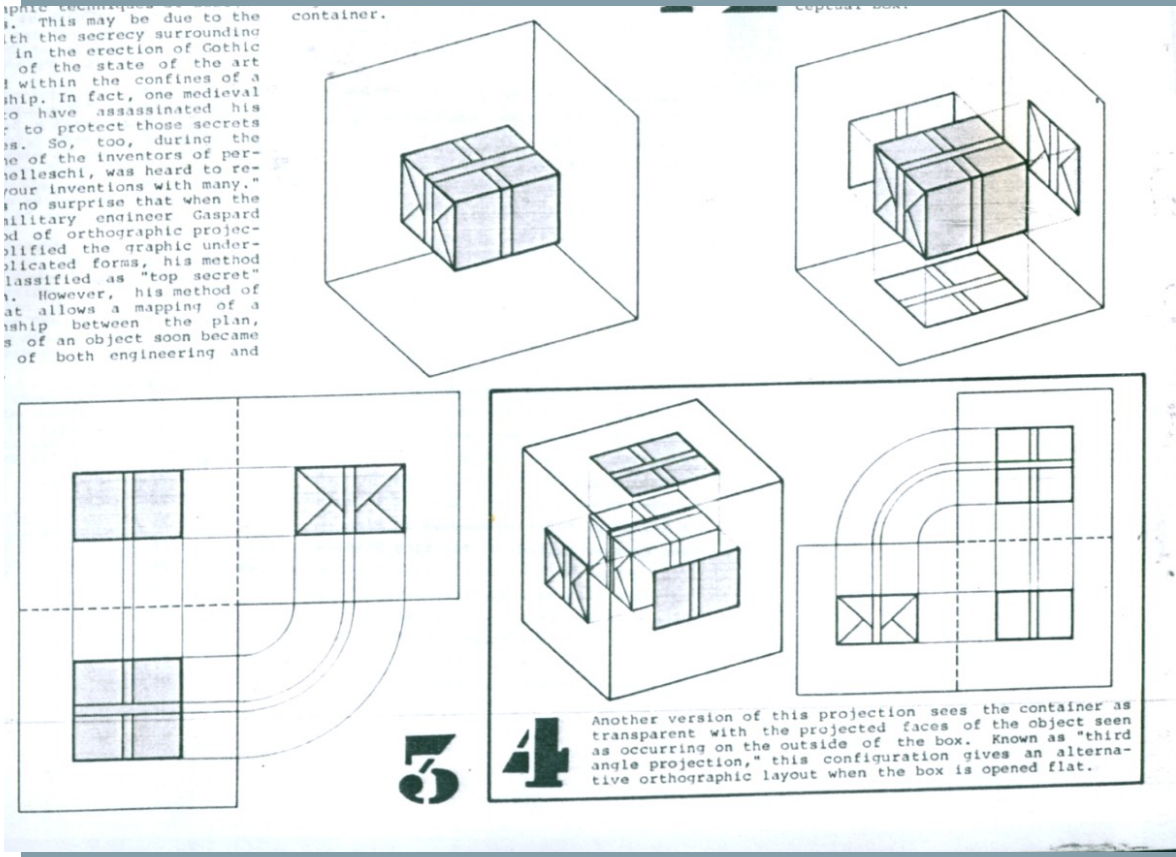
The principle

- The observer positions himself perpendicular to one of the faces of the object to be defined.
  The observed face is then projected and drawn in a **projection plane parallel** to this face and located behind the object









This may be due to the
th the secrecy surrounding
in the erection of Gothic
of the state of the art
within the confines of a
ship. In fact, one medieval
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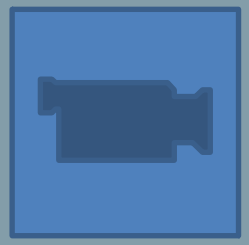
to protect those secrets
s. So, too, during the
e of the inventors of per-
elleschi, was heard to re-
our inventions with many."
no surprise that when the
ilitary engineer Gaspard
d of orthographic projec-
olified the graphic under-
licated forms, his method
lassified as "top secret"
. However, his method of
at allows a mapping of a
ship between the plan,
s of an object soon became
of both engineering and

container.

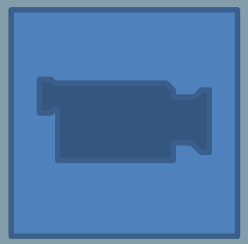
Another version of this projection sees the container as transparent with the projected faces of the object seen as occurring on the outside of the box. Known as "third angle projection," this configuration gives an alternative orthographic layout when the box is opened flat.

