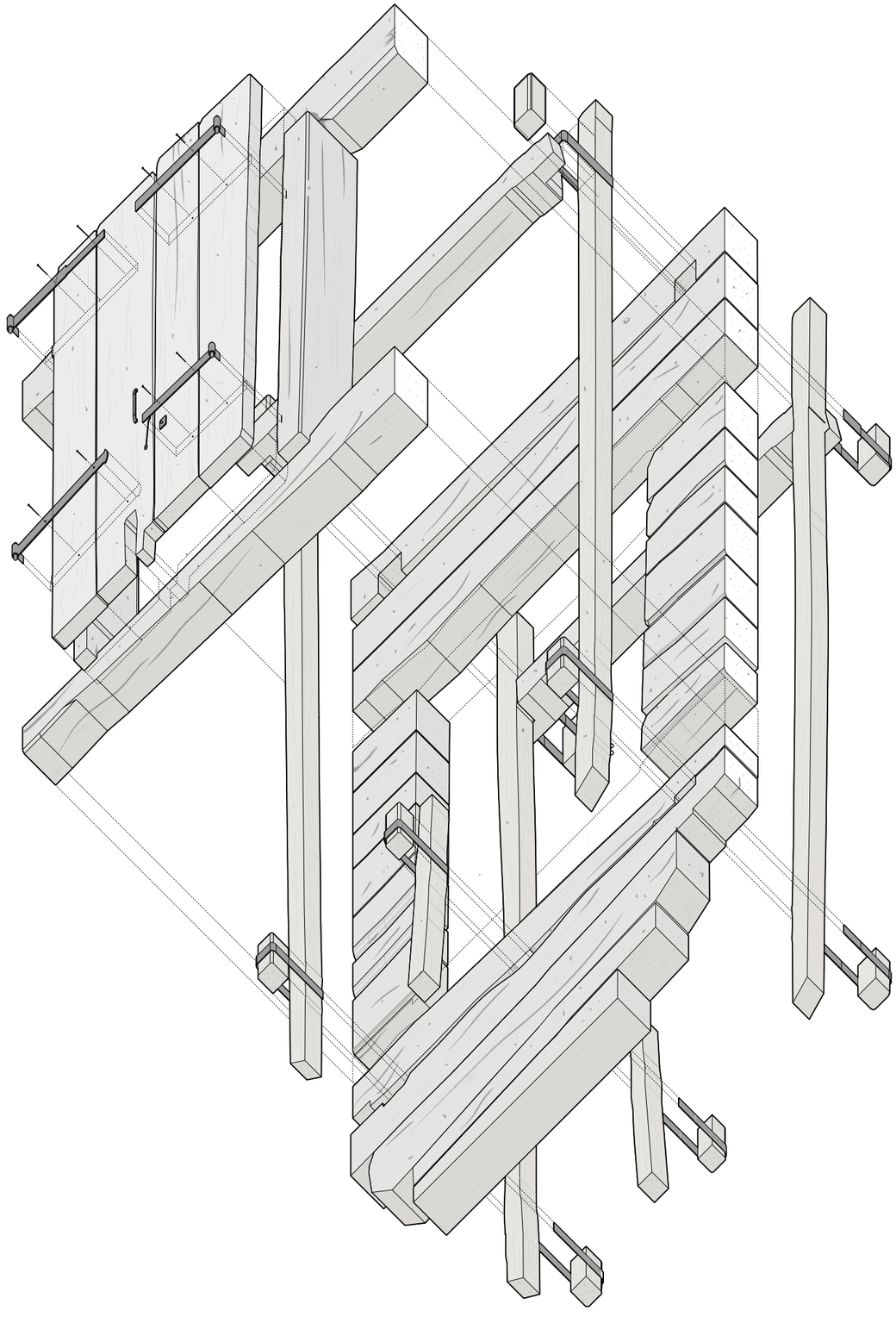
Dessin numérique 3D

Filippo Fanciotti

FIRE2

EPFL // ENAC // LAPIS

2018-2019



tips & tricks

before modeling

part 1

O

Organize your work

↓

Make different drawings / models

MAKE DIFFERENT MODELS

Physical Model

Simplified 3D

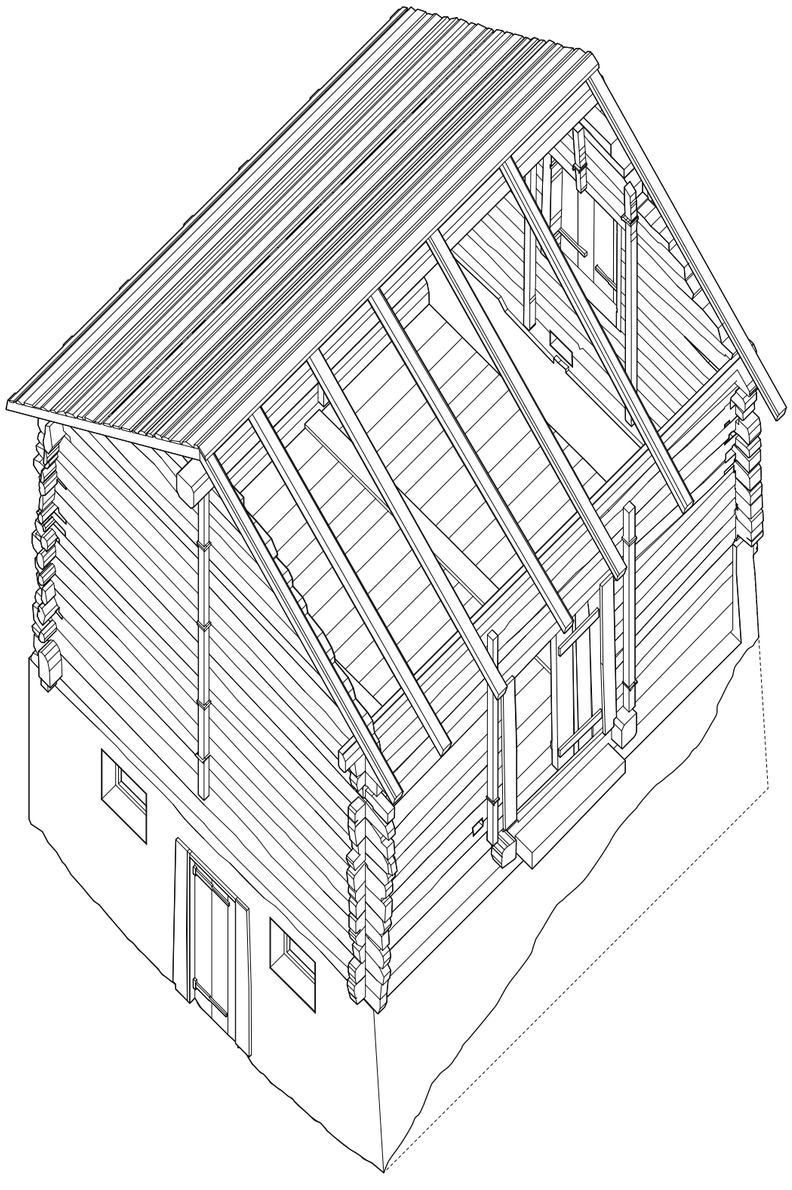
Axonometry

detailed 3D

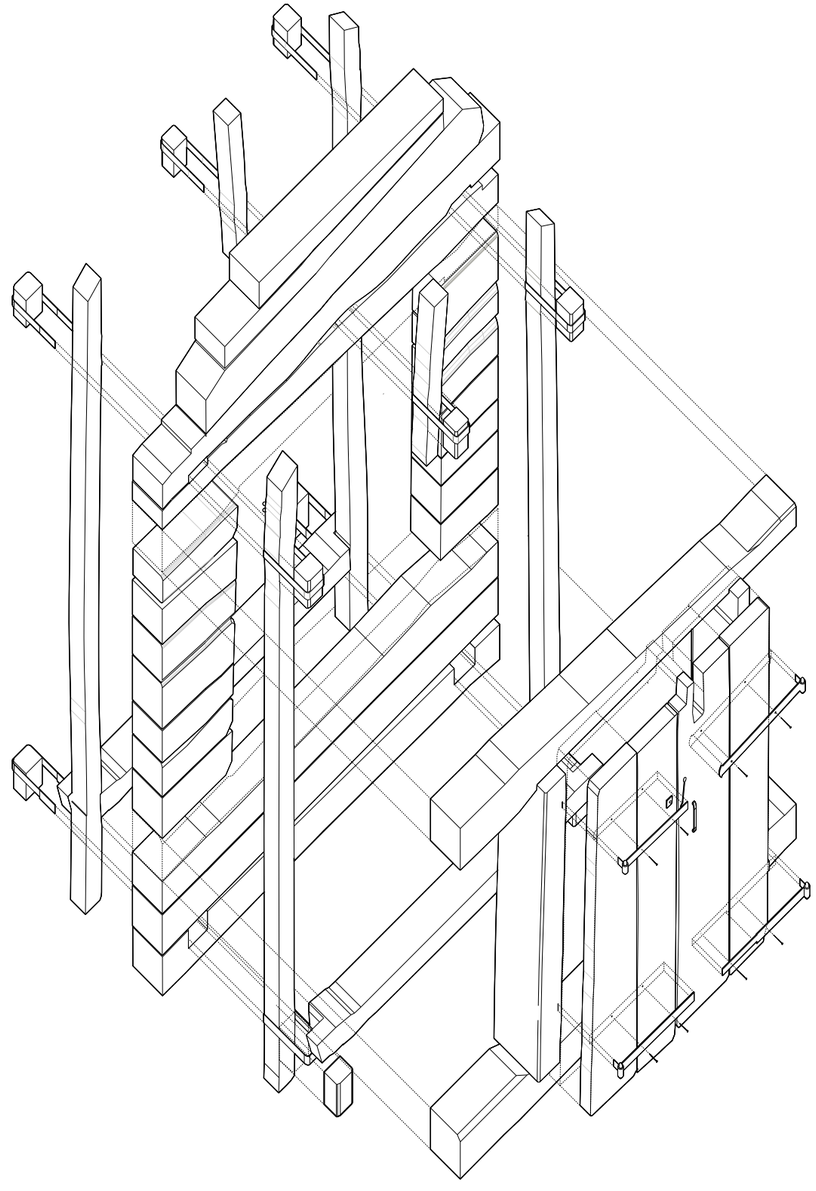
Detail

very detailed 3D

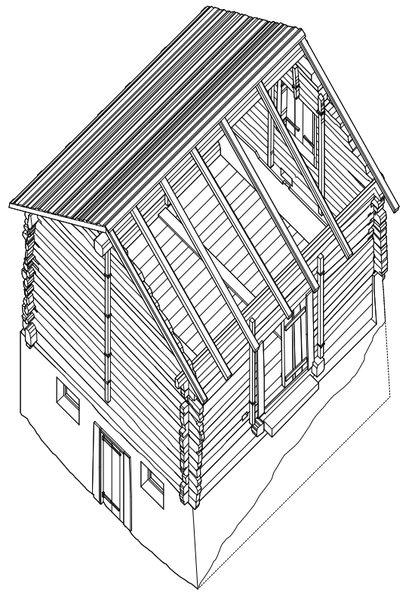
Axonometry



Detail



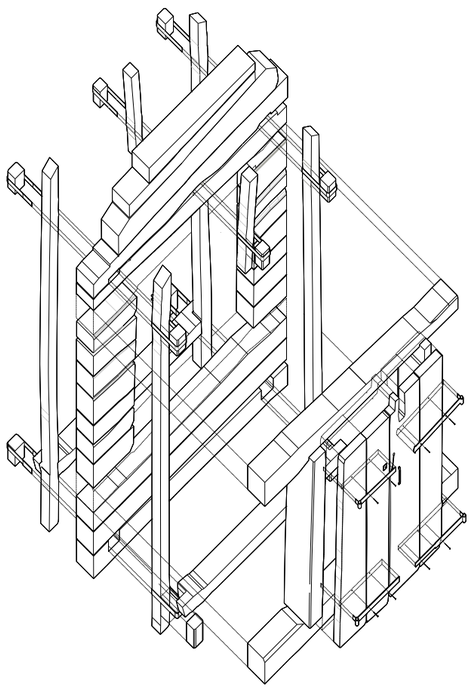
PROCEDURE
simplified 3d (physical model)



1. clean simplified 2d
2. import / open the clean 2d in modeling software
3. extrude main elements from plan + elevation
4. add details

DO IT FIRST !

PROCEDURE
detail or axo



1. clean detailed 2d (survey)
2. import / open the clean 2d in a copy of the 3d simplified file
3. extrude main elements from plan + elevation
4. add details
5. make 2d
6. export 2d lines
7. clean / post-produce drawing for printing

I

Clean it up

a good 3D comes from a clean 2D

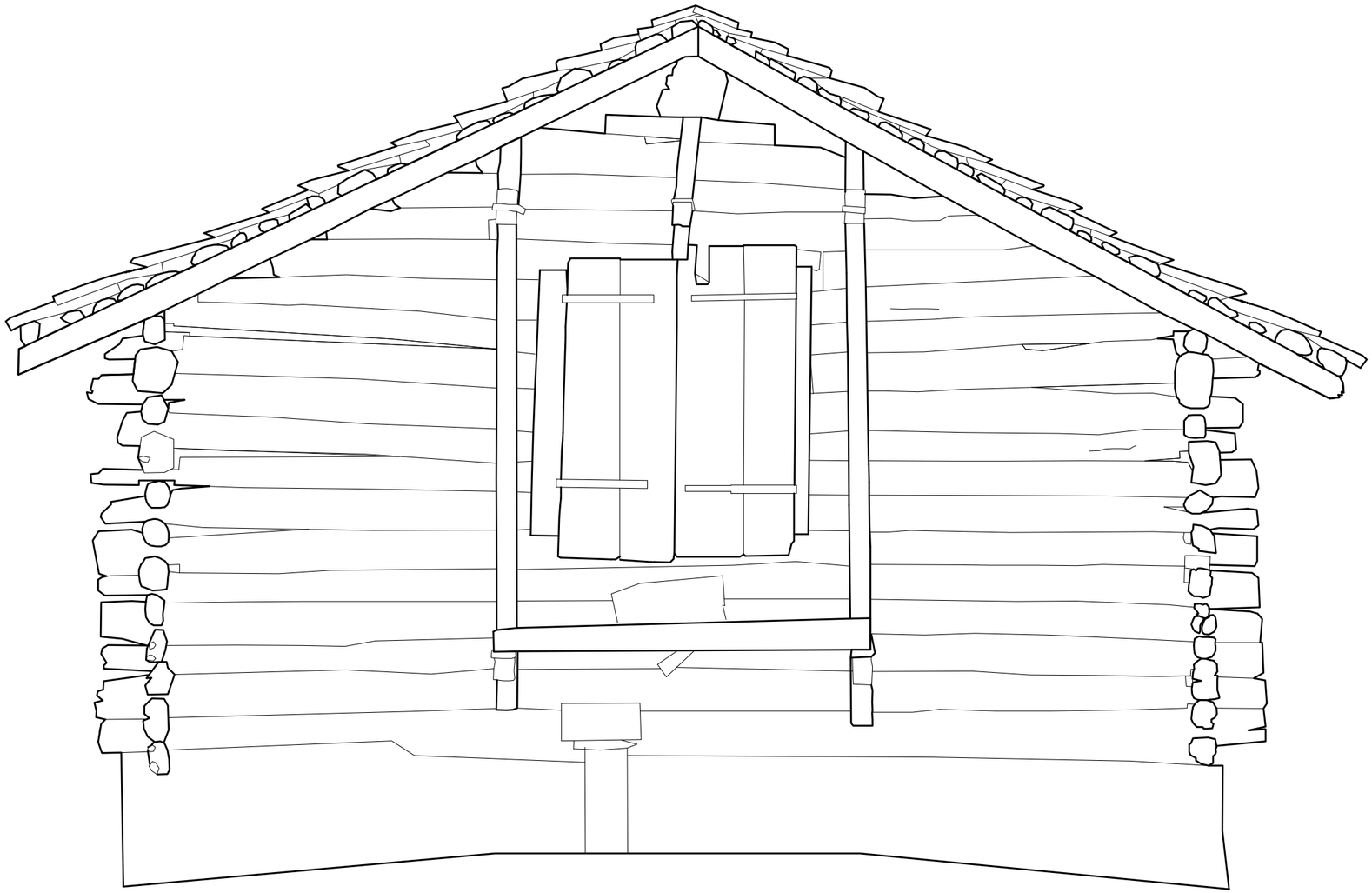
PREPARING FOR EXPORT > IMPORT

1. check + change unsupported elements *(es. regions > polylines)*
2. convert/join lines in polylines *(lines have no meaning in 3D)*
3. close + simplify all polylines *(avoid bad extrusions)*
4. Delete unnecessary layers *(structure preserving)*
5. Move geometry close to the origin *(lighter operations)*
6. Reduce file size *(delete things you don't need)*
7. Check the unit of measure *(cm > cm)*
8. Save in a compatible CAD file format *(check it)*

