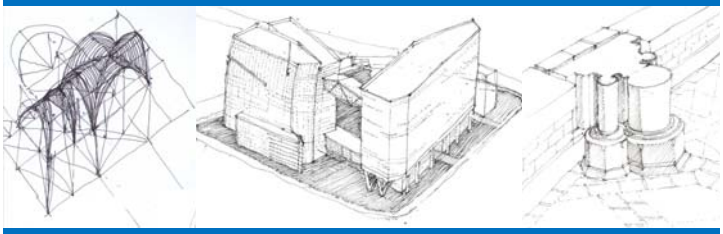
BST12781 BUILDING COMMUNICATION

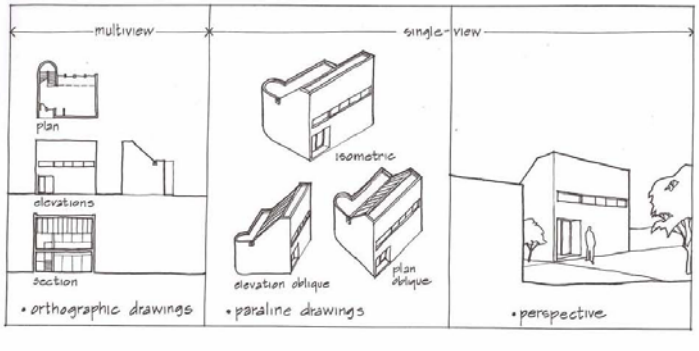
axonometric and isometric drawings



Sabine Pauli
spauli@cityu.edu.hk

Notes prepared by
Virginia FUNG Wai Man, Sabine PAULI

multi view and single view drawings



Source: F. Ching, Architectural graphics Pg.53

architectural projection

clearness

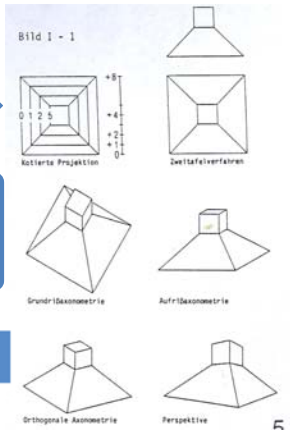
Plan, section, elevation

Elevation oblique + Plan oblique

paraline projection

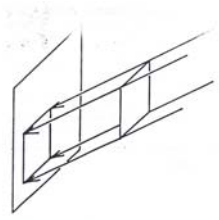
Perspective projection

Accuracy grade



Source: Bonanni, TU Berlin. Fachgebiet Architekturdarstellung und –gestaltung 1986 page 5

oblique projection - axonometry



- The parallel rays of projection appear angular from above on object and image plane.
- The size of the picture is independent from the distance of the object to the image plane.
- This projection method can be a replacement of an accurate perspective.
- Axonometries are quick and easy to construct, they are consistent with perspectives from an endless distance.

Source: Thomae. Perspektive und Axonometrie. 2001 page 9

Oblique projection - axonometry

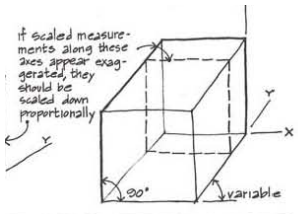
Elevation oblique

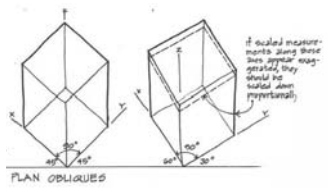
Plan Oblique

Elevation Oblique
Principal vertical face of rectangular form is parallel with the picture plane.

Plan Oblique
Principal horizontal face of rectangular form is parallel with the picture plane.