Orthogonal Projection Videos

- Glass Box

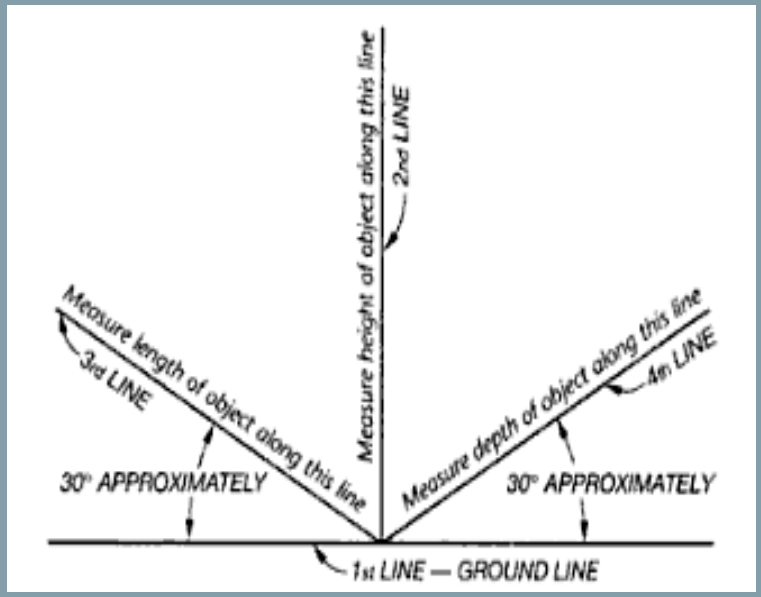


- Projected views



Axonometry

- Technique for graphic representation of objects using projections made on planes perpendicular to the three main, orthogonal directions of these objects



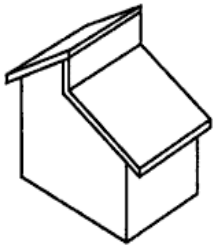


FIGURE 4.31 ■ Given structure.

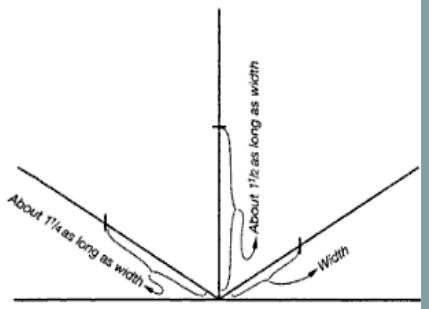
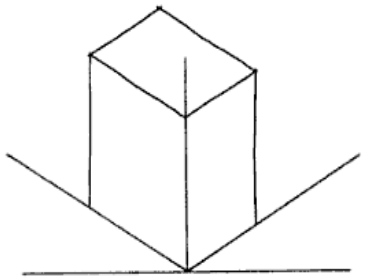


FIGURE 4.32 ■ Step 4: Lay out length, width, and height.



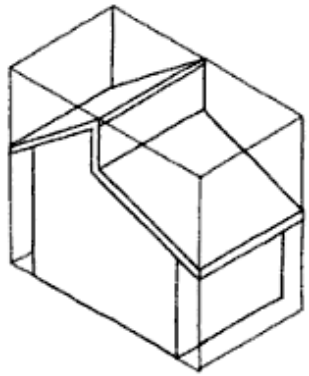


FIGURE 4.34 ■ Step 5: Sketch the features of the structure.

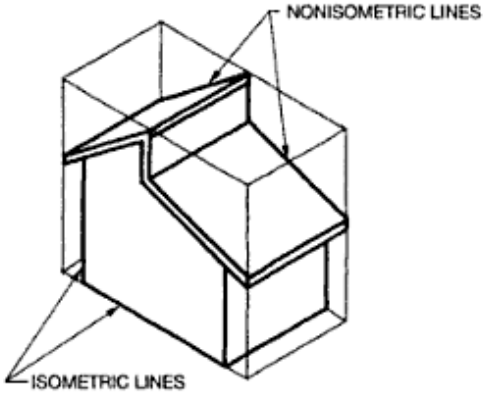
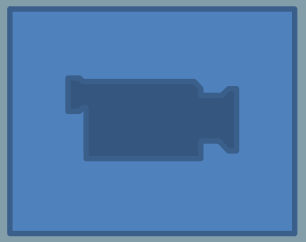


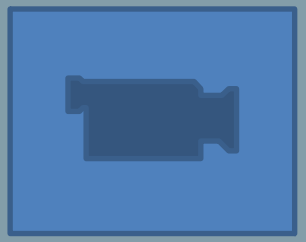
FIGURE 4.35 ■ Step 6: Darken the structure.