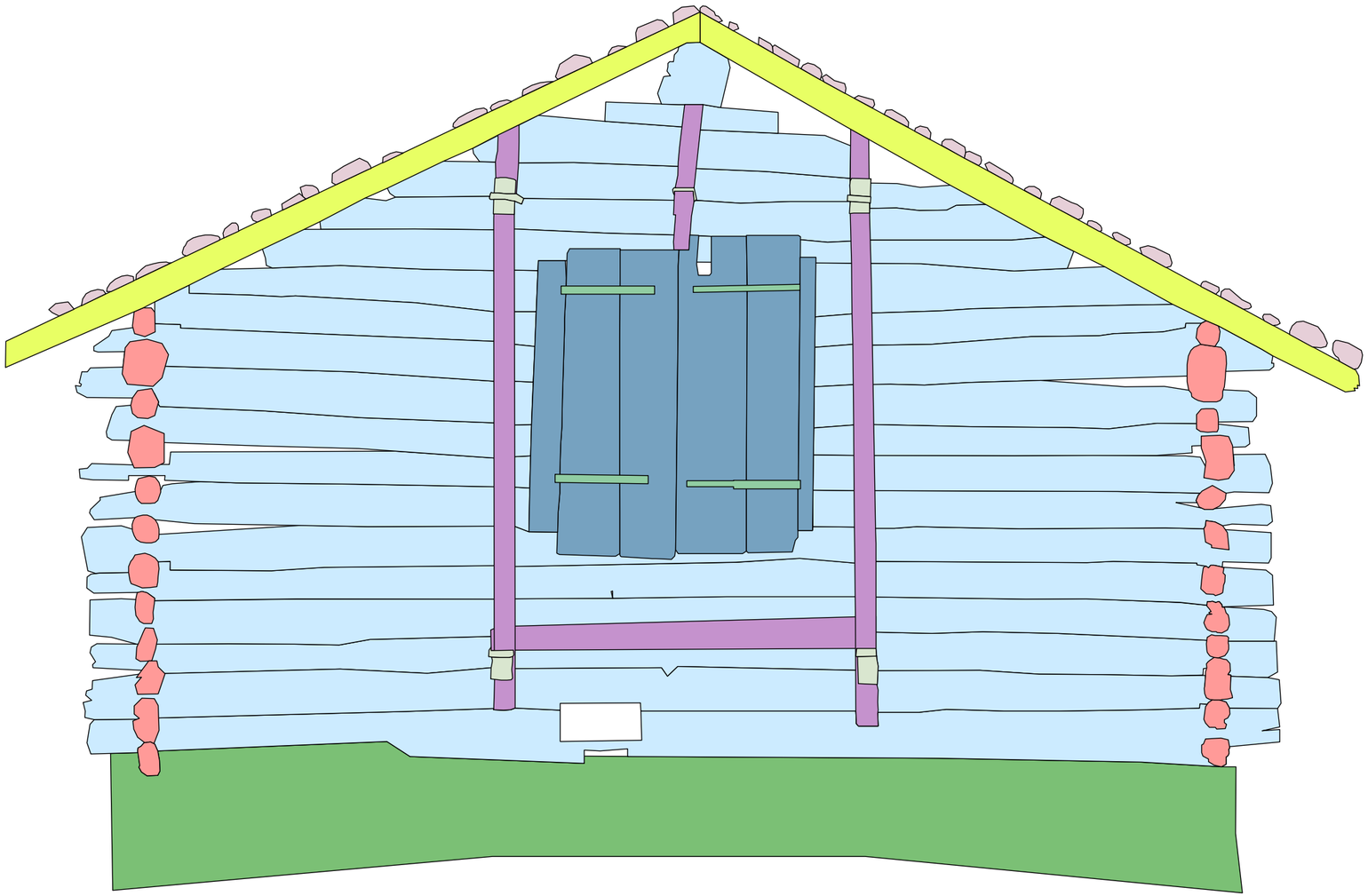
PREPARING FOR EXPORT > IMPORT

1. check + change unsupported elements *(es. regions > polylines)*
2. convert/join lines in polylines *(lines have no meaning in 3D)*
3. close + simplify all polylines *(avoid bad extrusions)*
4. Delete unnecessary layers *(structure preserving)*
5. Move geometry close to the origin *(lighter operations)*
6. Reduce file size *(delete things you don't need)*
7. Check the unit of measure *(cm > cm)*
8. Save in a compatible CAD file format *(check it)*

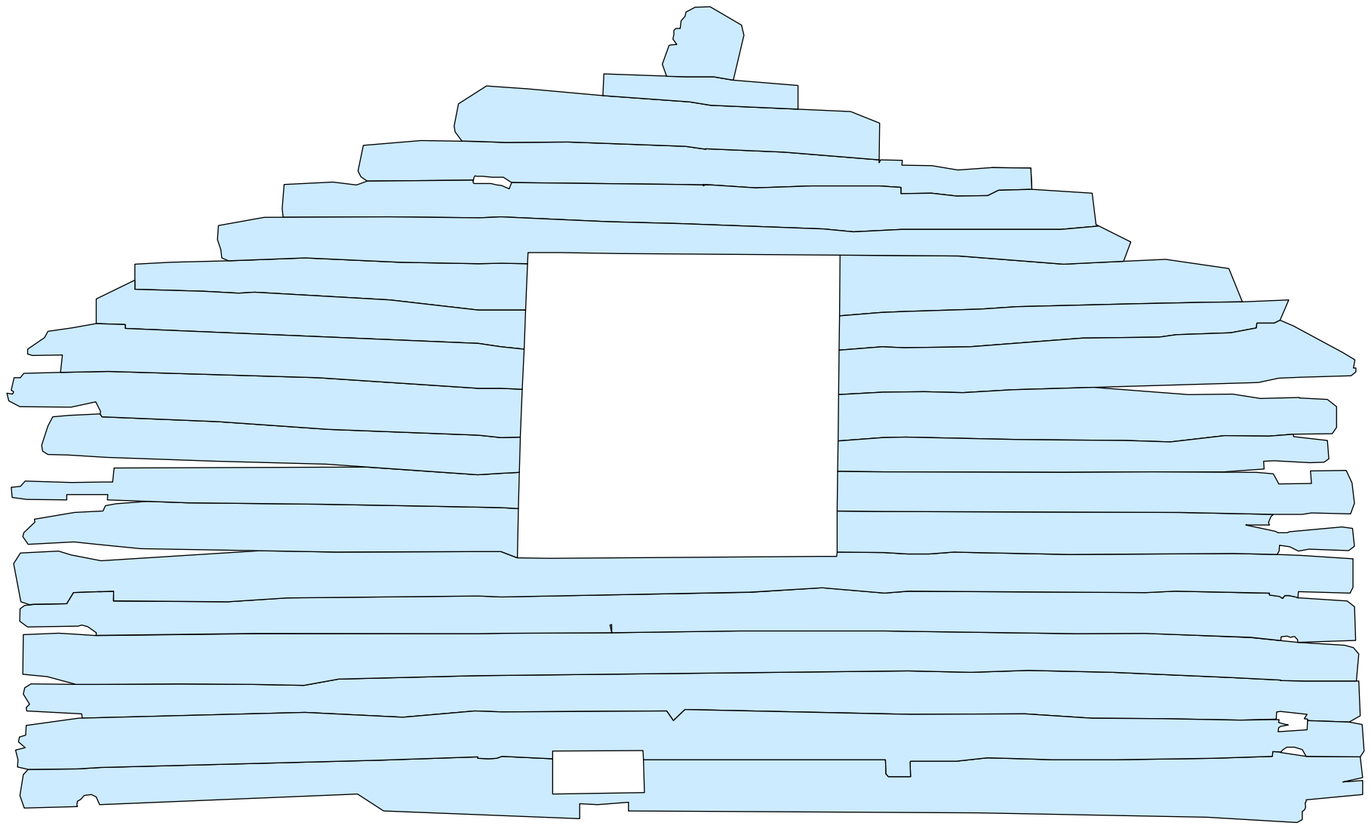
CAD DRAWINGS : LINES



COMBINE LINES > REGIONS, POLYGONS, POLYLINES



THINK IN SOLID (NOT A DRAWING ANYMORE)



Vectorworks File Edit View Modify Model AEC Tools Text Window Help

Mer 22 mar 23:44

Vectorworks Designer 2016 — GRL 170322.vwx

FF - concrete - section | Group #2 | 350% | Top/Plan | 0,00° | 2D Plan

Reshape Tool: Move Polygon Handles Mode

Exit Group

your lines are full of control points, so your 3D & make2d will be full of edges

Object

Attributes: Solid, Class..., 100%

Snapping

Basic

Drilled Footing

Obj Info

Shape | Data | Render

28 Objects

Class: FF - wood - projections

Layer: Survey-2

Plane: Layer

Reverse Direction

Show Direction

Perim: 16696,415cm

Area: 13,709 sq m

Survey-2
Survey
simplified
class elements
deposito

Undo: Simplify 2D Polygons

Vectorworks File Edit View Modify Model AEC Tools Text Window Help

Mer 22 mar 23:44

Vectorworks Designer 2016 — GRL 170322.vwx

FF - concrete - section | Group #2 | 350% | Top/Plan | 0,00° | 2D Plan

Reshape Tool: Move Polygon Handles Mode

Exit Group

simplify your polylines for "cleaner" extrusions

Attributes: Solid, Class..., 100%

Snapping

Basic

Drilled Footing

Obj Info

Shape | Data | Render

28 Objects

Class: FF - wood - projections

Layer: Survey-2

Plane: Layer

Reverse Direction

Show Direction

Perim: 16554,9cm

Area: 13,708 sq m

Survey-2
Survey
simplified
class elements
deposito

Vectorworks File Edit View Modify Model AEC Tools Text Window Help — Dom 19 mar 21:17

Vectorworks Designer 2016 — GRL 170318.vwx

FF - concrete - section | Layer Plane | 3406% | Top/Plan | 0,00° | 2D Plan

Reshape Tool: Move Edges Parallel Mode. Use the Option/Alt key while moving vertices to move vertex along bisector.

Modify

- Move ▶
- Send ▶
- Align ▶
- Rotate ▶
- Scale Objects...
- Working Plane ▶
- Hatch...
- Trim ⌘T
- Join ▶
- Add Surface ⌥⌘2
- Clip Surface ⌥⌘1
- Intersect Surface ⌥⇧⌘I
- Combine Into Surface
- Compose ⌥⇧⌘2
- Decompose ⌥⇧⌘1
- Convert ▶
- Create Symbol...
- Group ⌘G
- Ungroup ⌘U
- Edit Group ⌘[
- Exit Group ⌘]
- Top Level
- Link Text to Record...
- Trace Bitmap...
- Edit Constraints...
- Guides ▶
- Poly Smoothing ▶
- Drafting Aids ▶
- Unrotate 3D Objects ⇧⌘0
- Lock
- Unlock

Drafting Aids

- Arc into Segments...
- Line into Segments...
- Even Divide...
- Create Dividing Lines...
- Simplify Polys...

Simplify polys by reducing the number of vertices.

Attributes

Class... | Class... | 100% | 0,35

Snapping

Basic

Drilled Footing

Obj Info

Shape | Data | Render

Polygon

Class: FF - concrete - section
Layer: Survey
Plane: Layer

ΔX: 15,233
ΔY: 23,864
X: 593,673
Y: 293,045

Move: Entire Object
Vertex:
X: 600,562
Y: 269,18
Add Vertex

IFC...

Navigation - Design Layers

Layer Options: Show/Snap Others

Visibility	Design Layer Name
✕	Axo
✕	Reconstrucion
✕	Survey-2
✕ ✓	**Survey**
✕	simplified
✕	class elements
✕	deposito

Vectorworks File Edit View Modify Model AEC Tools Text Window Help — Dom 19 mar 21:18

Vectorworks Designer 2016 — GRL 170318.vwx

FF - concrete - section | Survey | Layer Plane | 3406% | Top/Plan | 0,00° | 2D Plan

Reshape Tool: Move Edges Parallel Mode. Use the Option/Alt key while moving vertices to move vertex along bisector.

Simplify Polys

Simplify by

- (•) Maximum Deviation
  - Deviation: 0,3
- ( ) Minimum Distance
  - Distance: 0

Click OK to Simplify Polys.

Cancel | OK

Attributes

Class... | Class... | 100% | 0,35

Snapping

Basic

Drilled Footing

Obj Info

Shape | Data | Render

Polygon

Class: FF - concrete - section
Layer: Survey
Plane: Layer

ΔX: 15,233
ΔY: 23,864
X: 593,673
Y: 293,045

Move: Entire Object
Vertex:
X: 600,562
Y: 269,18

Add Vertex

IFC...

Navigation - Design Layers

Layer Options: Show/Snap Others

Visibility	Design Layer Name
✕	Axo
✕	Reconstrucion
✕	Survey-2
✕ ✓	**Survey**
✕	simplified
✕	class elements
✕	deposito

Vectorworks File Edit View Modify Model AEC Tools Text Window Help — Dom 19 mar 21:18

Vectorworks Designer 2016 — GRL 170318.vwx

FF - concrete - section | Survey | Layer Plane | 3406% | Top/Plan | 0,00° | 2D Plan

Reshape Tool: Move Edges Parallel Mode. Use the Option/Alt key while moving vertices to move vertex along bisector.

Attributes

Class...

Class...

100%

0,35

Snapping

Basic

Drilled Footing

Obj Info

Shape | Data | Render

Polygon

Class: FF - concrete - section

Layer: Survey

Plane: Layer

ΔX: 15,233

ΔY: 23,74

X: 593,673

Y: 292,92

Move: Entire Object

Vertex:

X: 600,562

Y: 269,18

Add Vertex

IFC...

Navigation - Design Layers

Layer Options: Show/Snap Others

Visibility	Design Layer Name
✕	Axo
✕	Reconstrucion
✕	Survey-2
✕ ✓	**Survey**
✕	simplified
✕	class elements
✕	deposito

X: 589,45 | Y: 282,65 | L: 391,289 | A: 121,10°

2

Export

good 2d > export > good 3d

IF WORKING WITH

+

+

+

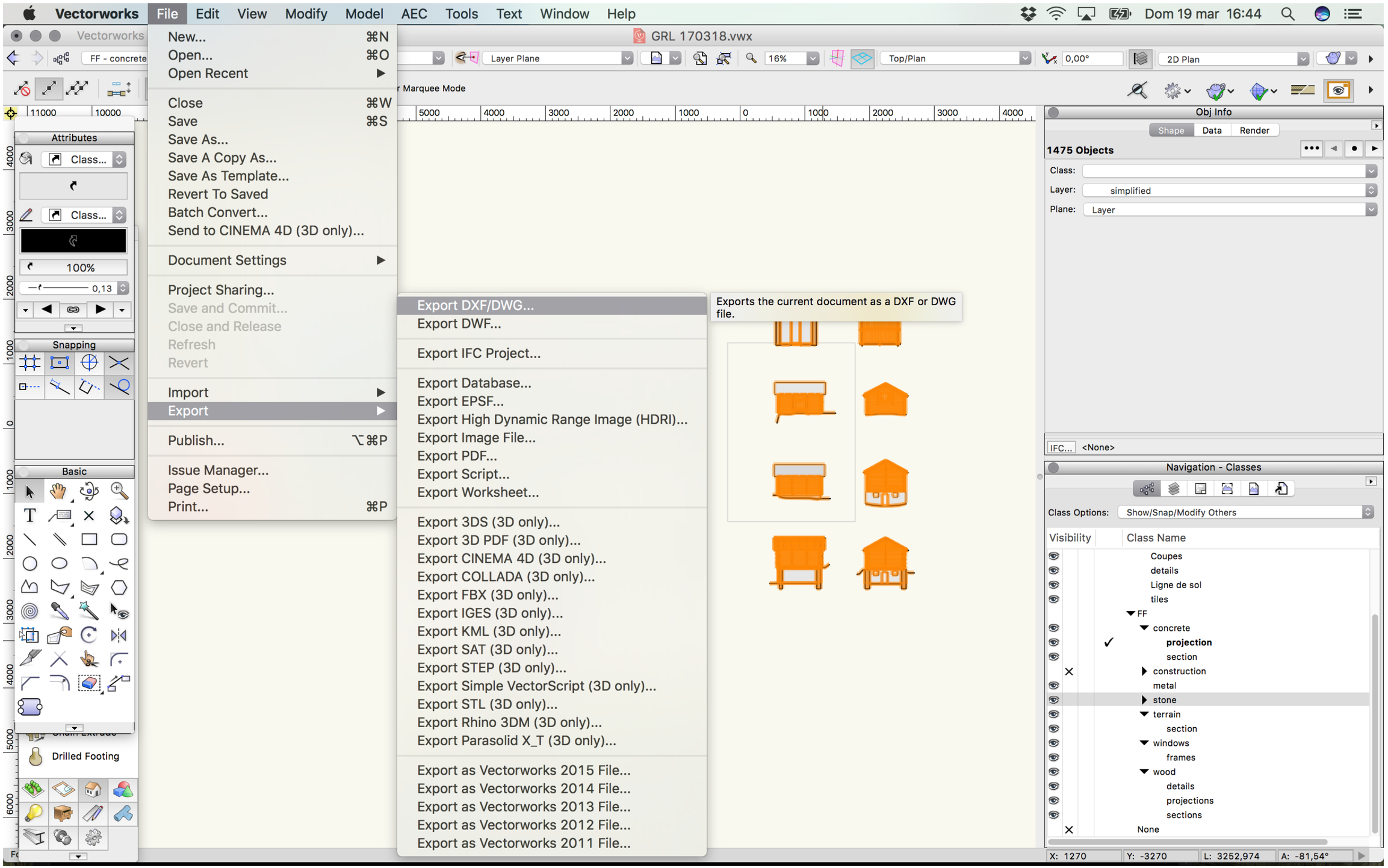
save as .dwg/.dxf

import .dwg/.dxf

export .dwg/.dxf

import .dwg/.dxf

Before importing a file, it's helpful to know what CAD elements *SketchUp* doesn't support and how to prepare your CAD file for best results.


Vectorworks
File
Edit
View
Modify
Model
AEC
Tools
Text
Window
Help
Dom 19 mar 16:44
GRL 170318.vwx
New... ⌘N
Open... ⌘O
Open Recent
Close ⌘W
Save ⌘S
Save As...
Save A Copy As...
Save As Template...
Revert To Saved
Batch Convert...
Send to CINEMA 4D (3D only)...
Document Settings
Project Sharing...
Save and Commit...
Close and Release
Refresh
Revert
Import
Export
Publish... ⌥⌘P
Issue Manager...
Page Setup...
Print... ⌘P
Export DXF/DWG...
Export DWF...
Export IFC Project...
Export Database...
Export EPSF...
Export High Dynamic Range Image (HDRI)...
Export Image File...
Export PDF...
Export Script...
Export Worksheet...
Export 3DS (3D only)...
Export 3D PDF (3D only)...
Export CINEMA 4D (3D only)...
Export COLLADA (3D only)...
Export FBX (3D only)...
Export IGES (3D only)...
Export KML (3D only)...
Export SAT (3D only)...
Export STEP (3D only)...
Export Simple VectorScript (3D only)...
Export STL (3D only)...
Export Rhino 3DM (3D only)...
Export Parasolid X_T (3D only)...
Export as Vectorworks 2015 File...
Export as Vectorworks 2014 File...
Export as Vectorworks 2013 File...
Export as Vectorworks 2012 File...
Export as Vectorworks 2011 File...
Exports the current document as a DXF or DWG file.
Obj Info
1475 Objects
Class:
Layer: simplified
Plane: Layer
Navigation - Classes
Class Options: Show/Snap/Modify Others
Visibility
Class Name
Coupes
details
Ligne de sol
tiles
FF
concrete
projection
section
construction
metal
stone
terrain
section
windows
frames
wood
details
projections
sections
None
Attributes
Snapping
Basic
Drilled Footing

DXF/DWG Export Options

Settings

Settings: <Active Settings> Save... Manage...

Class/Layer Mappings

Name: <None> Manage...

File Format

Format: DWG

Version: 2010

Class/Layer Conversions

Export as DXF/DWG Layers:

- (•) Classes
- ( ) Layers

Invisible Classes Are:

- ( ) Exported as Invisible DXF/DWG Layers
- (•) Not Exported

- [ ] Export Single Layer for Classes with Same Name
- [ ] Export Layers as Separate Files

Layer Scale

- [x] Rescale Layers To: 1:100

All exported layers are at the same scale.