Source: Ching. Architectural graphics. 2003 page 115

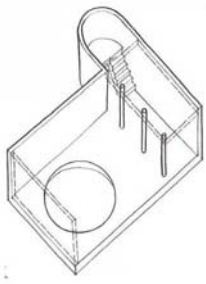




Plan oblique projection - axonometry

Axonometric drawings - better

- When circular elements exist on floor plan, it is usually easier to use axonometric drawings. In Axonometric drawings, the horizontal circles remain as true circles

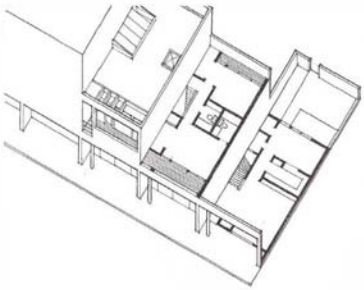


Source: F. Ching, Architectural graphics Pg. 58

Plan oblique projection - axonometry

Axonometric drawings for multistory

- Multistory buildings can be represented with a number of plans to reveal subsequent floor levels

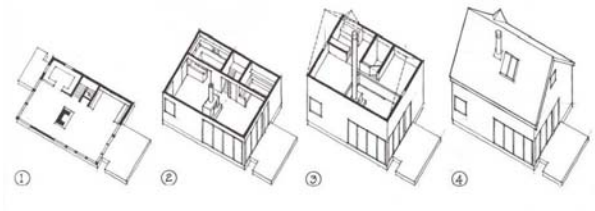


Source: F. Ching, Architectural graphics Pg. 60

Plan oblique projection - axonometry

Axonometric drawings for multistory

G/F plan | G/F plan w/ full height walls | G/F exterior & 1/F w/ full height walls | Overall view of building

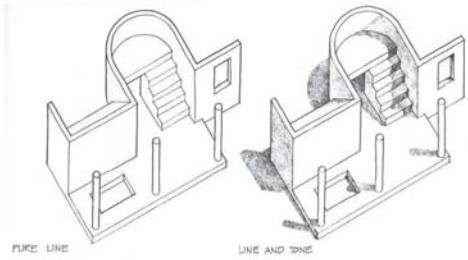


Source: F. Ching, Architectural graphics Pg. 60

Plan oblique projection - axonometry

Axonometric drawings w/ tonal value

- Tonal value can be added to axonometric drawings to enhance the 3D quality

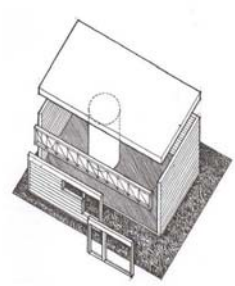


Source: F. Ching, Architectural graphics Pg. 101

Plan oblique projection - axonometry

Axonometric drawings w/ tonal value

- Horizontal & vertical planes in axonometric drawings can be hatched with different pattern / tones

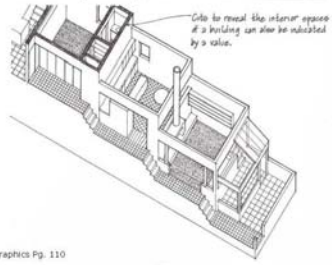


Source: F. Ching, Architectural graphics Pg. 110

Plan oblique projection - axonometry

Axonometric drawings w/ tonal value

- Horizontal planes in axonometric drawings can be hatched with pattern / tones to reinforce the contrast between the vertical and horizontal planes/ elements

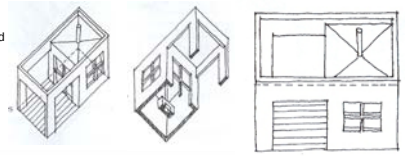


Source: F. Ching, Architectural graphics Pg. 110

Plan oblique - axonometry

Exercise 1

Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 24



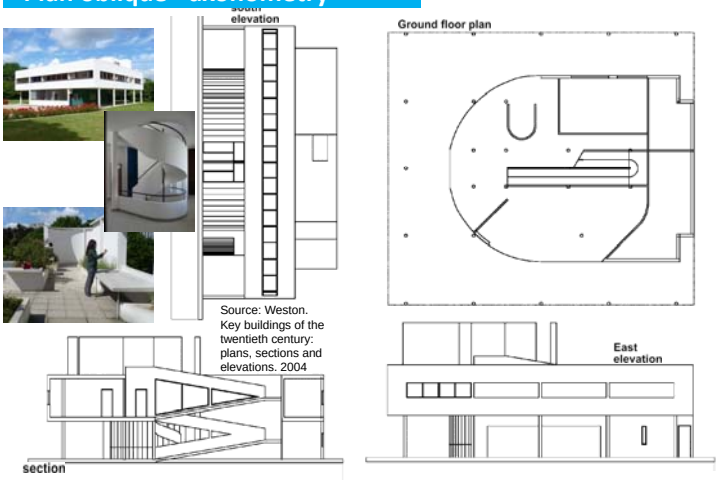
Attention: the axonometry of the example on this page is only for your reference., because this example was sketched in 45-45.