Isometry Videos

Isometric Construction 1



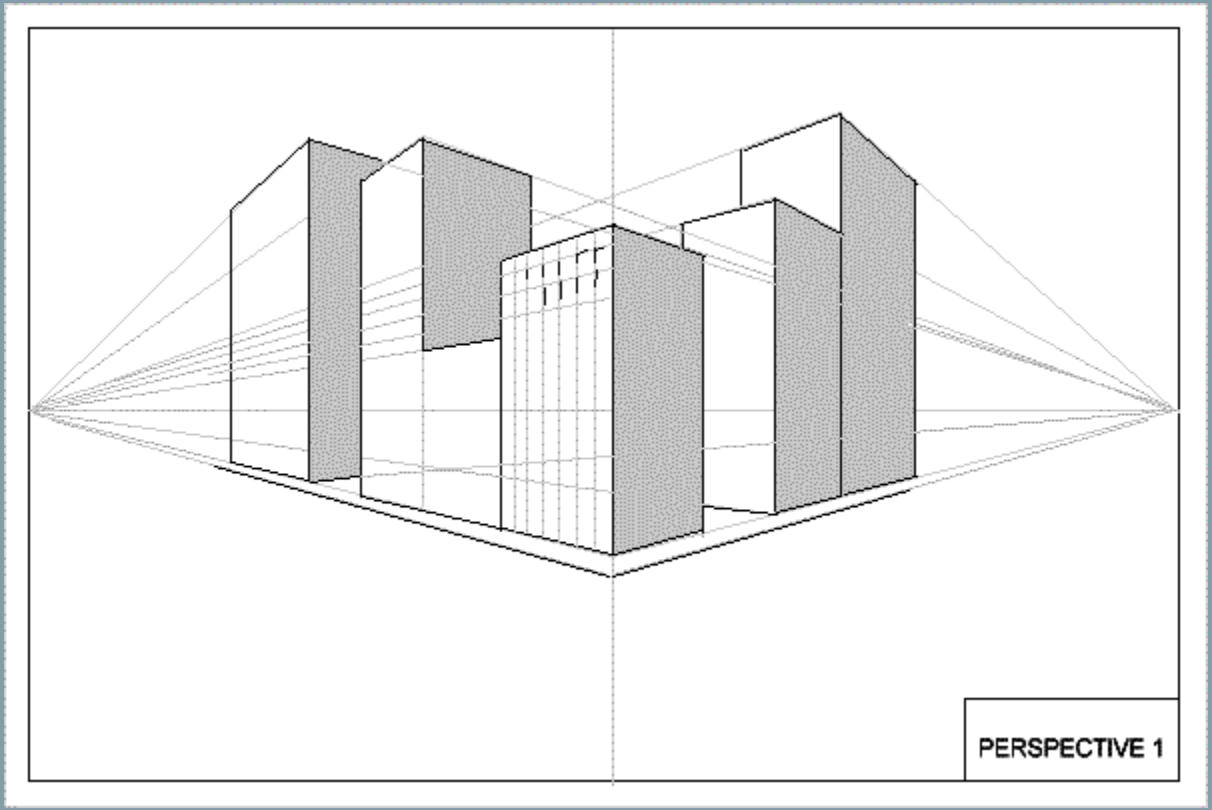
Isometric Construction 2



Perspective

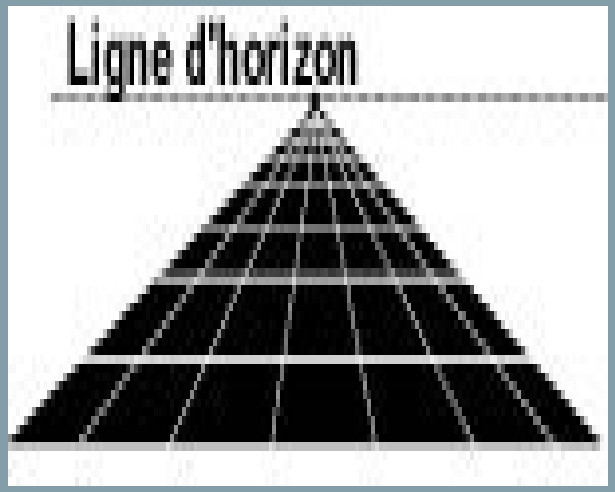
- Perspective is the phenomenon of visual perception by which the eye perceives a three-dimensional world in two dimensions.
- To represent a three-dimensional building on a plan, we use perspective, a technique which consists of projecting the elements to be visualized onto the drawing plan.