Sheets to Include

Export: Design Layers Only

- [ ] Export Viewports as 2D Graphics in Model Space

Sel	Sheets
	01 [east survey 50]
	02 [east survey 20]
	03 [east survey 20 red]
	04 [east plan survey]
	05 [east plan reconstruction]
	06 [survey all]
	07 [reconstruction all]
	08 [simplified all]

References

- [ ] Export Design Layer Viewports as Separate Files

Objects

- [x] Export Only Selected Objects
- [x] Export as Flattened 2D Graphics

Text

- [ ] Preserve Mapped Font on Export

2D Fills and Files

- [ ] Export 2D Fills
- [x] Export Images and Image Files
- [x] Export Hatches
  - [x] Export Hatch Pattern Files
- [ ] Export Hatches and 2D Fills into Separate DXF/DWG Layers

3D

- [x] Export Solids as ACIS Solids
- [x] Triangulate to Preserve Fills

Symbols and Groups

- [ ] Decompose 3D Symbols and Groups
- [ ] Export Groups as Anonymous Blocks

Dimensions

- [x] Preserve SIA Dimension Text Appearance

Line Types

- [x] Export Complex Line Types as Blocks

Line Weights and Colors

- ( ) Use True Colors
- (•) Use DXF/DWG Indexed Colors
  - [x] Map Line Weights to Colors

Cancel OK

3

Import

good 2d > export > good 3d

tips & tricks

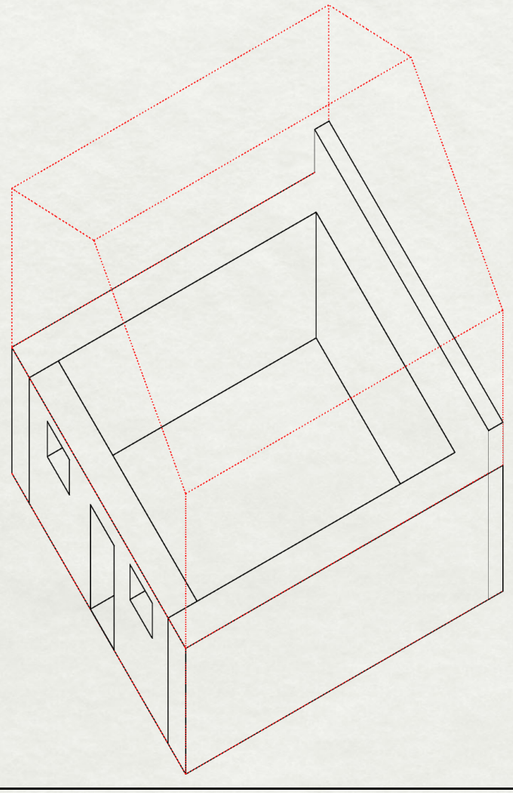
while modeling

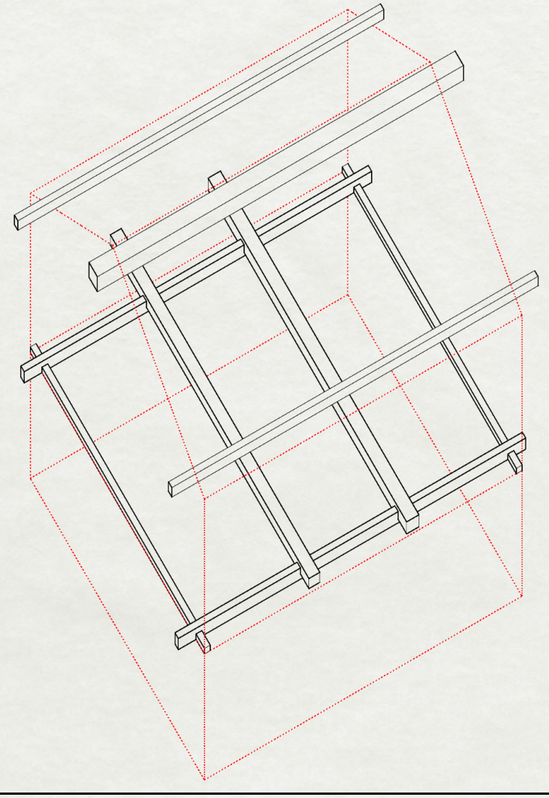
part 11

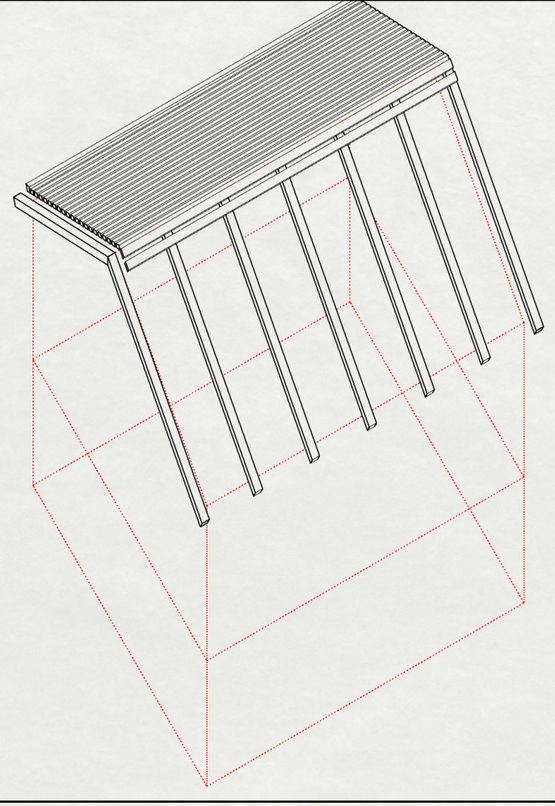
I

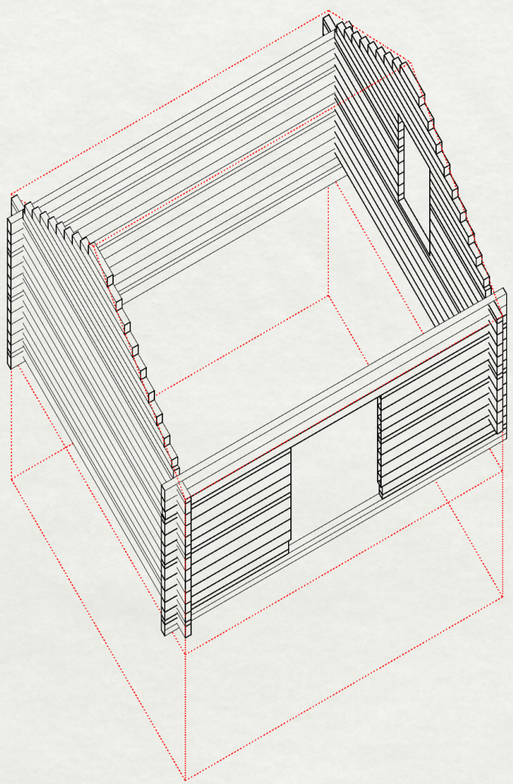
Build it up

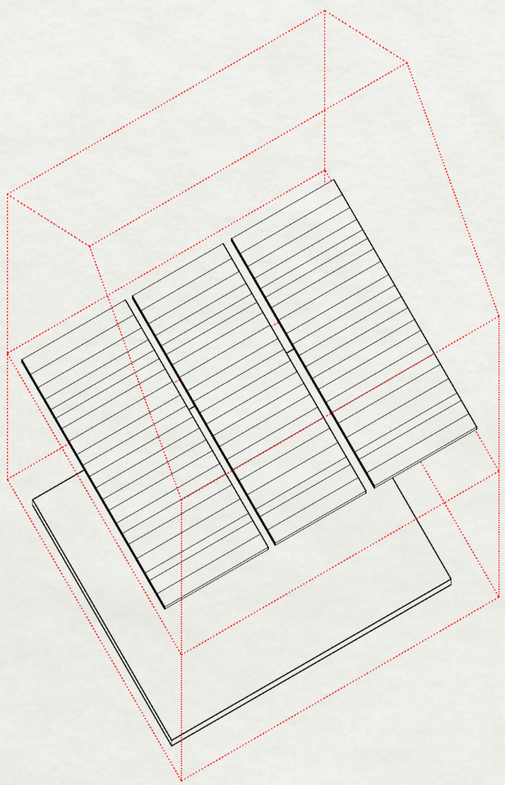
step by step

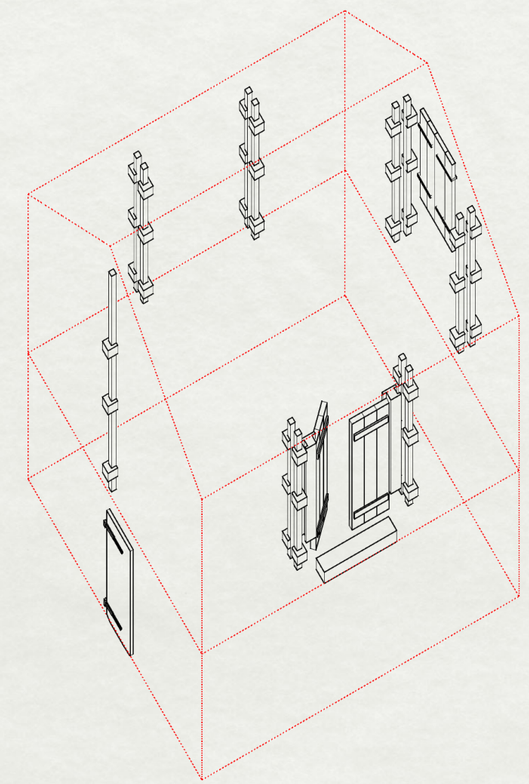


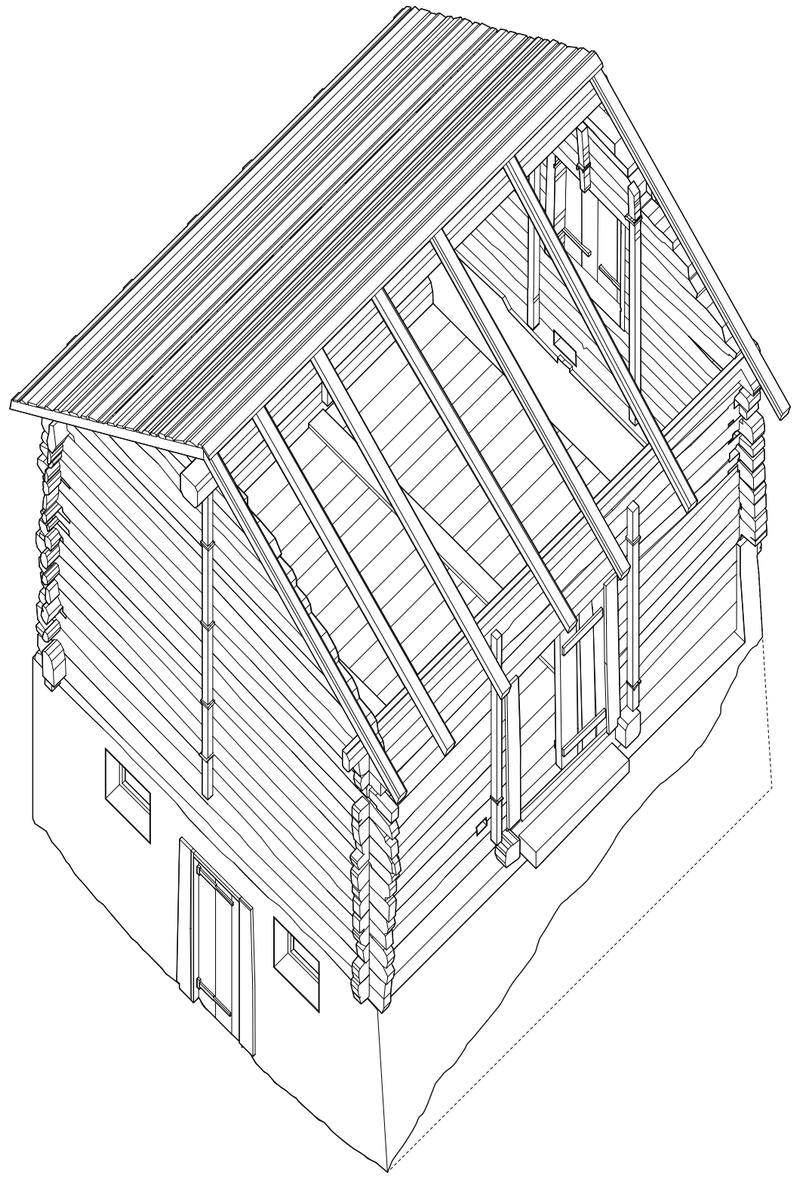












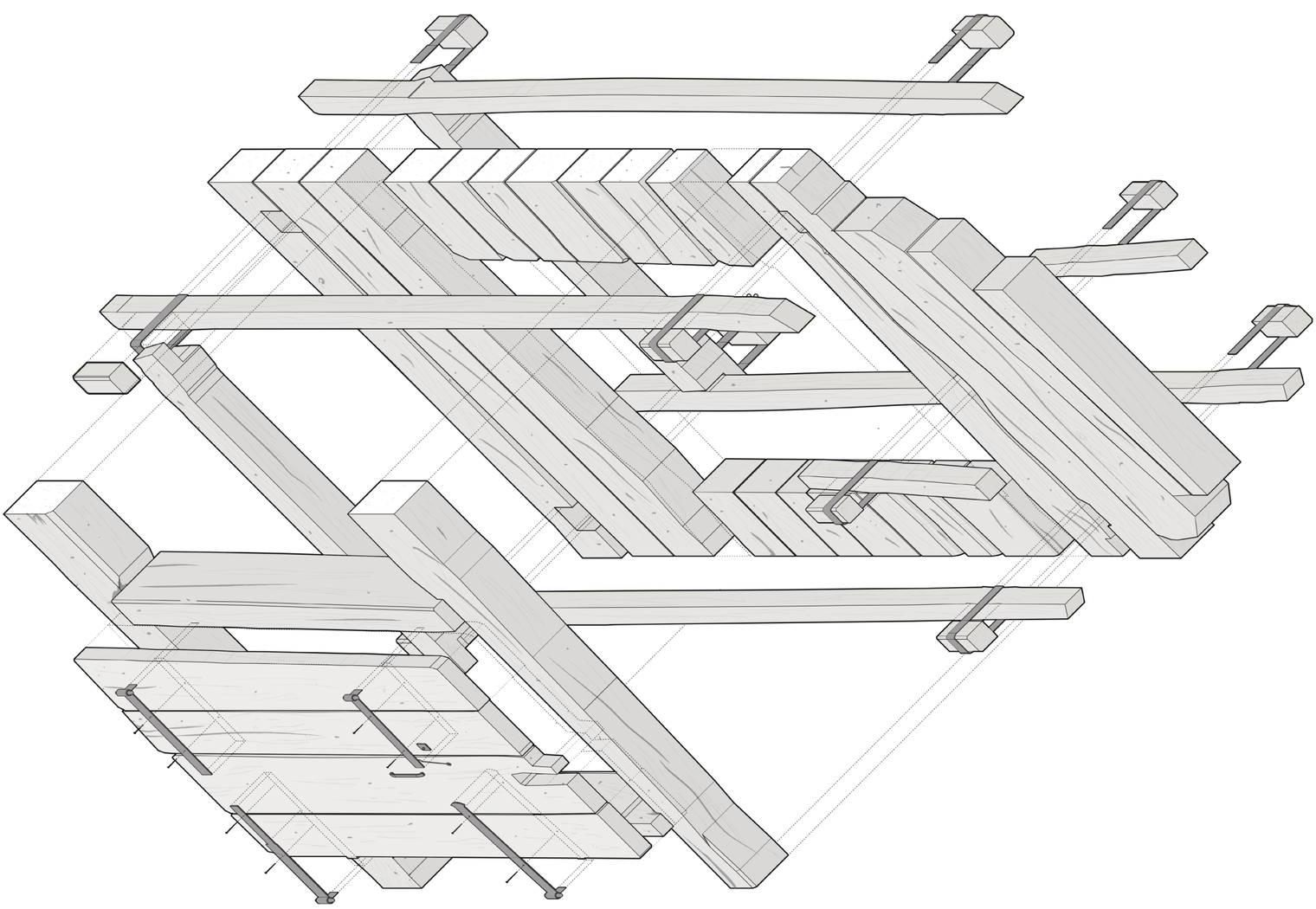
2

Main tools

things you need to know

LIST OF COMMANDS USED

1. Import/Export
2. Copy/Move/Rotate
3. ExtrudeCurve
4. Box
5. BooleanDifference
6. Trim
7. Scale1d
8. Cap
9. MatchProperties
10. Group
11. MakeHole
12. CPlane (+ ClippingPlane)
13. ProjectToCplane
14. MoveFace
15. MoveEdge
16. ChamferEdge
17. FilletEdge
18. ExtractSurface



LIST OF COMMANDS USED

1. Import/Export
2. Copy/Move/Rotate
3. ExtrudeCurve
4. Box
5. BooleanDifference
6. Trim
7. Scale1d
8. Cap
9. MatchProperties
10. Group
11. MakeHole
12. CPlane (+ ClippingPlane)
13. ProjectToCplane
14. MoveFace
15. MoveEdge
16. ChamferEdge
17. FilletEdge
18. CageEdit
19. ExtractSurface
20. DupBorder
21. DupEdge
22. DupFaceBorder
23. InsertKnot
24. InsertKink
25. PointsOn
26. Sweep1

3

Draw in curves

Don’t start off building solids and primitives

4

Fix + pre-filletize curves

↓

Before generating surfaces / solids

edit curves
Fillet, blend, or chamfer between curves and surfaces

5

Make things bigger, then trim

it’s always easier to cut

boolean operations
trim & split

6

Details can wait

Modeling = sculpting

7

Use Nurbs

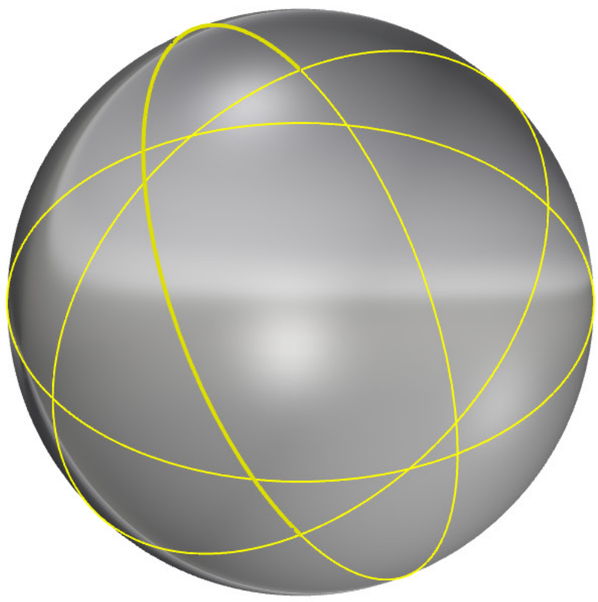
rather than Meshes

MESHES VS NURBS

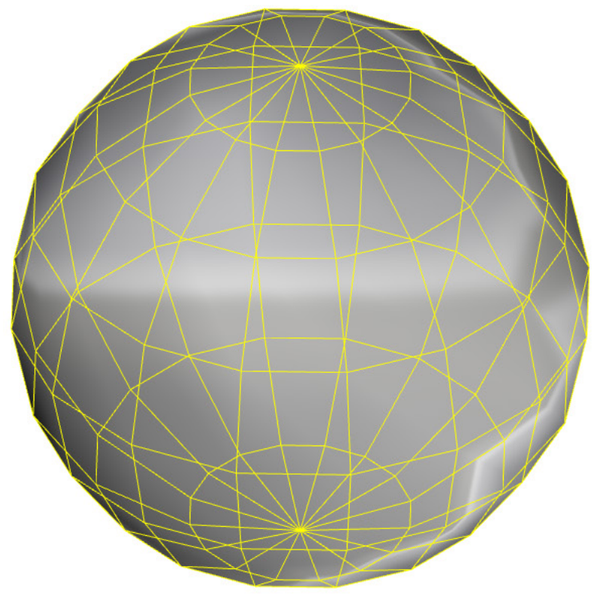
A mesh is a complex of triangulated polygons
approximating the geometry
(the more dense the triangles, the closer to the actual geometry).