60-30 axonometric

1. Use a A3 tracing paper, draw a horizontal line near the bottom of the paper (about 2 cm from the edge)
2. Use a compass to set another 2 lines forming the 60-30 degree sandwiching the 90 degree in between for placing the plan
3. Put the plan (1:100) under the tracing paper fitting into that 90 degree area
4. Trace the floor plan onto the tracing paper
5. Start drawing the vertical lines – all perpendicular to the tracing edge
6. Measure the height of walls, doors and other vertical elements and represent them correctly on the vertical lines on the axonometric drawings
7. Repeat it until all elements are depicted

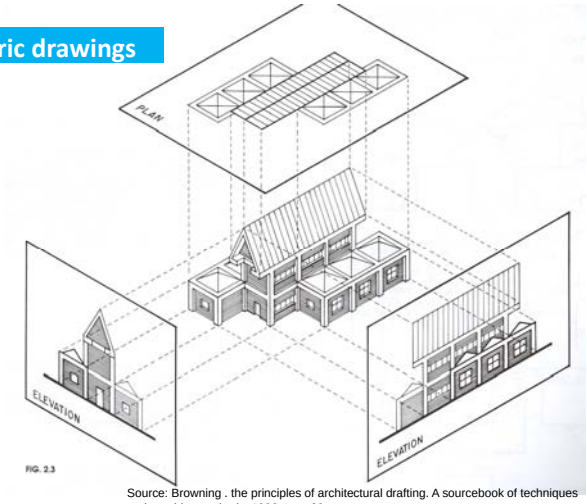
Plan oblique - axonometry

Exercise 1



Source: Weston. Key buildings of the twentieth century: plans, sections and elevations. 2004

Isometric drawings



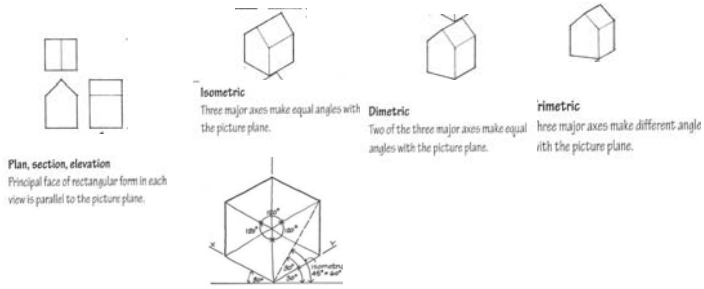
Source: Browning . the principles of architectural drafting. A sourcebook of techniques and graphic standards. 1996 page 39

Orthographic projection

Plan, section, elevation

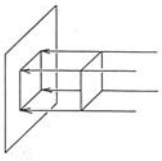
paraline projection

Isometric | **Dimetric** | **Trimetric**



Source: Ching. Architectural graphics. 2003 page 115

Orthographic projection



The vertical rays of projection encounter vertical on the image plane.

All lines and areas appear parallel to the image plane.

The size of the picture is independent from the distance of the object to the image plane.