Features

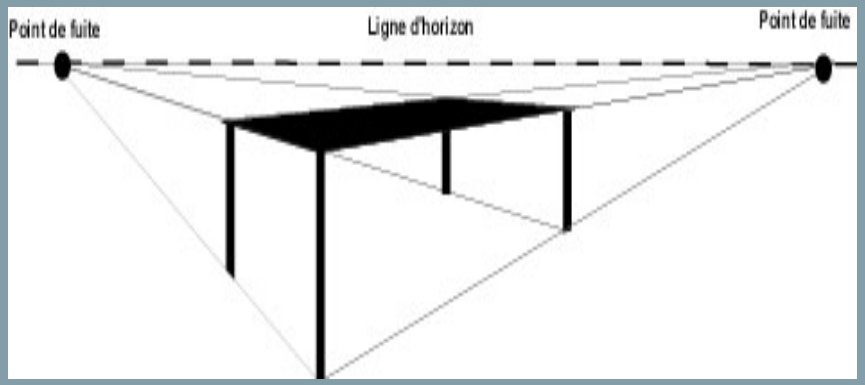


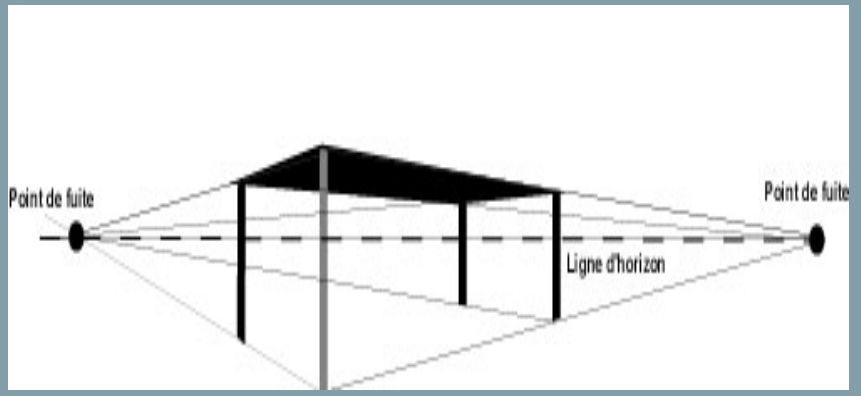
Features

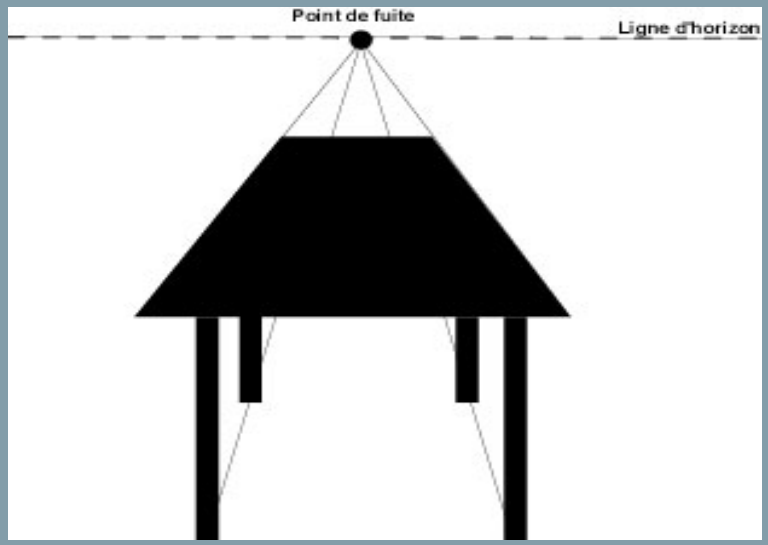
1.The horizon line



2. Vanishing points – Points de fuite

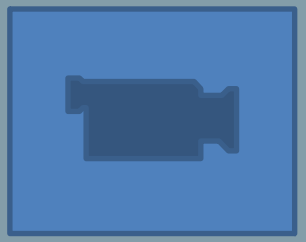




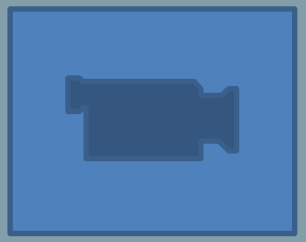


Perspective Videos

Perspective 1 Vanishing Point



Perspective 2 escape points



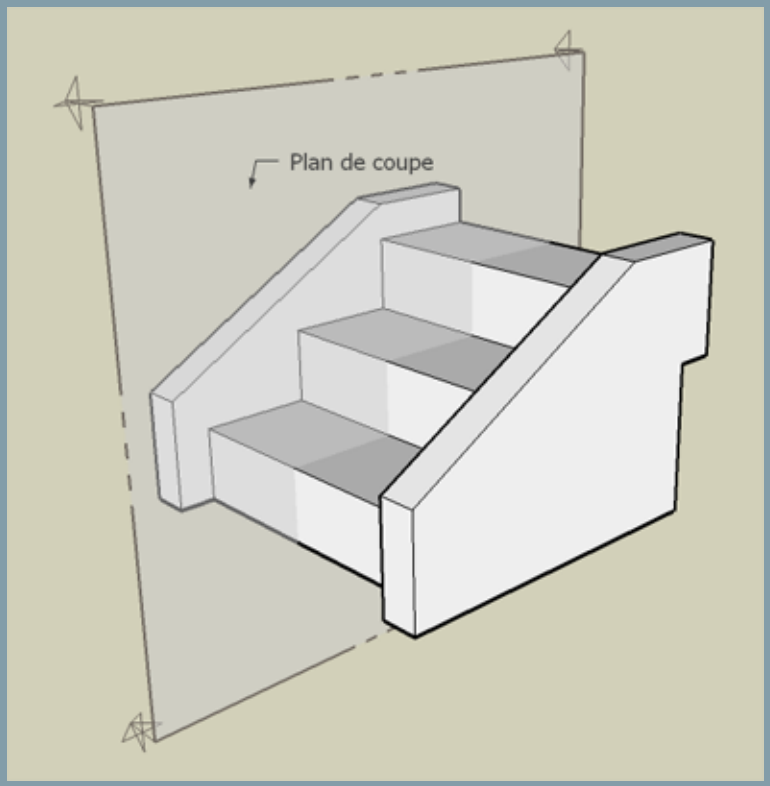
Sections

In terms of Architecture

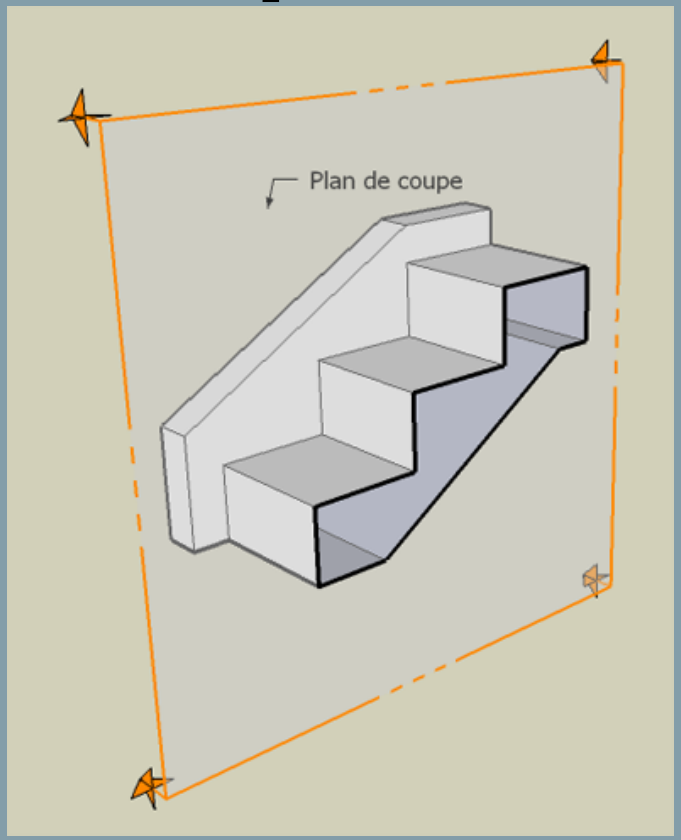
- The representation of a building, a building, etc., which is assumed to be cut
- **Vertically** in the direction of its length or width
- **Horizontally** to show interior details and dimensions.