A "surface" is the actual mathematical expression of the geometry (NURBS and the like) and what you're seeing in the viewport is a translation of that expression.

meshes operations



NURB



MESH

8

Create curves from other objects

that’s why you need Nurbs

Create curves from other objects

Nice tutorial collections

plethora project

Jose Sanchez's series of tutorials focus on a number of tools that are perhaps less "standard" in architecture, including the Unity3d game engine, Autodesk's Maya software for animations, and C#, Python and Javascript. However, the site also includes the more usual Rhino and Grasshopper tutorials, meaning there is something for almost everyone here.

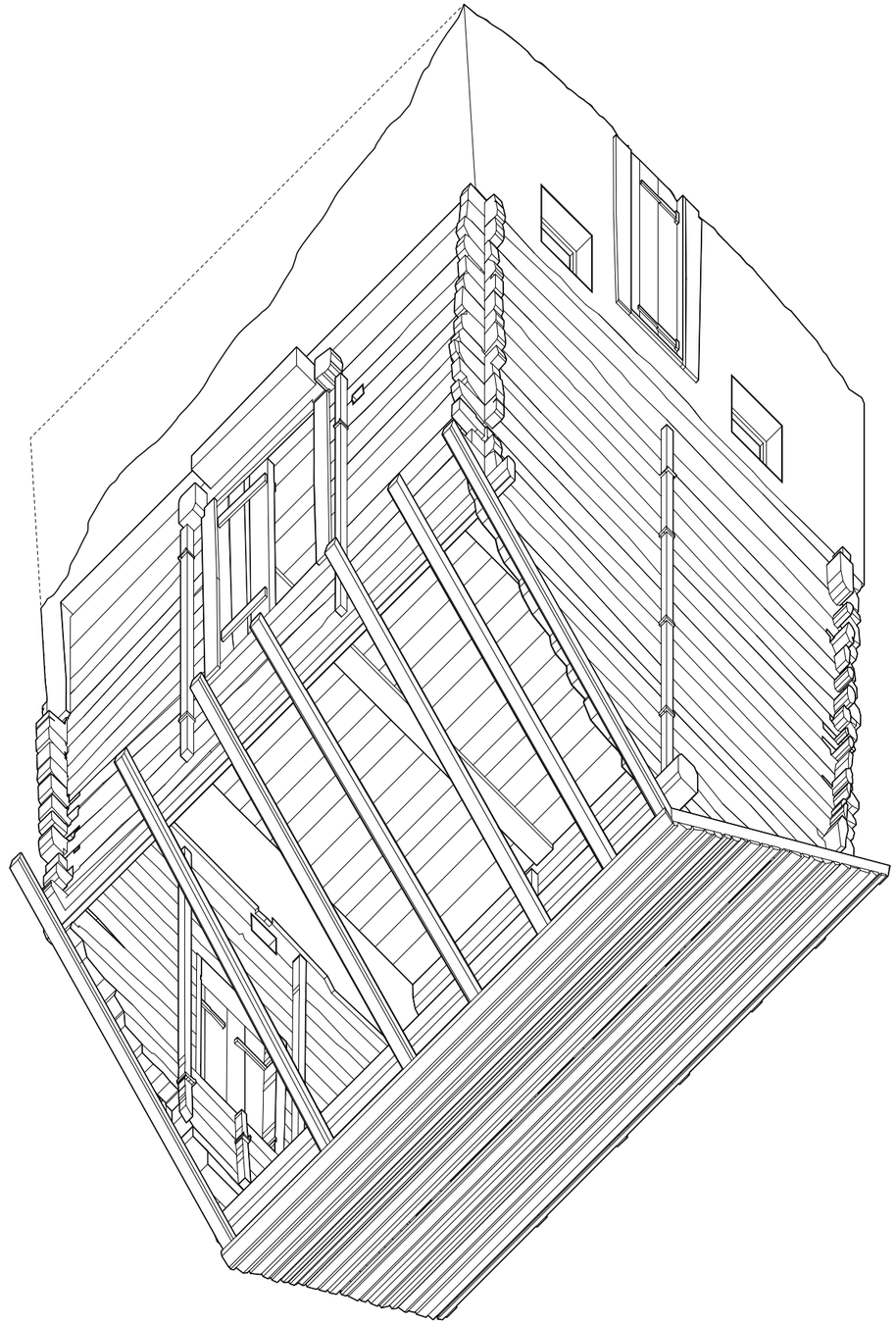
digital toolbox

Focusing on Rhino and Grasshopper, Digital Toolbox, developed by Scott Leinweber and Tam Tran, has hours of tutorials on topics ranging from the most basic uses to more involved processes. Digital Toolbox has a somewhat small collection of videos, but the content is nonetheless valuable.

tips & tricks

axonometries

part III



I

Axonometric projection

brief excursus

THREE MAIN TYPES OF AXONOMETRIC PROJECTION

isometric	*dimetric*	*trimetric*
x=y=z	x=y≠z	x≠y≠z

GRAPHIC PROJECTIONS

axonometric

oblique

isometric

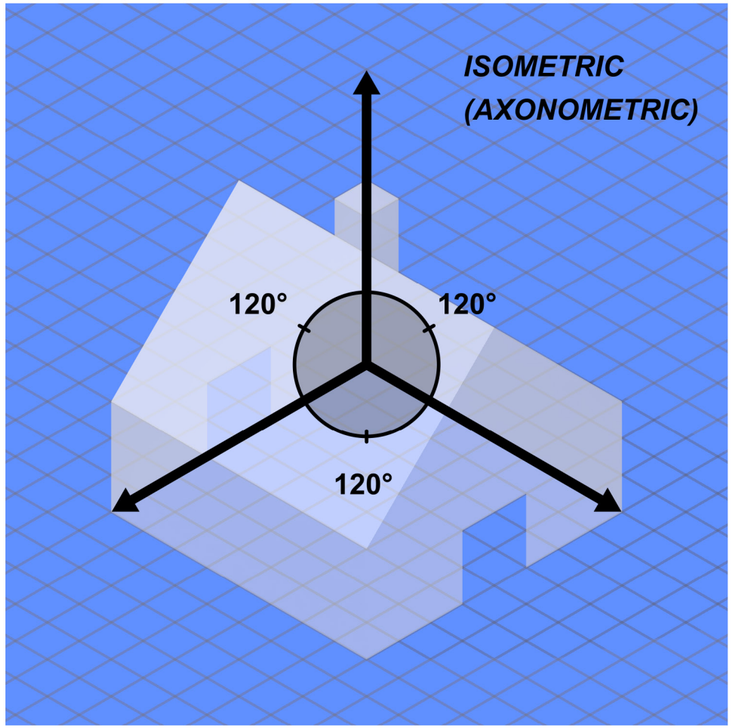
dimetric

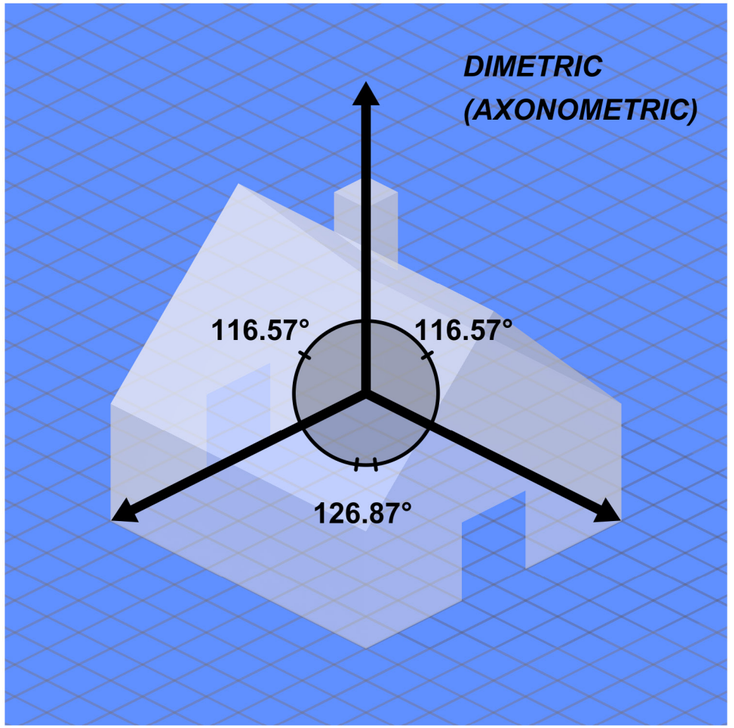
trimetric

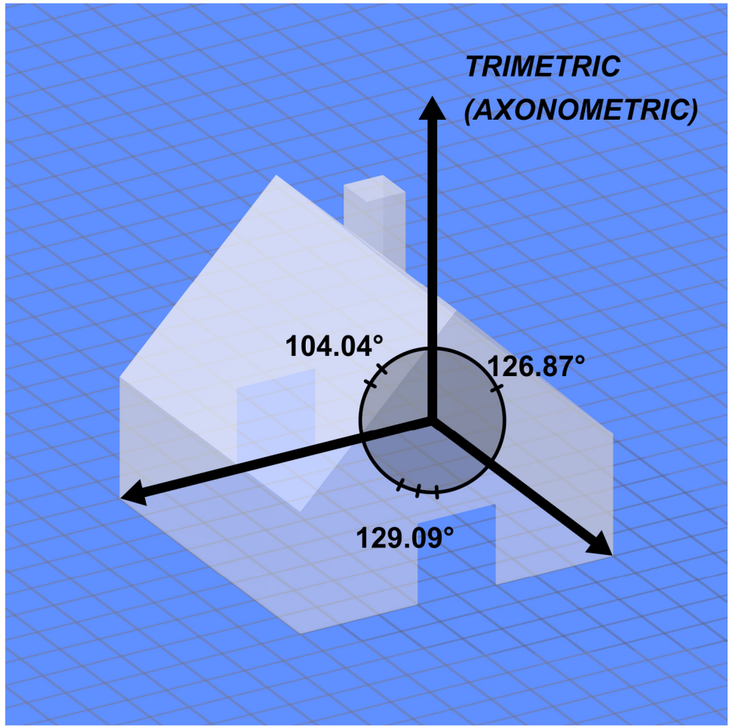
military

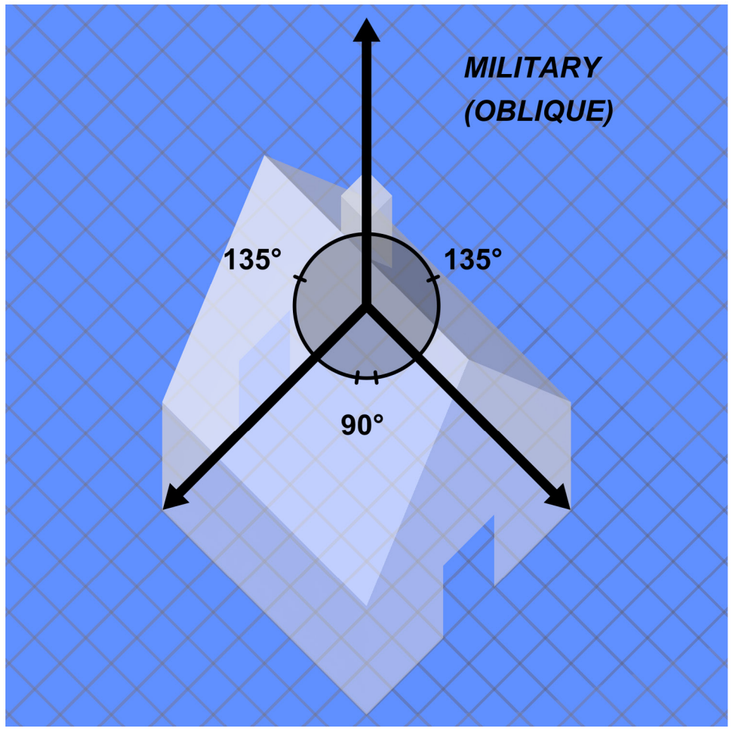
cavalier

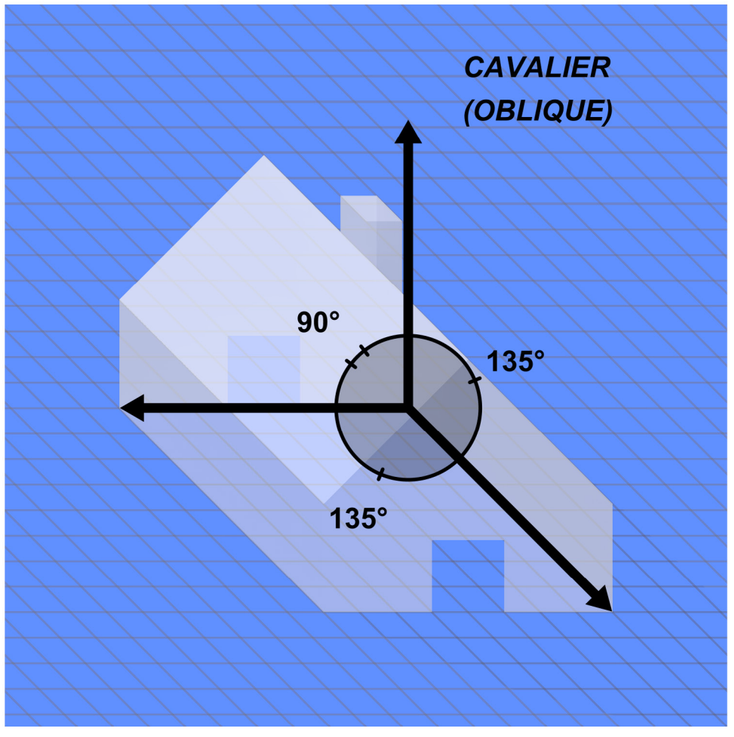
top-down

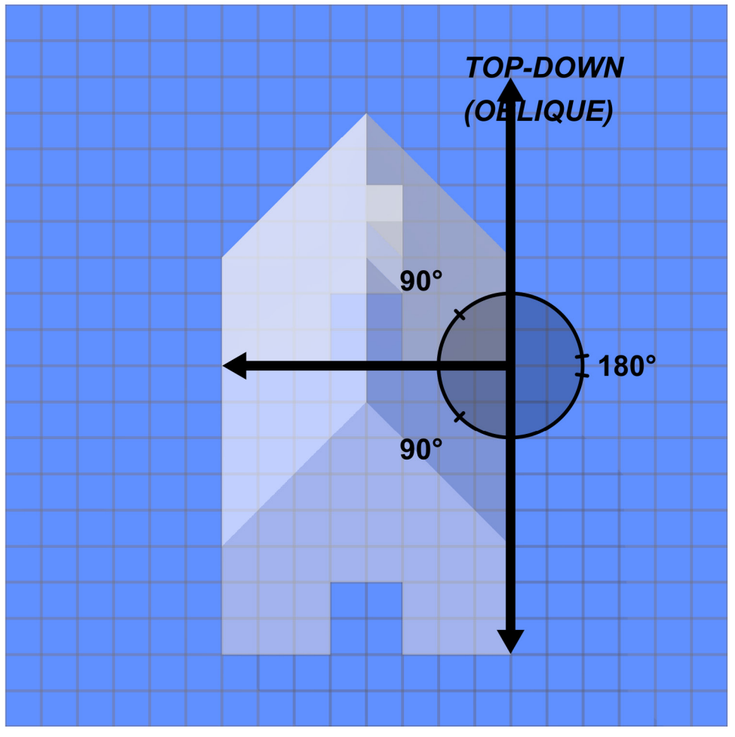

ISOMETRIC
(AXONOMETRIC)
120°
120°
120°


DIMETRIC
(AXONOMETRIC)
116.57°
116.57°
126.87°


TRIMETRIC
(AXONOMETRIC)
104.04°
126.87°
129.09°


MILITARY
(OBLIQUE)
135°
135°
90°


CAVALIER
(OBLIQUE)
90°
135°
135°


TOP-DOWN
(OBLIQUE)
90°
180°
90°

2

Military Projection

↓

Creating an "Axonometric" View in Rhino

Grid Snap | Ortho | Planar | SmartTrack | Gumball | History

Parallel | Top | Front | Right

Fron

- Repeat Z ▶
- Show Selected Objects
- Unlock Selected Objects
- Show Hidden Points
- Points Off
- Object Properties
- Object Information
- Object Material
- Grid Options
- Viewport Properties
- Set View ▶
  - Plan
  - Top
  - Bottom
  - Left
  - Right
  - Front
  - Back
  - Perspective
  - Two Point Perspective
  - Isometric ▶
    - NE
    - NW
    - SE
    - SW
  - Show Named Views Panel
- Set CPlane ▶
- Set Camera ▶
- Wireframe ^⌘W
- Shaded ^⌘S
- Rendered ^⌘R
- Ghosted ^⌘G
- X-Ray ^⌘X
- Technical ^⌘T
- Artistic ^⌘A
- ✓ Pen ^⌘P

The Isometric command changes the current viewport properties to a parallel projection isometric view.