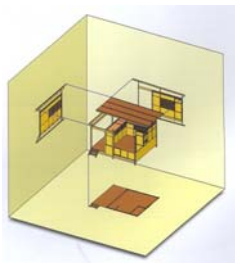
Source: Thomae. Perspektive und Axonometrie. 2001 page 9

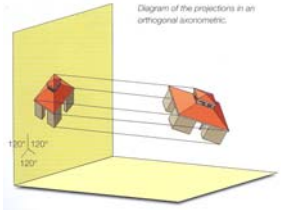
Orthographic projection

Plan, section, elevation

paraline projection

Isometric drawing





Source: Yanes, Domingues. Freehand drawing for architects and interior designers. 2005 page 60

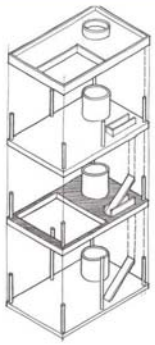
Isometric drawings

Line weight for isometric drawings

Hierarchy of lines:

Thickest
- Profile of total field of each floor level
- Horizontal cut-lines
- Profile lines of individual elements (edge against space)
- Transitios in form (corners)
- Material texture
- Vertical (light or dashed) lines to reinforce vertical relationships of structure/ circulation/ form

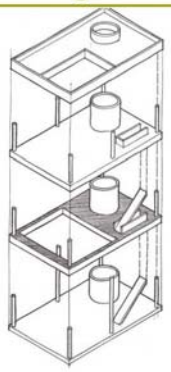
Thinnest



Source: F. Ching, Architectural graphics Pg. 59

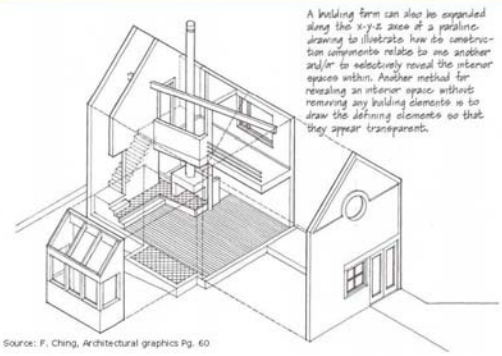
Expanded isometric drawings

- Isometric can also be used to illustrate vertical relationships in multistory buildings
- The building is expanded along Z-axis



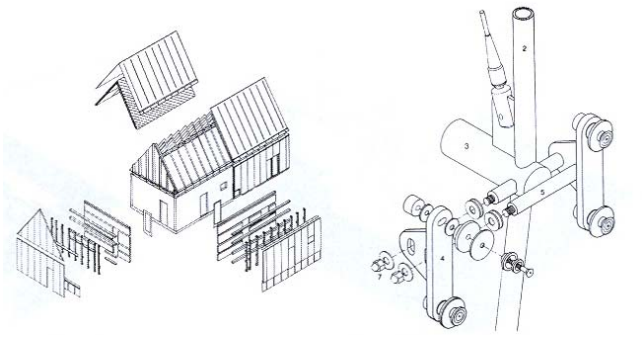
Source: F. Ching, Architectural graphics Pg. 59

Expanded isometric drawings



Source: F. Ching, Architectural graphics Pg. 60

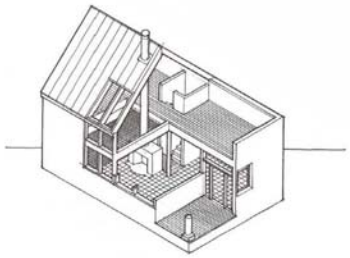
Expanded isometrv



Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 78

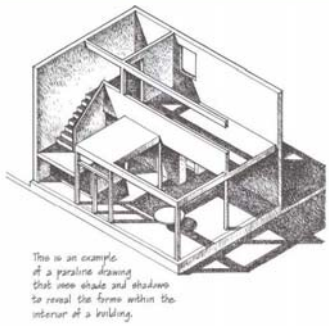
Isometric drawings w/ tonal value

- Horizontal planes in isometric drawings can be hatched with pattern / tones to reinforce the contrast between the vertical and horizontal planes/ elements



Source: F. Ching, Architectural graphics Pg. 110

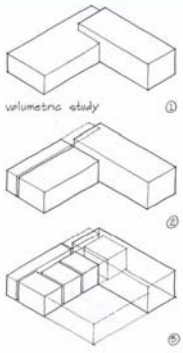
Isometric drawings w/ shades and shadows