Sections

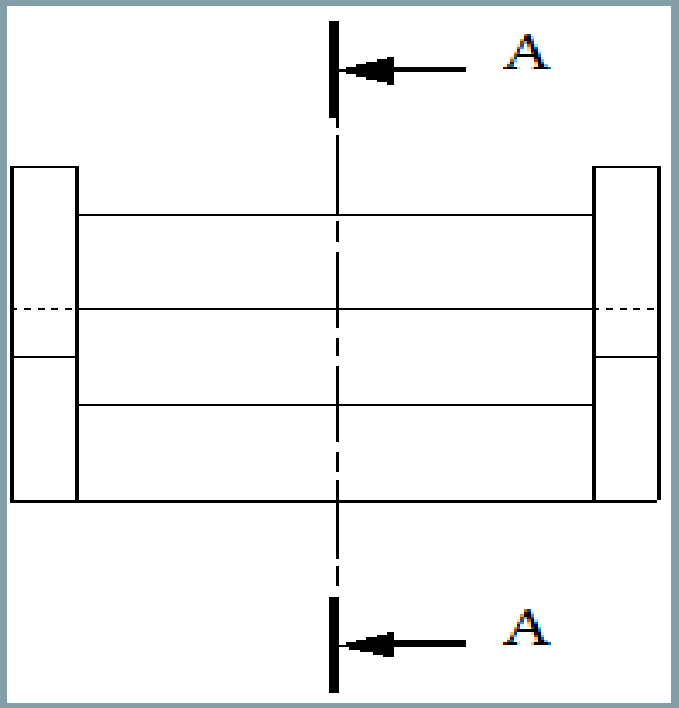
Cutting plane

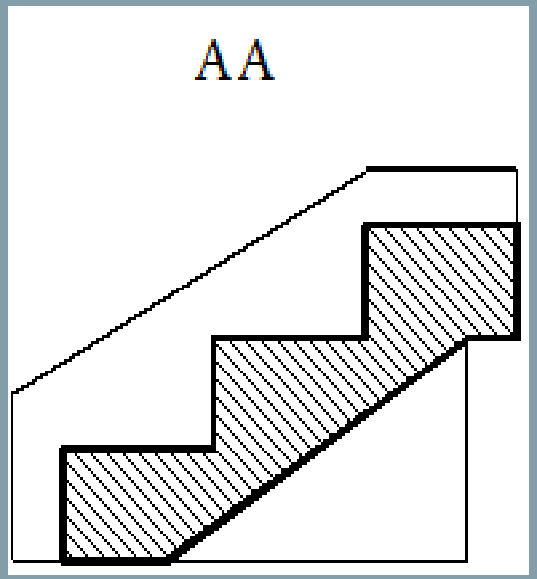


The Coupe staircase

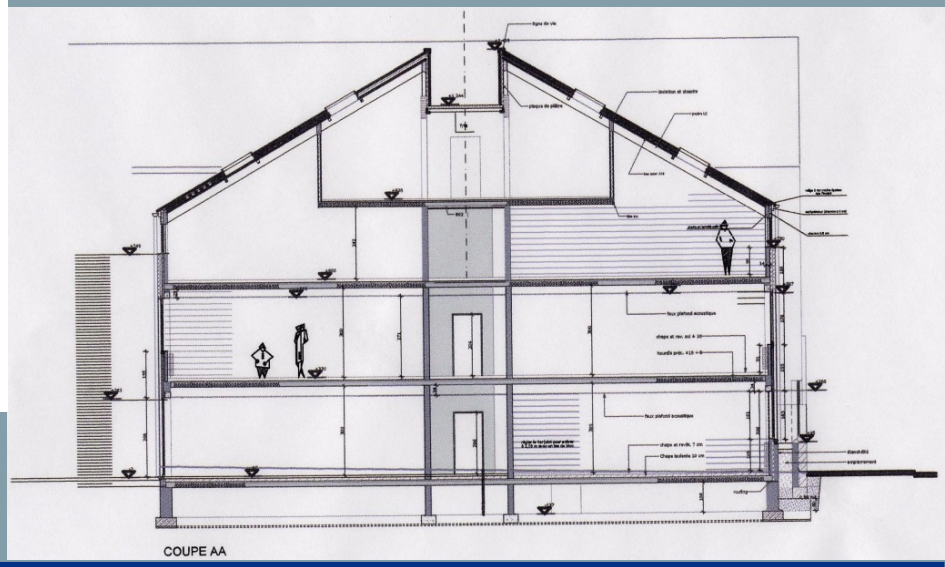


Representation

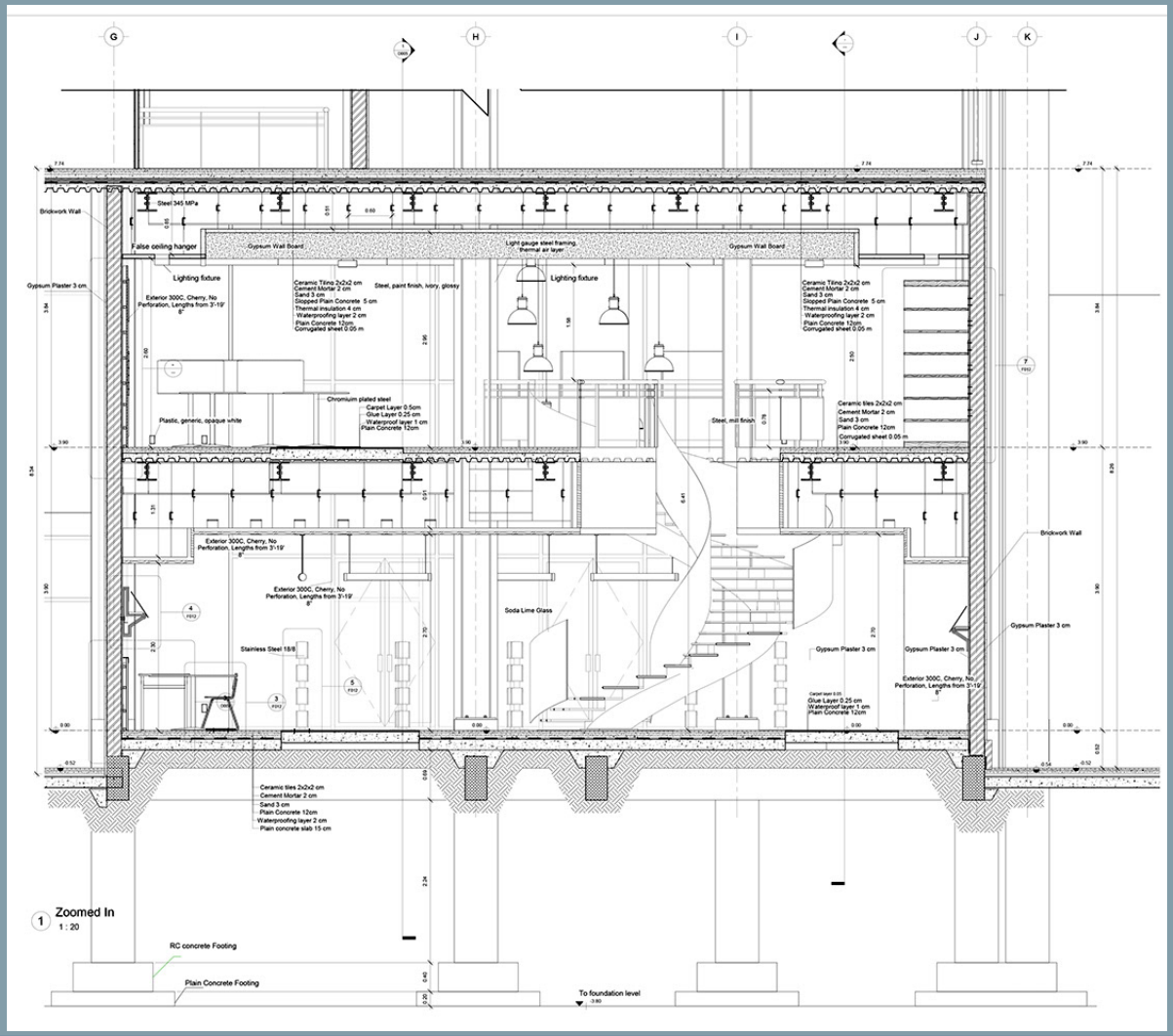




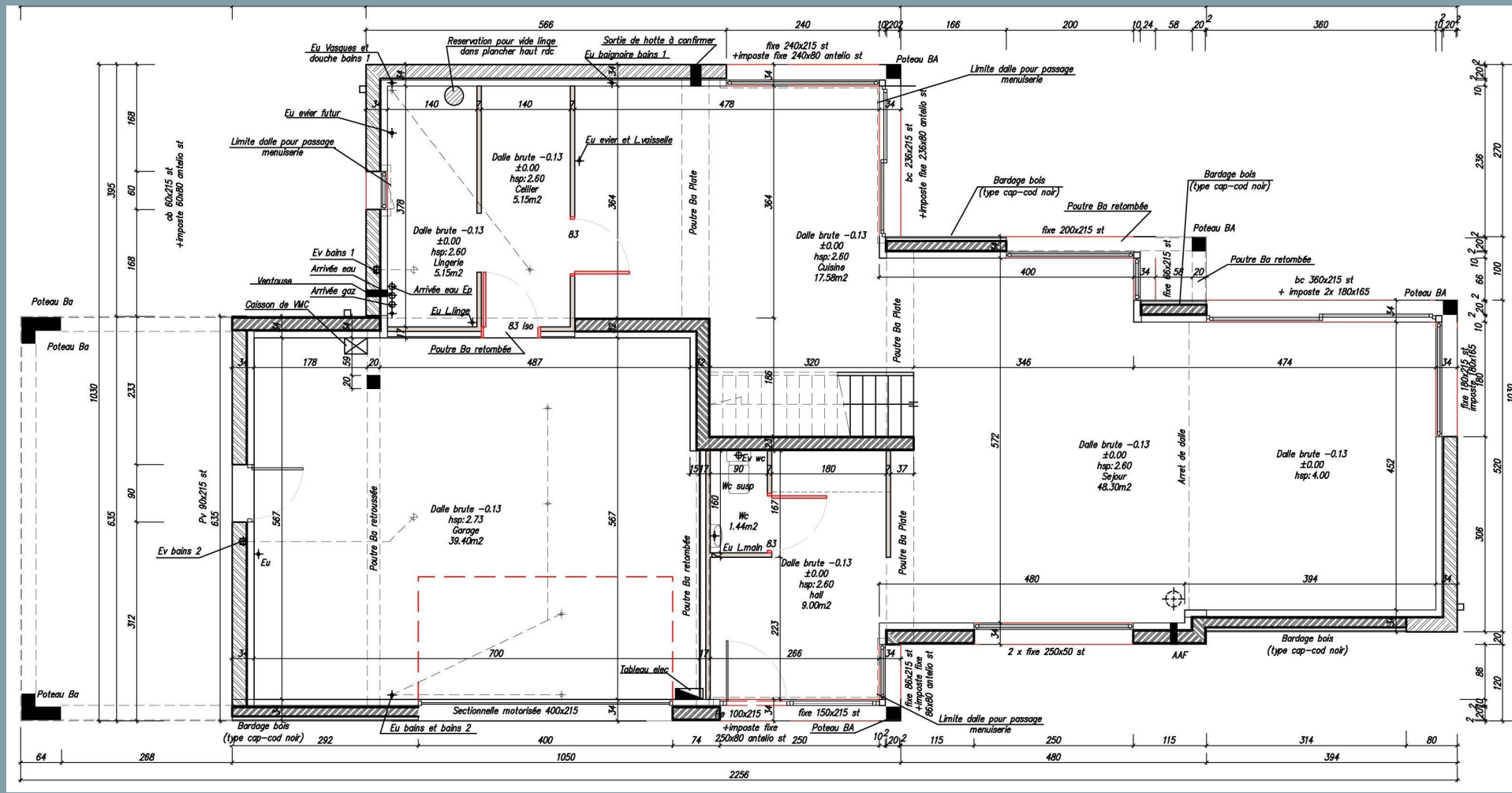
Representation



Representation - Section



Representation - Plan

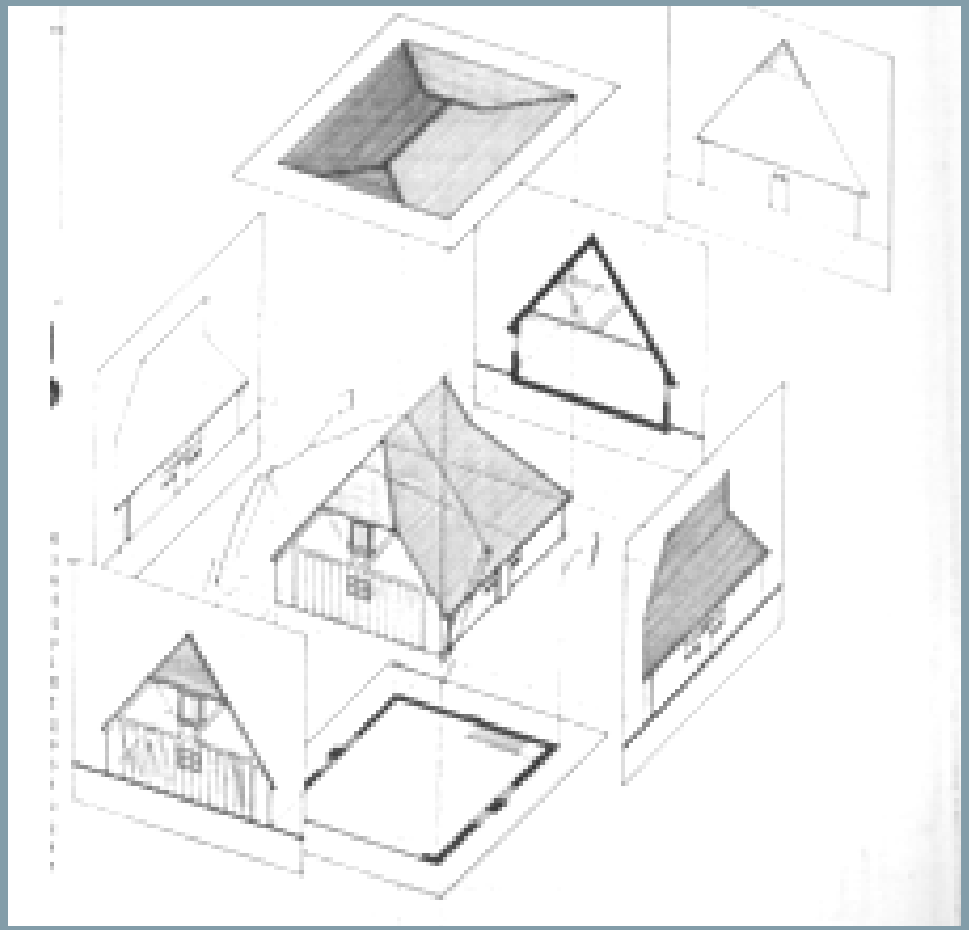


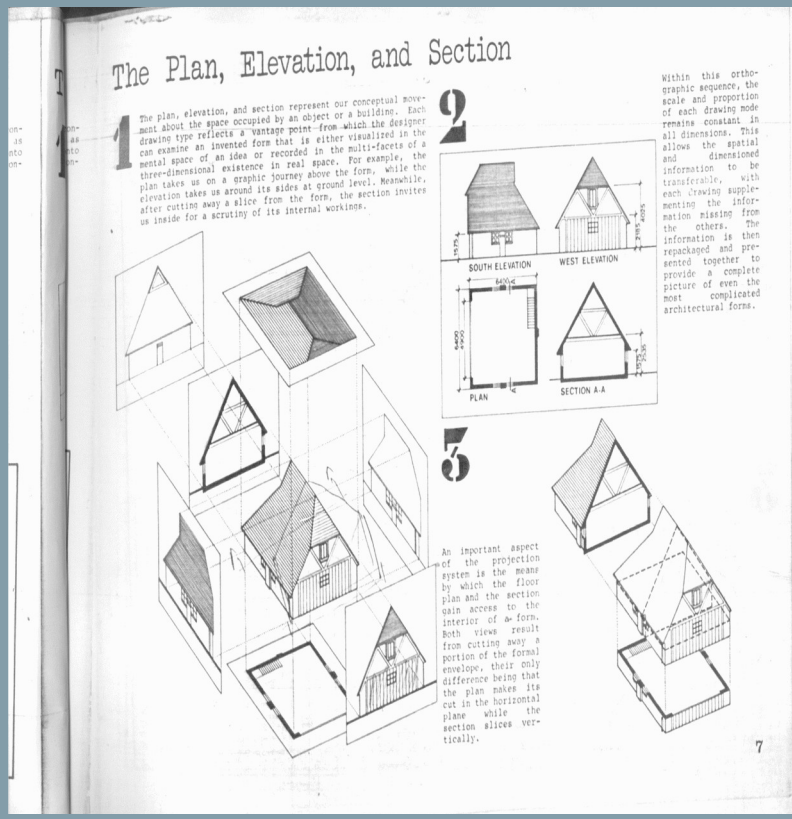
Conclusion

- In conclusion, projection and representation systems in architectural drawing are essentially based on the following elements:

- **Plans** which are horizontal sections of the architectural object and which show the distributions of interior spaces
- **sections** highlighting construction elements and interior spaces
- **The facades** which are the exterior views of the architectural object
- **Perspective or isometry** which is a three-dimensional representation of the architectural object

Conclusion





The Plan, Elevation, and Section

1

The plan, elevation, and section represent our conceptual movement about the space occupied by an object or a building. Each drawing type reflects a vantage point from which the designer can examine an invented form that is either visualized in the mental space of an idea or recorded in the multi-facets of a three-dimensional existence in real space. For example, the plan takes us on a graphic journey above the form, while the elevation takes us around its sides at ground level. Meanwhile, after cutting away a slice from the form, the section invites us inside for a scrutiny of its internal workings.

2

SOUTH ELEVATION

WEST ELEVATION

PLAN

SECTION A-A

Within this orthographic sequence, the scale and proportion of each drawing mode remains constant in all dimensions. This allows the spatial and dimensioned information to be transferable, with each drawing supplementing the information missing from the others. The information is then repackaged and presented together to provide a complete picture of even the most complicated architectural forms.

3

An important aspect of the projection system is the means by which the floor plan and the section gain access to the interior of a form. Both views result from cutting away a portion of the formal envelope, their only difference being that the plan makes its cut in the horizontal plane while the section slices vertically.

7

Application Example