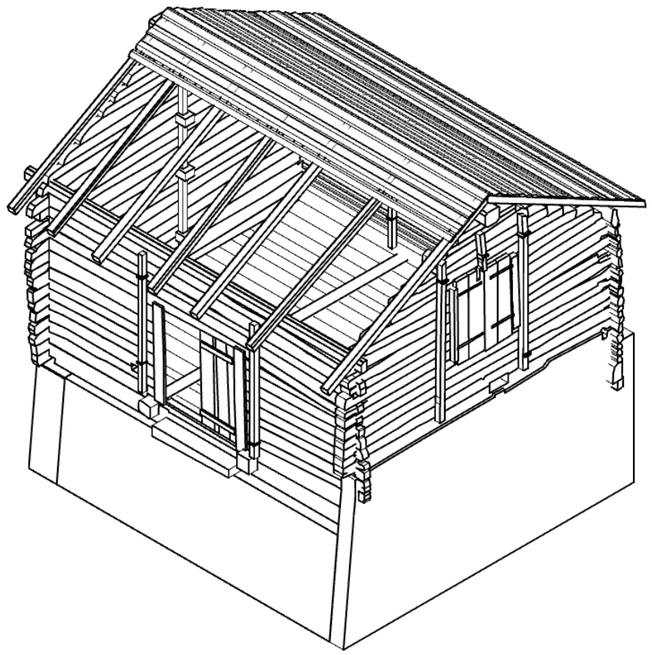
Command: '_Zoom

CPlane X: 3198.838 Y: 3888.212 Z: 0.000

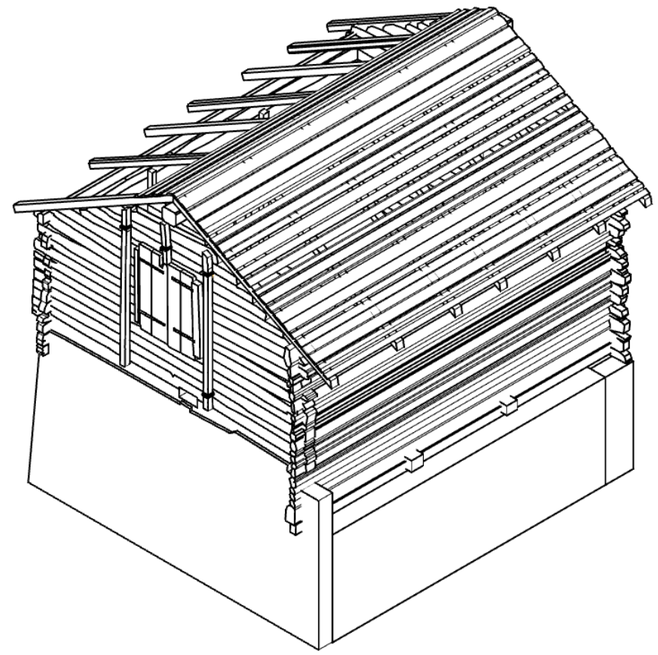
Grid Snap Ortho Planar SmartTrack Gumball History Default

ISO NW | ISO NE | ISO SE | ISO SW Layouts...

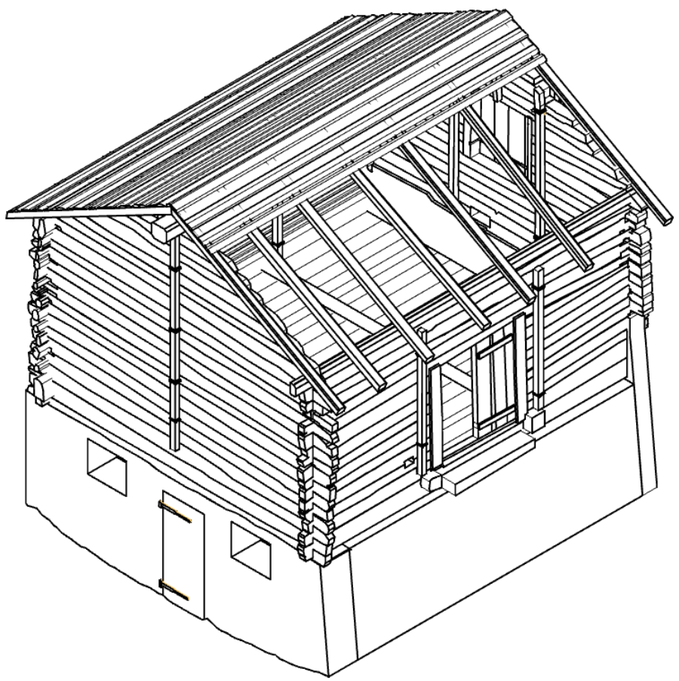
ISO NE



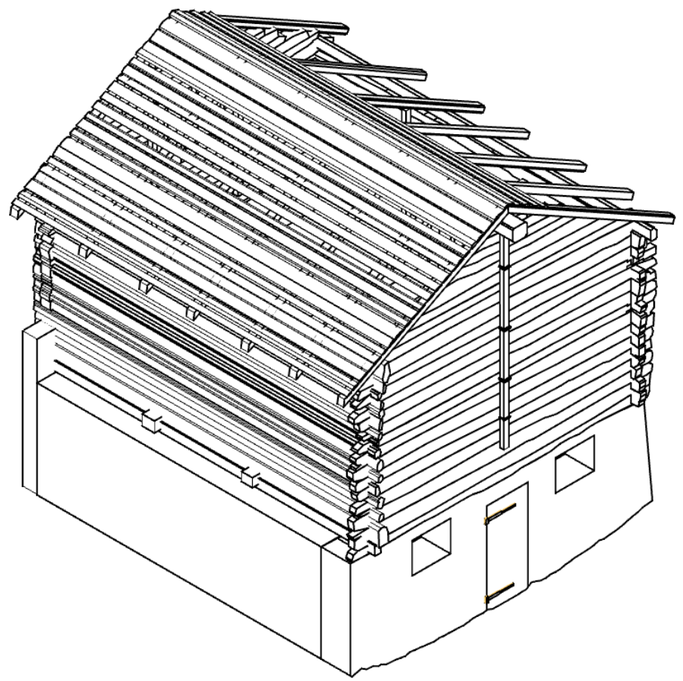
ISO NW



ISO SE



ISO SW



Command: _NamedView

CPlane X: -917.609 Y: 3122.202 Z: 0.000

CREATING AN AXONOMETRIC VIEW IN RHINO

There is no way to create a real-time 3D axonometric view that's geometrically correct in Rhino, as axonometric isn't really a true 3D display mode, but rather an artificial (pseudo-3D) construction ...

=(

CREATING AN AXONOMETRIC VIEW IN RHINO

... Anyway it is possible to create a geometrically accurate axonometric plan view in the top viewport, which can then be used with Make2D to create exportable line geometry for 2D plans.

=)

> PROCEDURE <

1. In the *Top viewport*, *Select* the object to shear and *rotate* it to the Axonometric angle desired, depending on the orientation of your drawing (45°, or multiple such as 135°, 225°, 315°).

2. While the object is still selected, go to the *Transform menu* > *Shear*.

3. To establish the baseline for shear, indicate two points - with *Ortho on,* vertical to each other - in the *Right viewport*.

4. At the prompt for *Shear Angle*, type -45, and press Enter. The model will shear over 45° to the right. In the *Top viewport*, you should now see your model in "pseudo-axonometric".

5. Use *Make2D* in the *Top viewport* to create your 2D line geometry.

OR ... YOU CAN SIMPLY COPYPASTE THIS SCRIPT

// For Rhino running in English : //

! _Select _Pause _SetActiveViewport Top _Rotate 0 315 _SetActiveViewport Right _Shear w0 w0,0,1 -45 _SetActiveViewport Top _Zoom _All _Extents

// Pour Rhino en Français : //

! _Select _Pause _SetActiveViewport Dessus _Rotate 0 315 _SetActiveViewport Droite _Shear w0 w0,0,1 -45 _SetActiveViewport Dessus _Zoom _All _Extents

*** WATCH OUT : I USED 315 ACCORDING TO THE FACES I WANTED TO SHOW !

;)

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help — Gio 30 mar 19:09

GRL 170330 class 03 axo MAKE2D — Edited

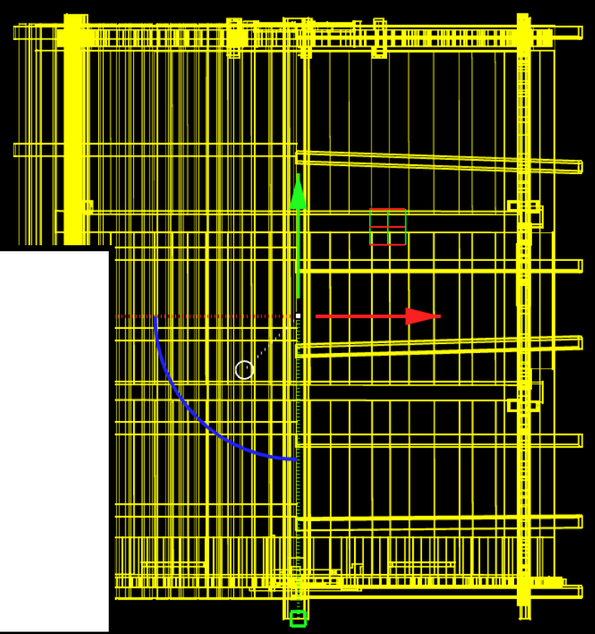
Grid Snap | Ortho | Planar | SmartTrack | Gumball | History | Default

Right | Top | Front | Perspective | Layouts...

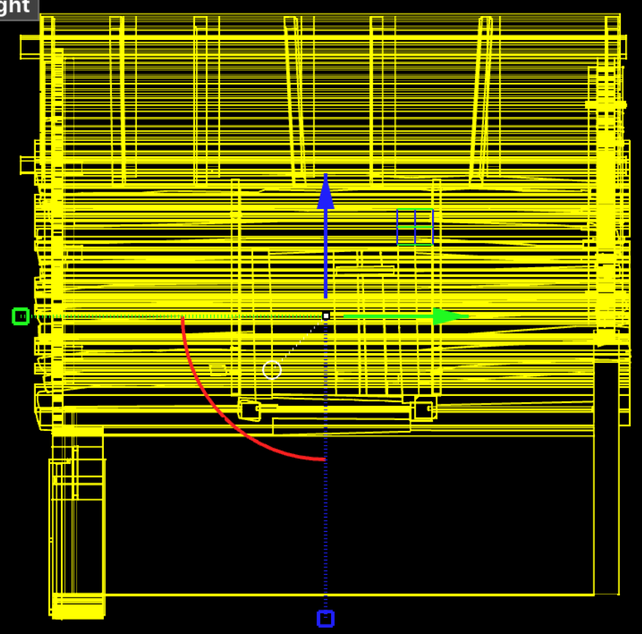
! _Select _Pause _SetActiveViewport Top _Rota

copypaste the script in the command bar

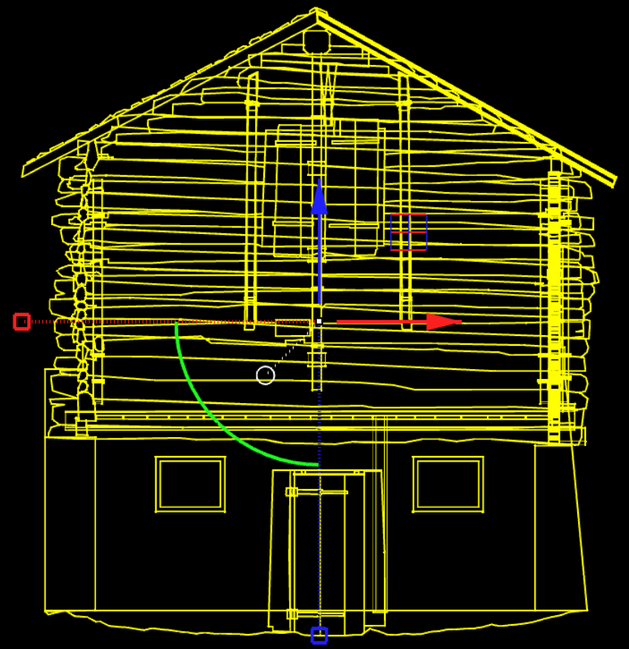
Top



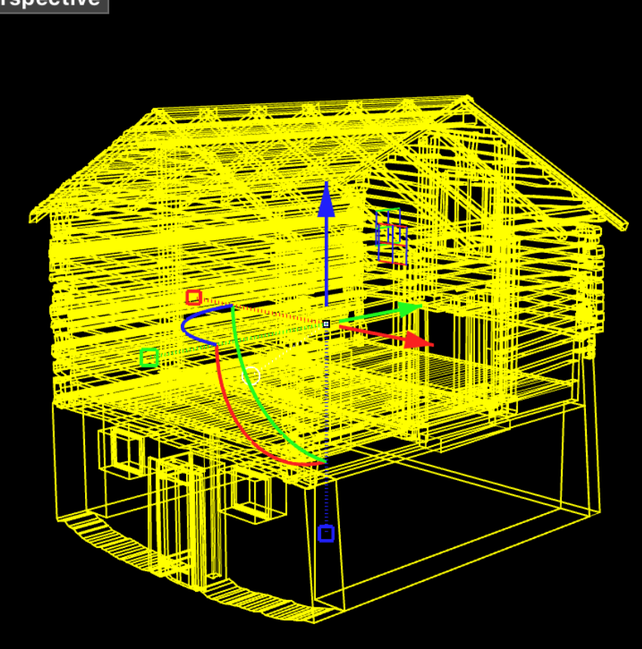
Right



Front



Perspective



Persistent
One shot

End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Vertex
On curve
On surface
On polysurface
On mesh
Project
SmartTrack

Disable all

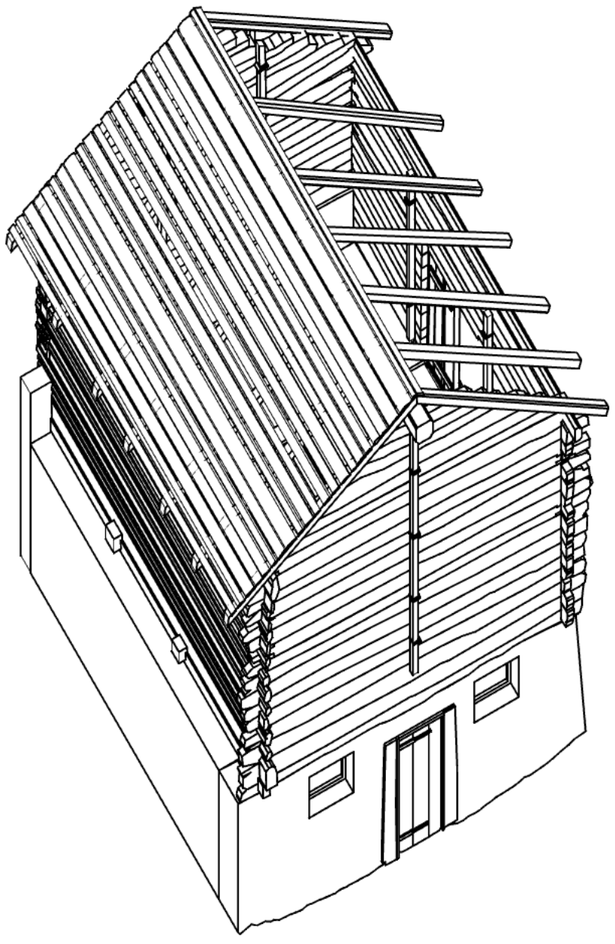
Name	Linety
Default	Dash.
FF 3D	Conti.
ROOF	Conti.
WALLS	Conti.
wood	Conti.
restraint	Conti.
concrete	Conti.
DOOR	Conti.
frame	Conti.
step	Conti.
leaf	Conti.
metal	Conti.
GLASS	Conti.
FLOOR	Conti.
0	Conti.
EXPORT	Conti.
Make2D	Conti.

Viewport settings
Active viewport: Top
Display mode: Pen
Background: Solid color
Solid color:

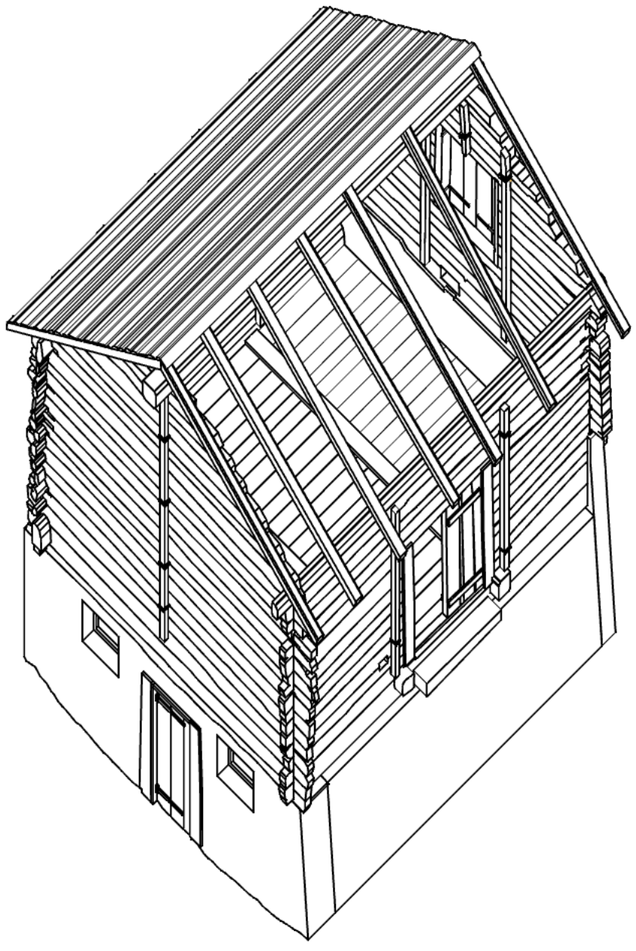
General settings
Flat shading
Shade vertex colors
Shadows
Surface isocurves
Surface edges
Mesh wires
Curves

98 extrusions, 2 curves, 341 polysurfaces, 6 surfaces added to selection.