Source: F. Ching, Architectural graphics Pg. 129

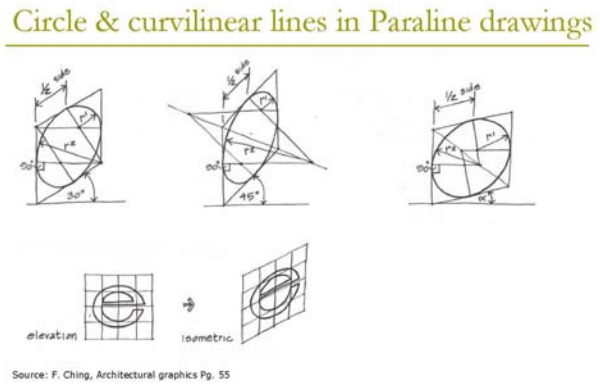
Isometric in graphical presentation

- Isometric are often used to create volumetric study or massing concept study



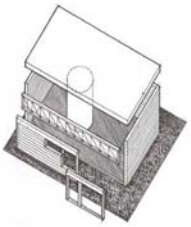
Source: F. Ching, Architectural graphics Pg. 169

Isometric drawings

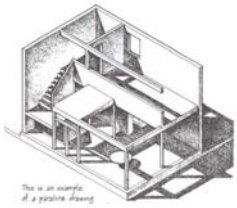


Source: F. Ching, Architectural graphics Pg. 55

summary

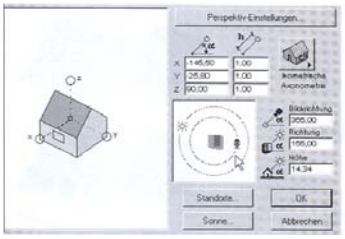


Axonometric drawings are also named plan oblique or elevation oblique. The true plan (either the floor plan or the elevation) is used to construct the axonometric drawings, type 45-45 emphasis more on the horizontal view, type 30-60 emphasis more on the vertical view.

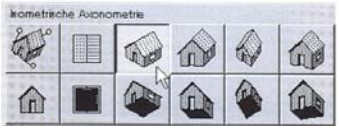


Isometric drawings are constructed with a distorted plan as well as distorted elevations, all surfaces have equal emphasis.

Computer-supported isometry and axonometry



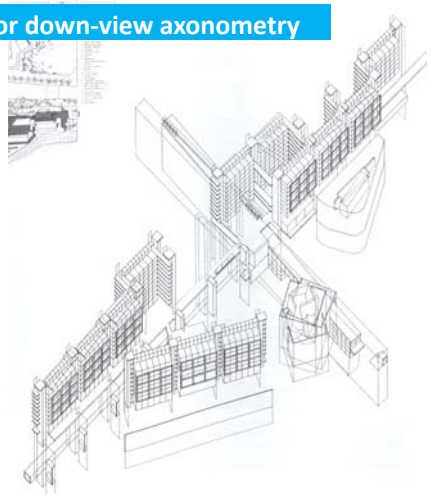
Orientation with support of a test object (ArchiCAD 5.0)



Choise of predefinated oblique projections (ArchiCAD 5.0)

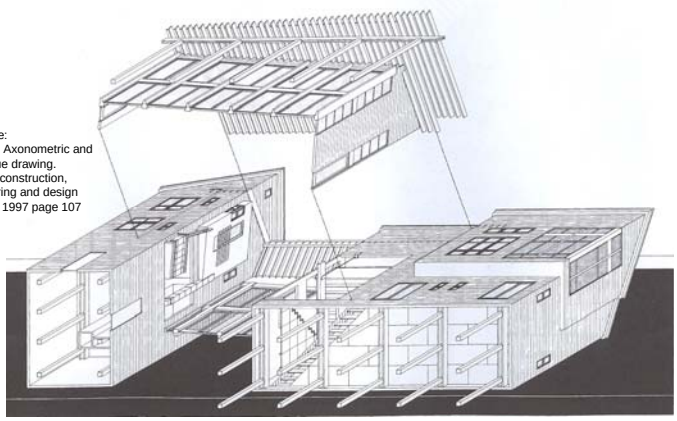
Source: Leopold. Geometrische Grundlagen der Architekturdarstellung. 2005 page 80