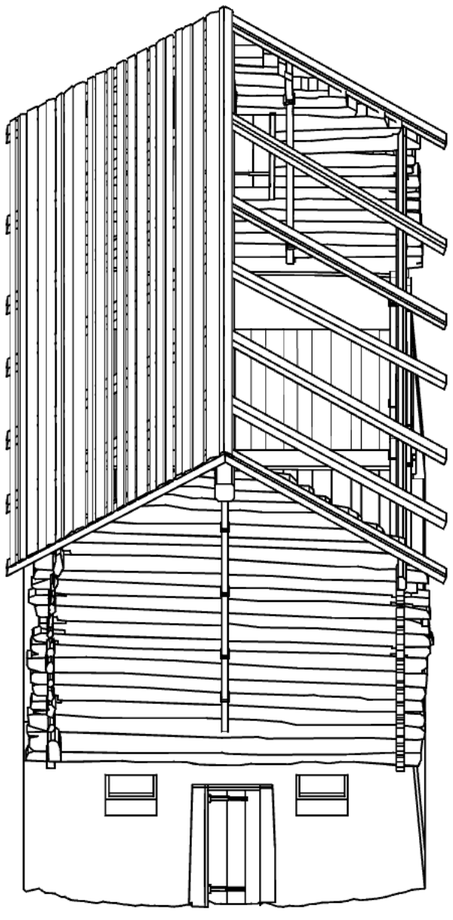
CPlane X: 226.331 Y: 3916.652 Z: 0.000



30°



45°



0°

3

Make 2D

2d > 3d > make2d

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help Gio 30 mar 19:49

GRL 170330 class 03 axo MAKE2D — Edited

Grid Snap | Ortho | Planar | SmartTrack | Gumball | History | Default

Right | Top | Front | Perspective | Layouts...

Top

Make2D
Make2D
MakeHole
akeNonPeriodic
kePeriodic
Uniform
niformUV

always from the top view !

Persistent
One shot

End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Vertex
On curve
On surface
On polysurface
On mesh
Project
SmartTrack

Disable all

Name | Linety

Default
FF 3D
ROOF
WALLS
wood
restraint
concrete
DOOR
frame
step
leaf
metal
GLASS
FLOOR
0
EXPORT
Make2D

Viewport settings
Active viewport: Top
Display mode: Pen
Background: Solid color
Solid color:

General settings
Flat shading
Shade vertex colors
Shadows
Surface isocurves
Surface edges
Mesh wires
Curves

98 extrusions, 341 polysurfaces, 6 surfaces, 2 curves added to selection.

CPlane X: 7230.923 Y: 7589.712 Z: 0.000

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help

Gio 30 mar 19:50

GRL 170330 class 03 axo MAKE2D — Edited

Grid Snap | Ortho | Planar | SmartTrack | Gumball | History

Default

Right | Top | Front | Perspective | Layouts...

Top

Command

Persistent
One shot

End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Vertex
On curve
On surface
On polysurface
On mesh
Project
SmartTrack

Disable all

Name | Linety

Default
FF 3D
ROOF
WALLS

Mesh wires
Curves

2-D Drawing Options

Drawing layout

- (•) Current View
- ( ) Current CPlane
- ( ) 4 View (USA)
- ( ) 4 View (Europe)

Options

- [ ] Show tangent edges
- [ ] Show hidden lines
- [ ] Show viewport rectangle
- [x] Maintain source layers

Layers for Make2D objects

Visible lines: Make2D::visible::lines
Visible tangents: Make2D::visible::tangents
Visible clipping planes: Make2D::visible::clipping_planes
Hidden lines: Make2D::hidden::lines
Hidden tangents: Make2D::hidden::tangents
Hidden clipping planes: Make2D::hidden::clipping_planes
Annotations: Make2D::Annotation

Restore Defaults

Cancel | OK

Command: Make2D

CPlane X: 7230.923 Y: 7589.712 Z: 0.000

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help

Gio 30 mar 19:52

GRL 170330 class 03 axo MAKE2D — Edited

Grid Snap | Ortho | Planar | SmartTrack | Gumball | History

Default

Right | Top | Front | Perspective

Layouts...

Top

Command

Persistent
One shot

End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Vertex
On curve
On surface
On polysurface
On mesh
Project
SmartTrack

Disable all

Name | Linety

Default
FF 3D
ROOF
WALLS
wood
restraint
concrete
DOOR
frame
step
leaf
metal
GLASS
FLOOR
0
EXPORT
Make2D

Viewport settings

Active viewport: Top

Display mode: Shaded

Background: Solid color

Solid color:

General settings

Flat shading
Shade vertex colors
Shadows
Surface isocurves
Surface edges
Mesh wires
Curves

Command: '_Zoom

CPlane | X: 652.746 | Y: 1209.146 | Z: 0.000

>> WATCH OUT <<

Shear is a relatively simple transformation, it usually doesn't need a lot of memory or calculation time. However, if your model is VERY complex and your machine is weak, it may take some time.

Make2D on the other hand is very processor intensive and uses a lot of memory. If your model is complex, your machine is slow and/or you do not have a lot of memory, it is not likely to succeed - it will take a very long time or crash Rhino. Bad objects or many objects with concurrent edges will also cause Make2D to take much longer to execute.

=O

1. make a copy of your model before Shearing
2. save your file before Make2d

How to Get Make2D to Perform Better

tips & tricks

post-production

part IV

I

Export

for post- production

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help

Mar 28 mar 22:10

GRL 170327 class 03 axo MAKE2D — Edited

Grid S… rack Gumball History Default

Top | Front | Perspective Layouts…

- New ⌘N
- New Using Template… ⇧⌘N
- Open… ⌘O
- Open Recent ▶
- Close ⌘W
- Save ⌘S
- Duplicate ⇧⌘S
- Rename…
- Move To…
- Save Small
- Save As Template…
- Revert To ▶
- Insert… ⌘I
- Import…
- Export…
- Export Selected…
- Export With Origin…
- Settings…
- Print… ⌘P

Command

Persistent
One shot

- [x] End
- [ ] Near
- [ ] Point
- [x] Midpoint
- [ ] Center
- [ ] Intersection
- [x] Perpendicular
- [ ] Tangent
- [ ] Quadrant
- [ ] Knot
- [ ] Vertex
- [ ] On curve
- [ ] On surface
- [ ] On polysurface
- [ ] On mesh
- [ ] Project
- [ ] SmartTrack

Disable all

y
x

Command: _Export

CPlane X: 916.289 Y: 1692.253 Z: 0.000

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help Mar 28 mar 22:10

GRL 170327 class 03 axo MAKE2D — Edited

Grid Snap Ortho Planar SmartTrack Gumball History Default

Right Top Front Perspective Layouts...

Command

Export

Save As: GRL 170327 class 03 axo MAKE2D.3dm

Tags:

GRL 170327 CLASS 02a e... Search

Favorites
- Recents
- Dropbox
- iCloud Drive
- Applications
- Downloads
- Music
- Desktop
- 01 WORK
- Documents

Today
- GRL 17032...port file.ctb
- GRL 17032...ort file.dwg

- ✓ Rhino 5 3D Models (3dm)
- Rhino 4 3D Models (3dm)
- Rhino 3 3D Models (3dm)
- Rhino 2 3D Models (3dm)
- 3D Studio (3ds)
- ACIS (sat)
- Adobe Illustrator (ai)
- AutoCAD Drawing (dwg)
- AutoCAD Drawing Exchange (dxf)
- COLLADA (dae)
- Cult3D (cd)
- DirectX (x)
- Google Earth (kmz)
- GTS (GNU Triangulated Surface) (gts)
- IGES (igs)
- LightWave (lwo)
- Moray UDO (udo)
- MotionBuilder (fbx)
- OBJ (obj)

Hide extension New Folder Cancel Export

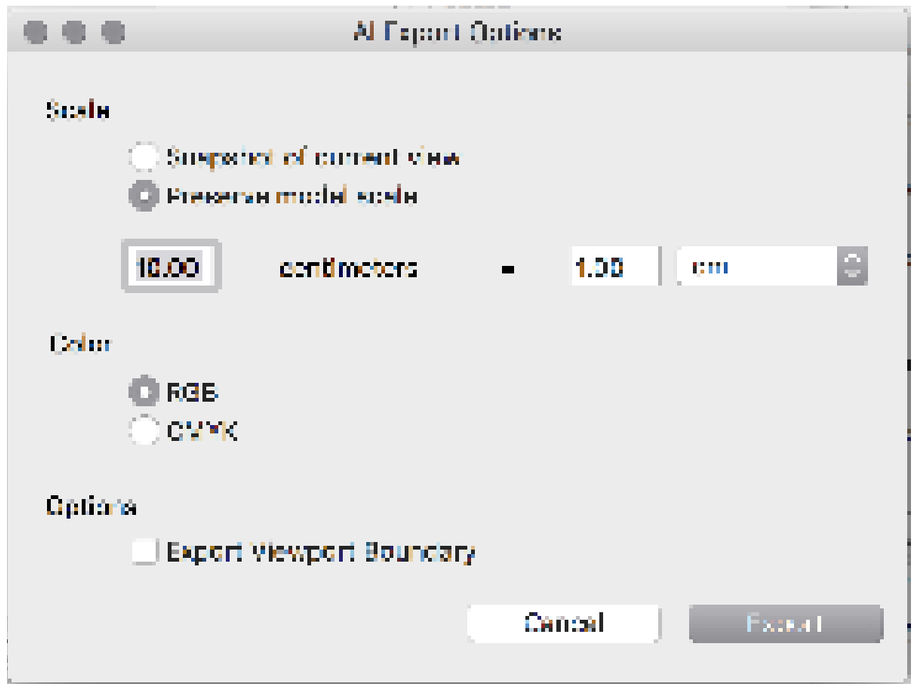
- Persistent
- One shot
- ☑ End
- ☐ Near
- ☐ Point
- ☑ Midpoint
- ☐ Center
- ☐ Intersection
- ☑ Perpendicular
- ☐ Tangent
- ☐ Quadrant
- ☐ Knot
- ☐ Vertex
- ☐ On curve
- ☐ On surface
- ☐ On polysurface
- ☐ On mesh
- ☐ Project
- ☐ SmartTrack

☐ Disable all

Command: _Export

CPlane X: 916.289 Y: 1692.253 Z: 0.000

EXPORT YOUR DRAWING IN THE DESIRED SCALE (1:10)



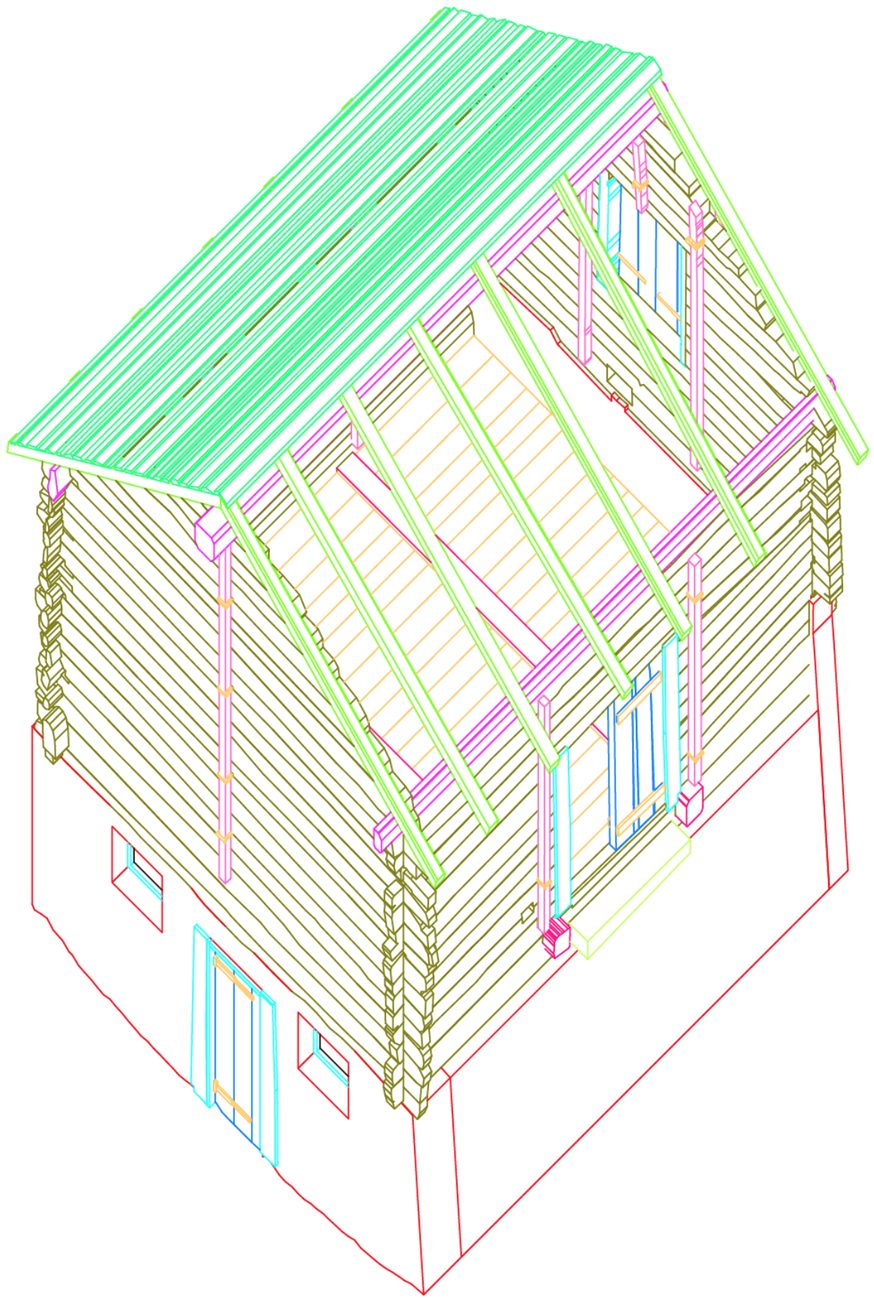
Illustrator File Modifica Oggetto Testo Seleziona Effetto Visualizza Finestra Aiuto

Mar 28 mar 22:49

Essenziali

Nessuna selezione | Traccia: 1 pt | Uniforme | Base | Opacità: 100% | Stile: | Imposta documento | Preferenze

GRL 170328 class 03 axo MAKE2D [Convertito].AI* @ 87,52% (RGB/Anteprima)



the layers are the same of Rhino, even the colors (avoid yellow&white)

Livelli | Tavole disegno

- Make2D::visible::lines::FF 3D::WALLS::DOOR::GLASS
- Make2D::visible::lines::FF 3D::WALLS::DOOR::metal
- Make2D::visible::lines::FF 3D::WALLS::DOOR::leaf
- Make2D::visible::lines::FF 3D::WALLS::DOOR::step
- Make2D::visible::lines::FF 3D::WALLS::DOOR::frame
- Make2D::visible::lines::FF 3D::FLOOR::structure
- Make2D::visible::lines::FF 3D::FLOOR::boards
- Make2D::visible::lines::FF 3D::WALLS::concrete
- Make2D::visible::lines::FF 3D::WALLS::restraint
- Make2D::visible::lines::FF 3D::WALLS::wood
- Make2D::visible::lines::FF 3D::ROOF::main structure
- Make2D::visible::lines::FF 3D::ROOF::beams 01
- Make2D::visible::lines::FF 3D::ROOF::beams 02

13 livelli

Inters
Perpe
Tange
Quadr
Knot
Vertex
On cu
On su
On po
On me
Projec
Smart
Disabl

87,52% 1 Aggiunge/toglie alla selezione

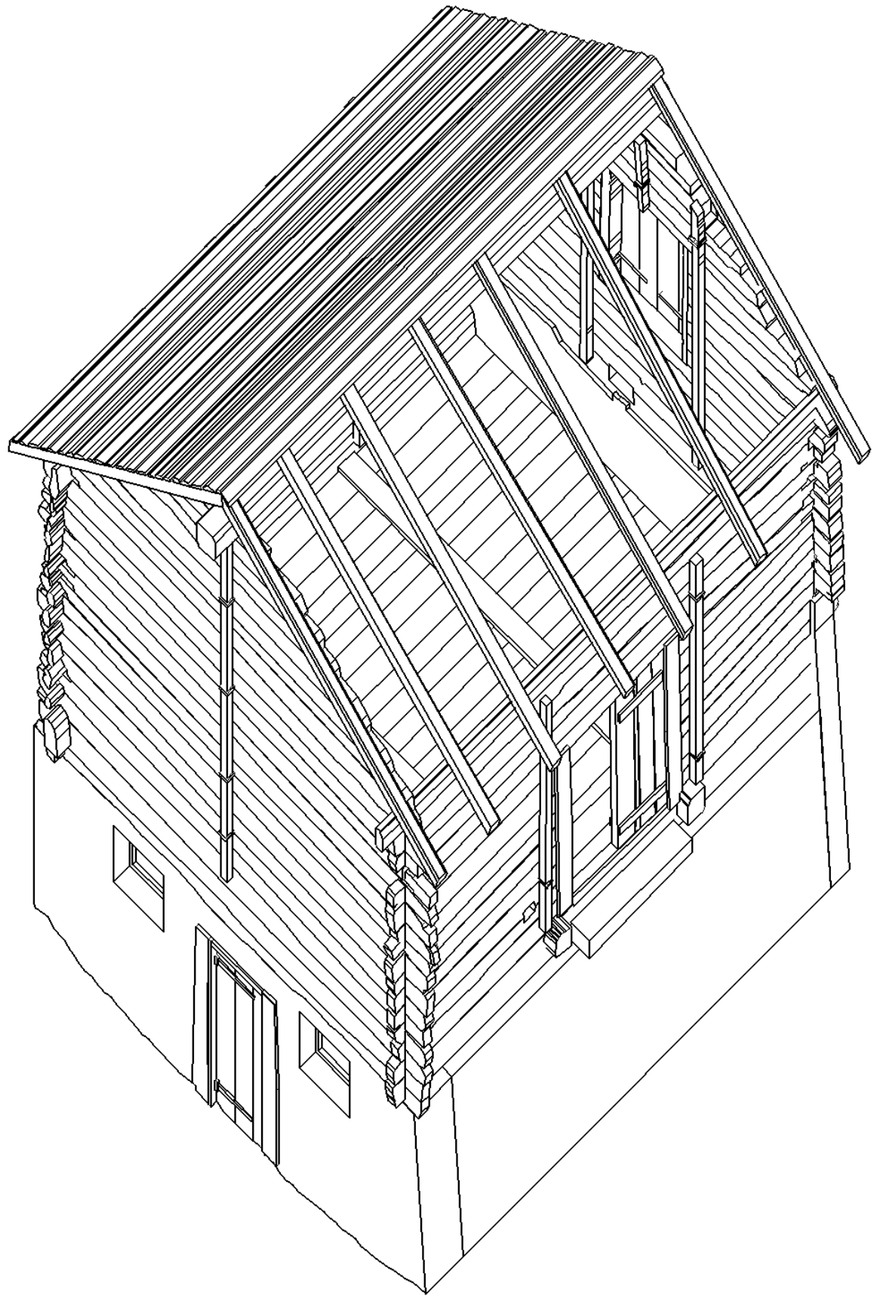
Illustrator File Modifica Oggetto Testo Seleziona Effetto Visualizza Finestra Aiuto

Mar 28 mar 22:49

Essenziali

Nessuna selezione | Traccia: 1 pt | Uniforme | Base | Opacità: 100% | Stile: | Imposta documento | Preferenze

GRL 170328 class 03 axo MAKE2D [Convertito].AI* @ 87,52% (RGB/Contorno)



Livelli | Tavole disegno

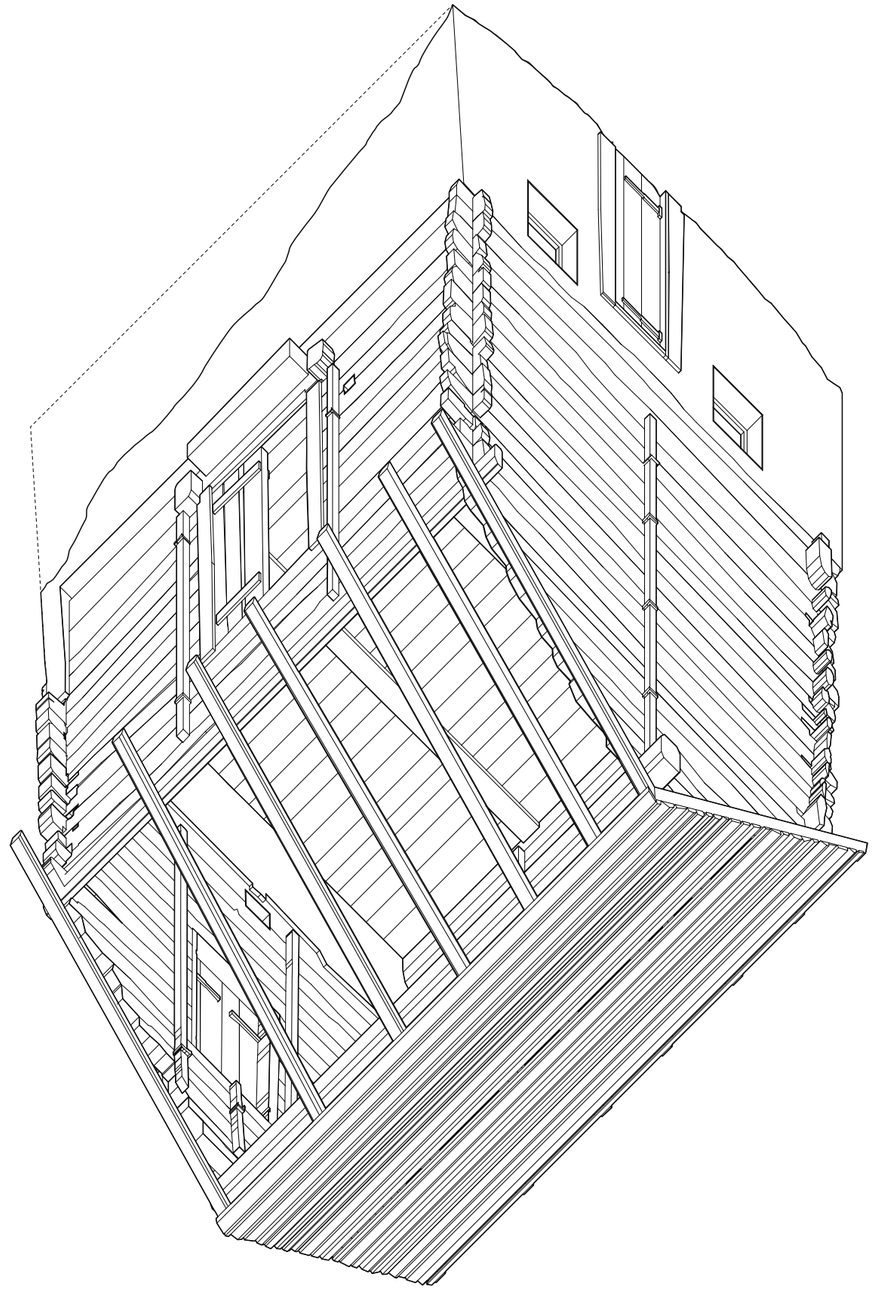
- Make2D::visible::lines::FF 3D::WALLS::DOOR::GLASS
- Make2D::visible::lines::FF 3D::WALLS::DOOR::metal
- Make2D::visible::lines::FF 3D::WALLS::DOOR::leaf
- Make2D::visible::lines::FF 3D::WALLS::DOOR::step
- Make2D::visible::lines::FF 3D::WALLS::DOOR::frame
- Make2D::visible::lines::FF 3D::FLOOR::structure
- Make2D::visible::lines::FF 3D::FLOOR::boards
- Make2D::visible::lines::FF 3D::WALLS::concrete
- Make2D::visible::lines::FF 3D::WALLS::restraint
- Make2D::visible::lines::FF 3D::WALLS::wood
- Make2D::visible::lines::FF 3D::ROOF::main structure
- Make2D::visible::lines::FF 3D::ROOF::beams 01
- Make2D::visible::lines::FF 3D::ROOF::beams 02

13 livelli

Inters
Perpe
Tange
Quadr
Knot
Vertex
On cu
On su
On po
On me
Projec
Smart
Disabl

Comman

87,52% | 1 | Aggiunge/toglie alla selezione



1. make everything editable (use illustrator only for the very last touches).

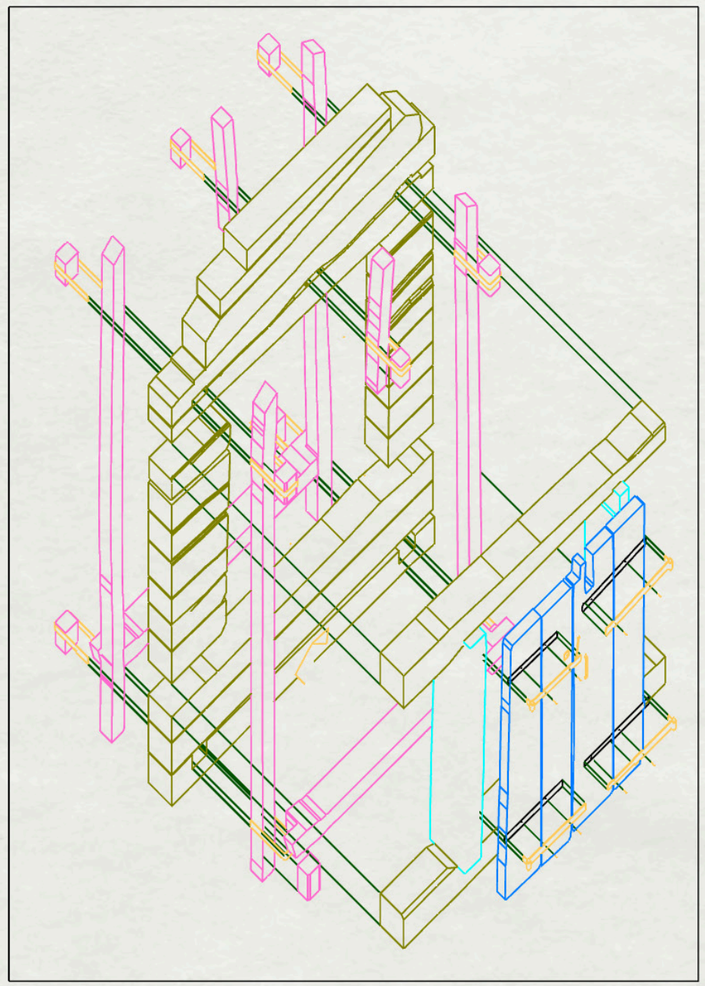
2. export from Rhino always using the same origin, structure and settings to preserve the paste in place in post-production.

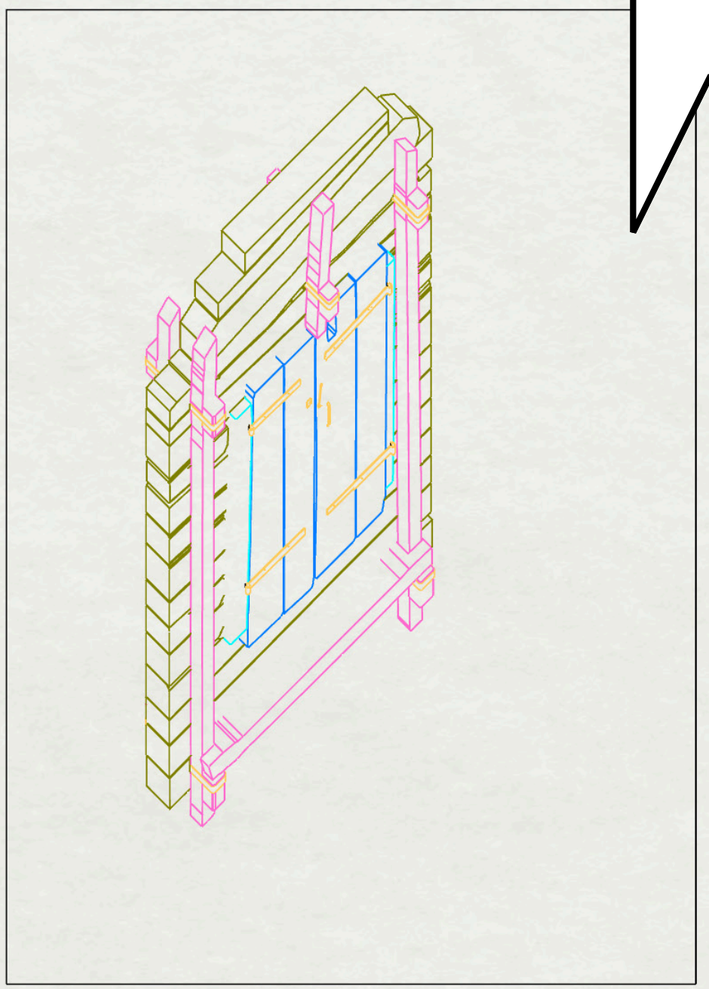
2

Post-production

Only for the last touches

draw a A2 (x10) rectangle to include your drawing to export (ref point)





export selection
in 1:10 scale

Rhinoceros File Edit View Curve Surface Solid Mesh Dimension Transform Tools Analyze Render Window Help

Gio 12 apr 17:42

FIRE2 180409 class 02 detail — Edited

mball History

PROJECTIONS

FIRE2 180409 class 02 detail

GRL 170324 class 02 a import & modeling tools.3dm

ISO NE detail 1 1

Layouts...

Background Image file

File name: <Pen>

neral settings

Flat shading
Shade vertex colors
Shadows
Surface isocurves
Surface edges
Mesh wires
Curves
Hidden lines
Edges
Silhouettes
Creases
Seams
Intersections
Lights
Clipping planes

AI Export Options

Scale

Snapshot of current view
Preserve model scale

10.00 centimeters = 1.00 cm

Color

RGB
CMYK

Options

Export Viewport Boundary

Cancel Export

Persistent
One shot

End
Near
Point
Midpoint
Center
Intersection
Perpendicular
Tangent
Quadrant
Knot
Vertex
On curve
On surface
On polysurface
On mesh
Project
SmartTrack

Disable all

Named views

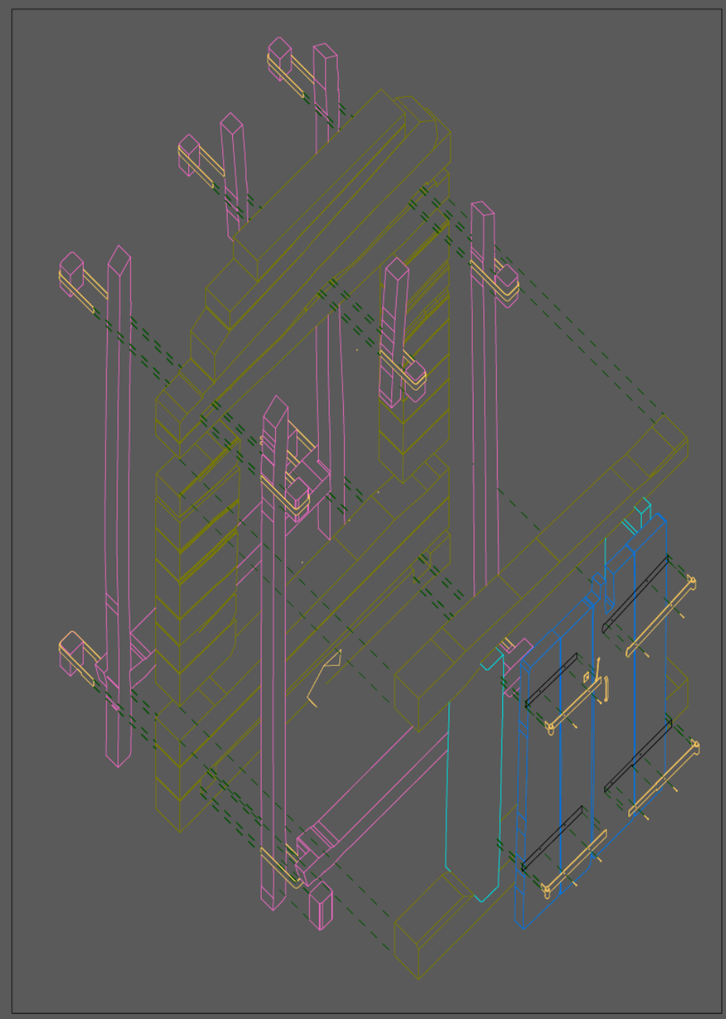
ISO NE
ISO NW
ISO SE
ISO SW
ISO NE detail 1 1

Restore

Command: Export

CPlane X: 511.407 Y: 618.738 Z: 0.000

opening the .ai file you find out the importance of drawing close to origin :)



Illustrator File Modifica Oggetto Testo Seleziona Effetto Visualizza Finestra Aiuto

Gio 12 apr 17:49

Essenziali

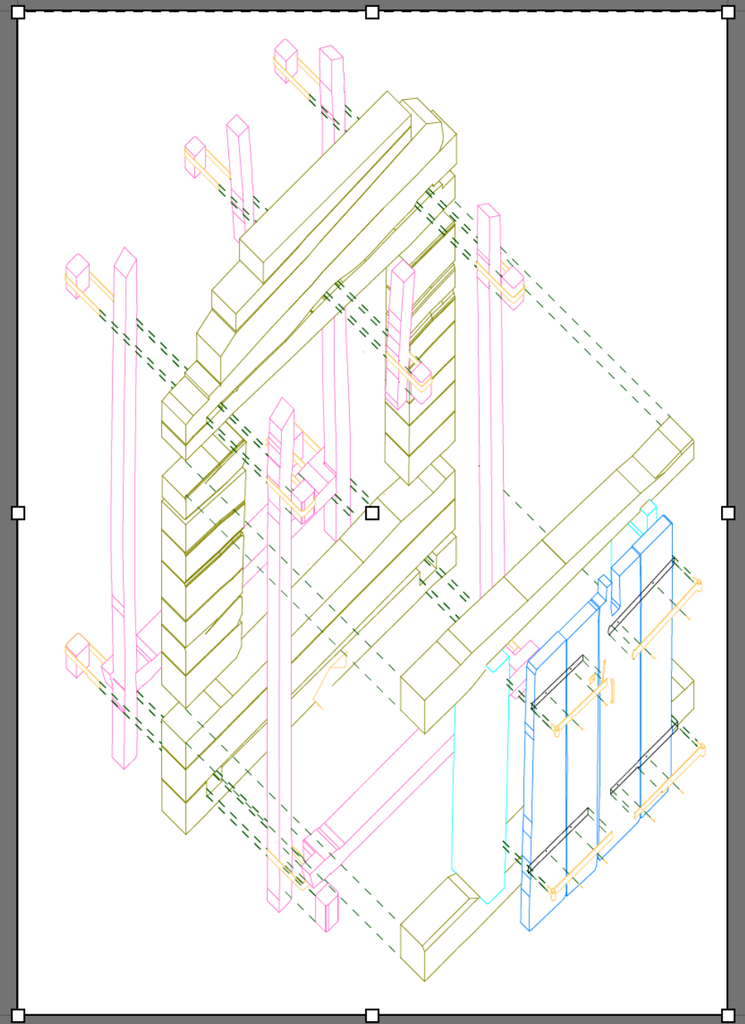
Tavola disegno | Predefiniti: Personale | Nome: Tavola disegno 2 | X: 72,4 cm | Y: -30,3 cm | L: 42,04 cm | A: 59,44 cm | Tavole disegno: 1

FIRE2 180412 class 02 detail [Convertito].AI* @ 33,33% (RGB/Anteprima)

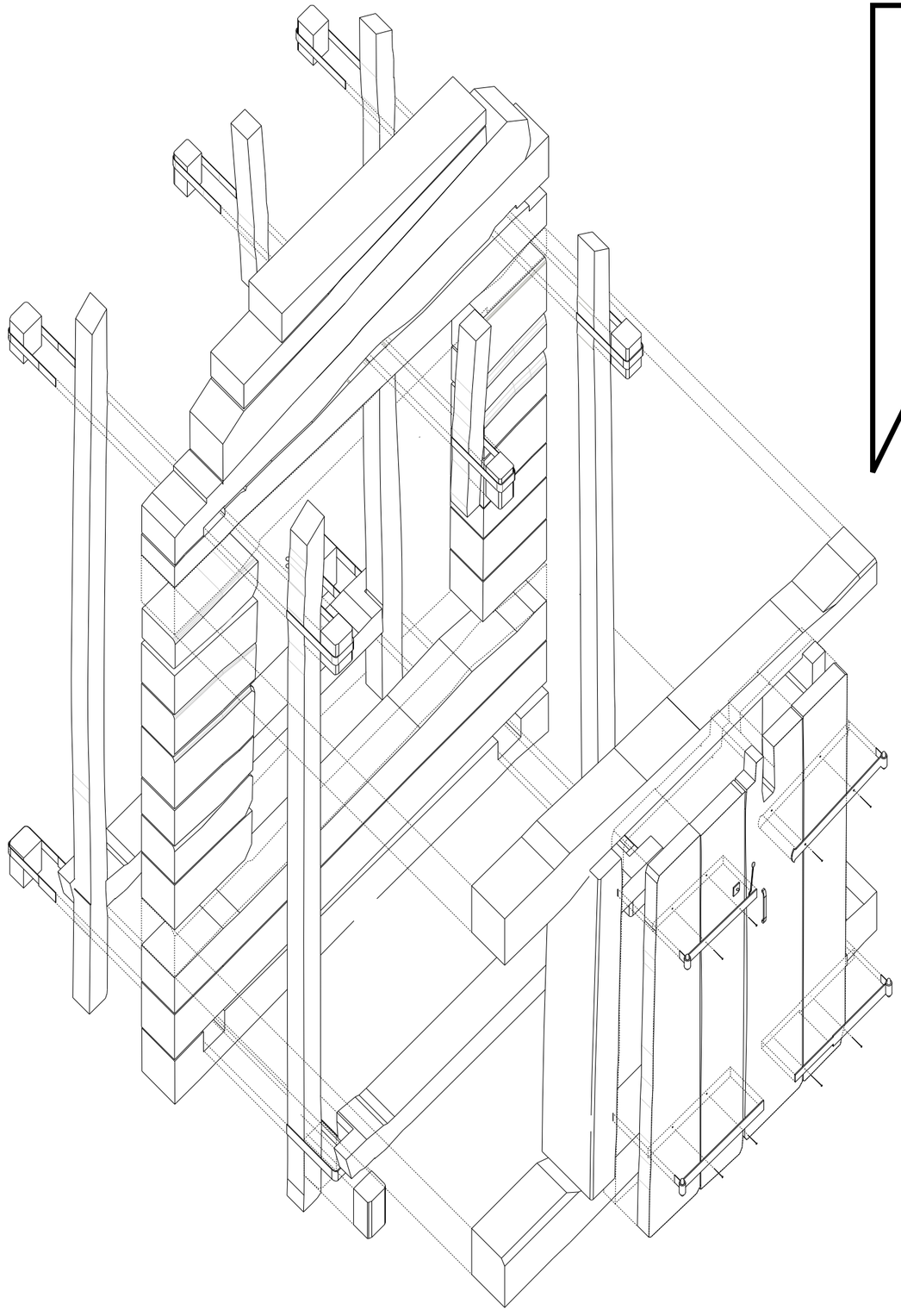
FIRE2 180412 class 02 detail [Convertito].AI* @ 33,33% (RGB/Anteprima)