Bird's eye axonometry or down-view axonometry



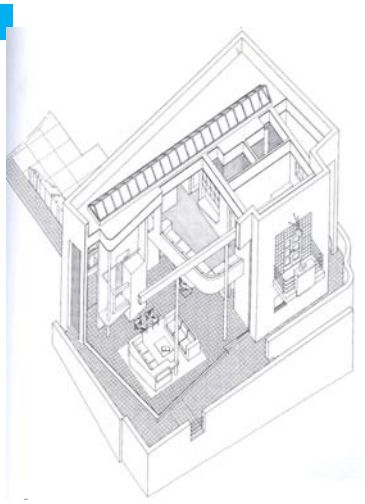
Source:
Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 103

worm's eye axonometry or up-view axonometry



Source:
Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 107

Cut-away-axonometry

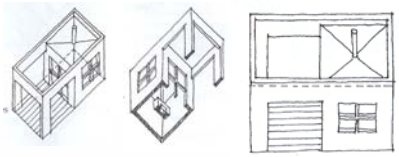


Source:
Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 111

Isometric drawing

Exercise 2

Uddin. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. 1997 page 24



Isometric

Attention: the example on this page is only for your reference, because this example was

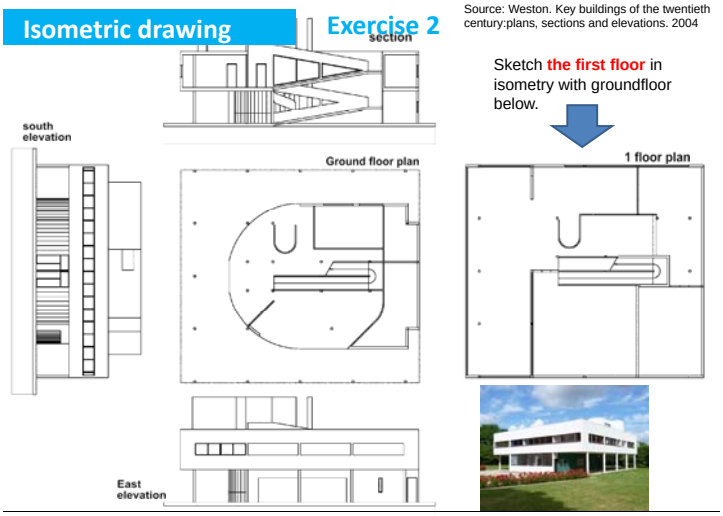
1. Use a A3 tracing paper, draw a horizontal line near the bottom of the paper (about 2 cm from the edge)
2. Use a compass to set another 2 lines forming the 30-30 degree sandwiching the 120 degree in between for redrawing the plan into this distorted shape
3. Measure from the plan (1:100) the horizontal dimensions of building elements and draw them along x and y axis of the isometric drawing, the complete floor area should be represented filling up the 120 degree on the tracing paper
4. Continue depicting plan elements onto the tracing paper
5. Start drawing the vertical lines – all perpendicular to the tracing edge
6. Measure the height of walls, doors and other vertical elements and represent them correctly on the vertical lines on the isometric drawings
7. Repeat it until all elements are depicted

Isometric drawing

Exercise 2

Source: Weston. Key buildings of the twentieth century:plans, sections and elevations. 2004

Sketch **the first floor** in isometry with groundfloor below.



bibliography

- Bonanni, Arno. TU Berlin. Fachgebiet Architekturdarstellung und –gestaltung 1986
- Browning Hugh C. the principles of architectural drafting. A sourcebook of techniques and graphic standards. New York 1996
- Ching, Francis D.K. Architectural graphics. New York 2003
- Leopold, Cornelie. Geometrische Grundlagen der Architekturdarstellung. Stuttgart 2005
- Locher, J.L. The magic of M.C.Escher. New York 2000
- Thomae, Reiner. Perspektive und Axonometrie. 2001
- Uddin, M. Saleh. Axonometric and oblique drawing. A 3-D construction, rendering and design guide. New York 1997
- Weston, Richard. Key buildings of the twentieth century: plans, sections and elevations. New York 2004
- Yanes, Magali Delagado; Domingues, Ernest Redondo. Freehand drawing for architects and interior designers. New York 2005