Personale
Adatta a limiti grafica
Adatta a grafica selezionata
Lettera
Legal
Tabloid
A4
A3
B5
B4
NTSC DV
NTSC DV Widescreen
NTSC D1
NTSC D1 Widescreen
PAL D1/DV
PAL D1/DV Widescreen
HDV/HDTV 720
HDV 1080
DVCPRO HD 720
DVCPRO HD 1080
HDTV 1080
Cineon Half
Cineon Full
Film (2K)
Film (4K)
iPad Air
iPad Mini
iPhone 5S
Nexus 5
Nexus 7 (2013)
Fire HD
Fire HD 8.9"
Galaxy S5
Surface Pro 2
640x480 (VGA)
800x600 (SVGA)

select A2 rectangle
check
"adapt to selected graphic"

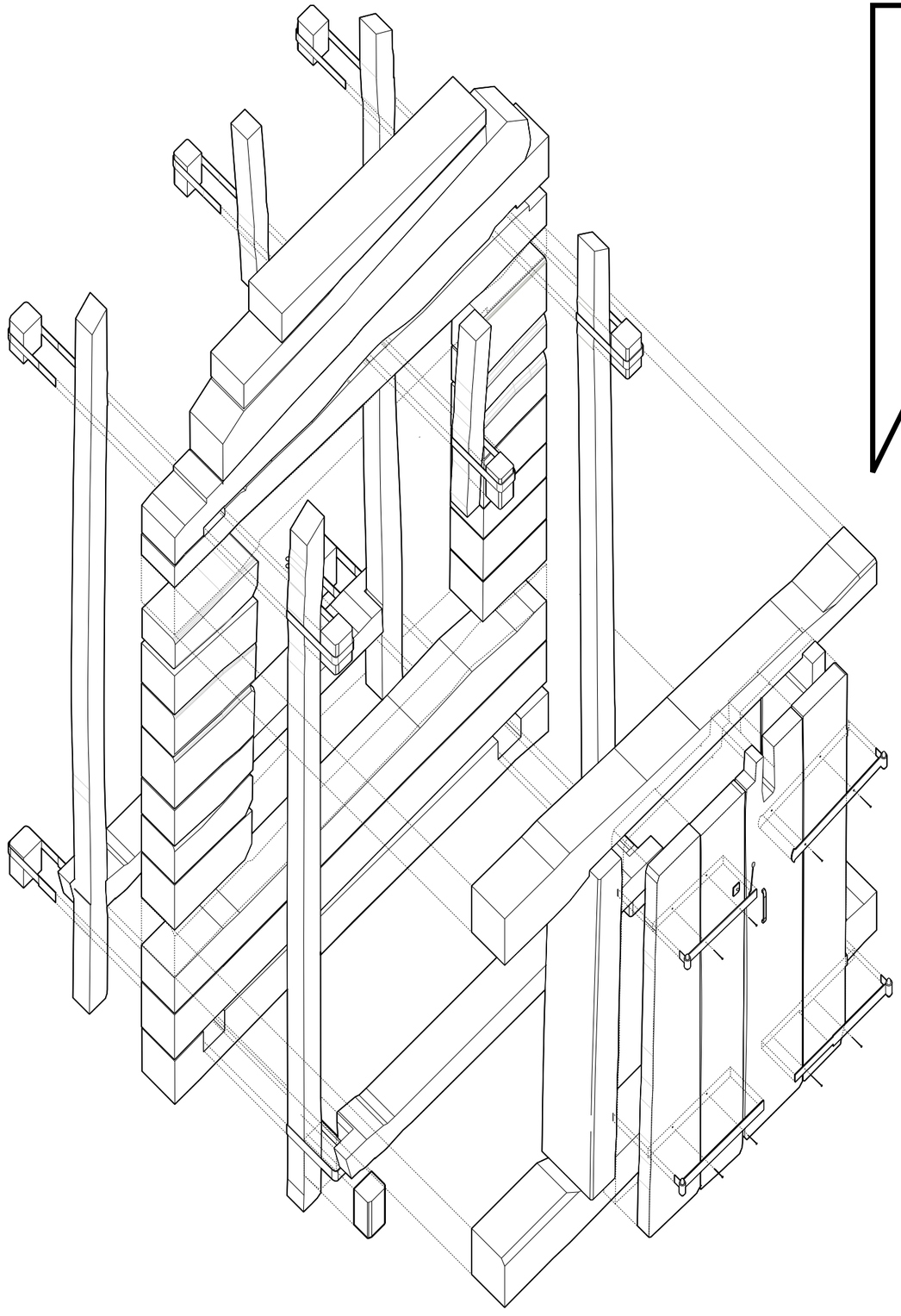


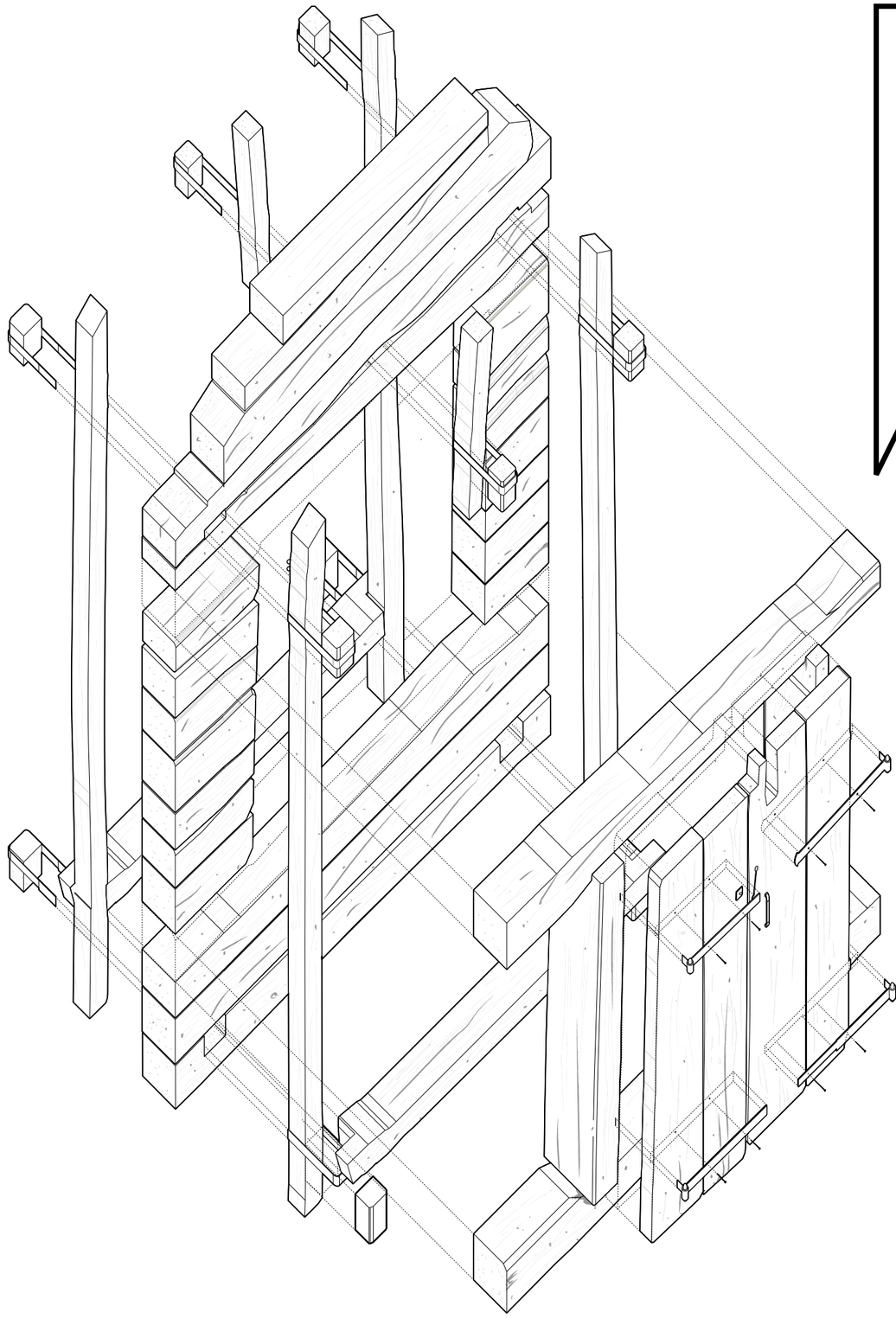
Aggiunge/toglie alla selezione



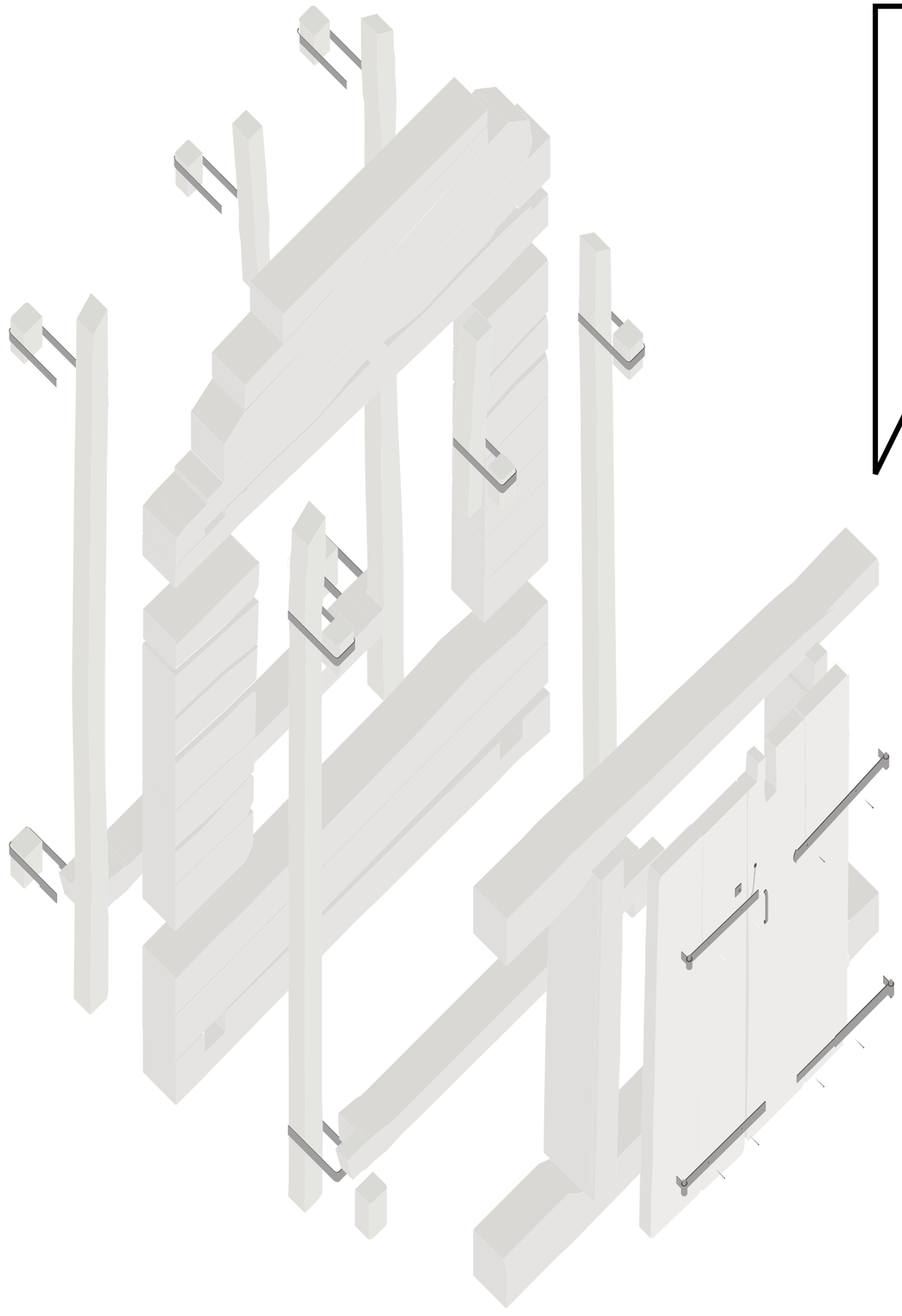
all lines set to black 0.12

Border Line 0.35

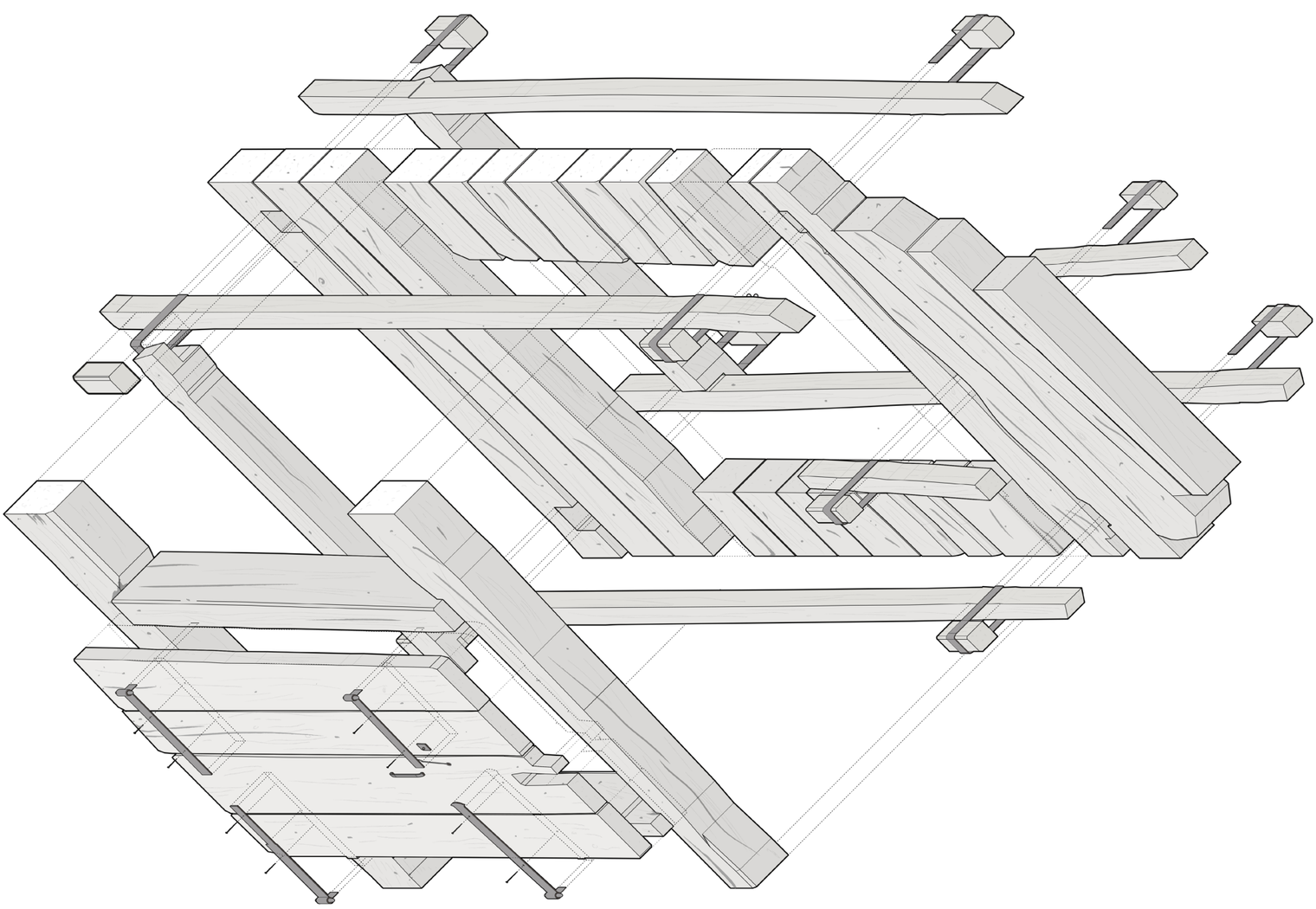


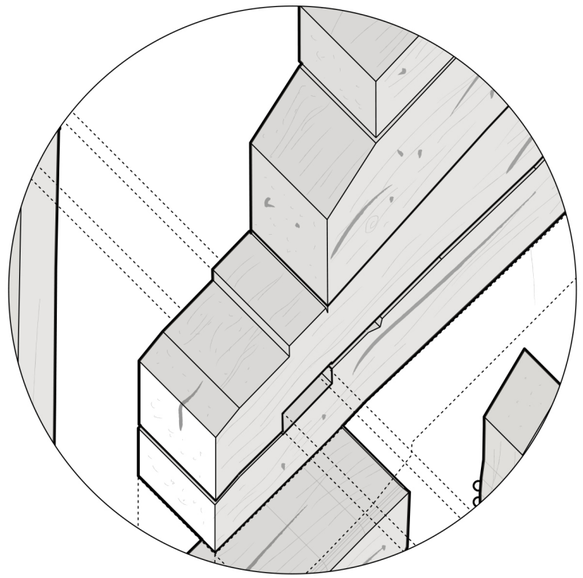


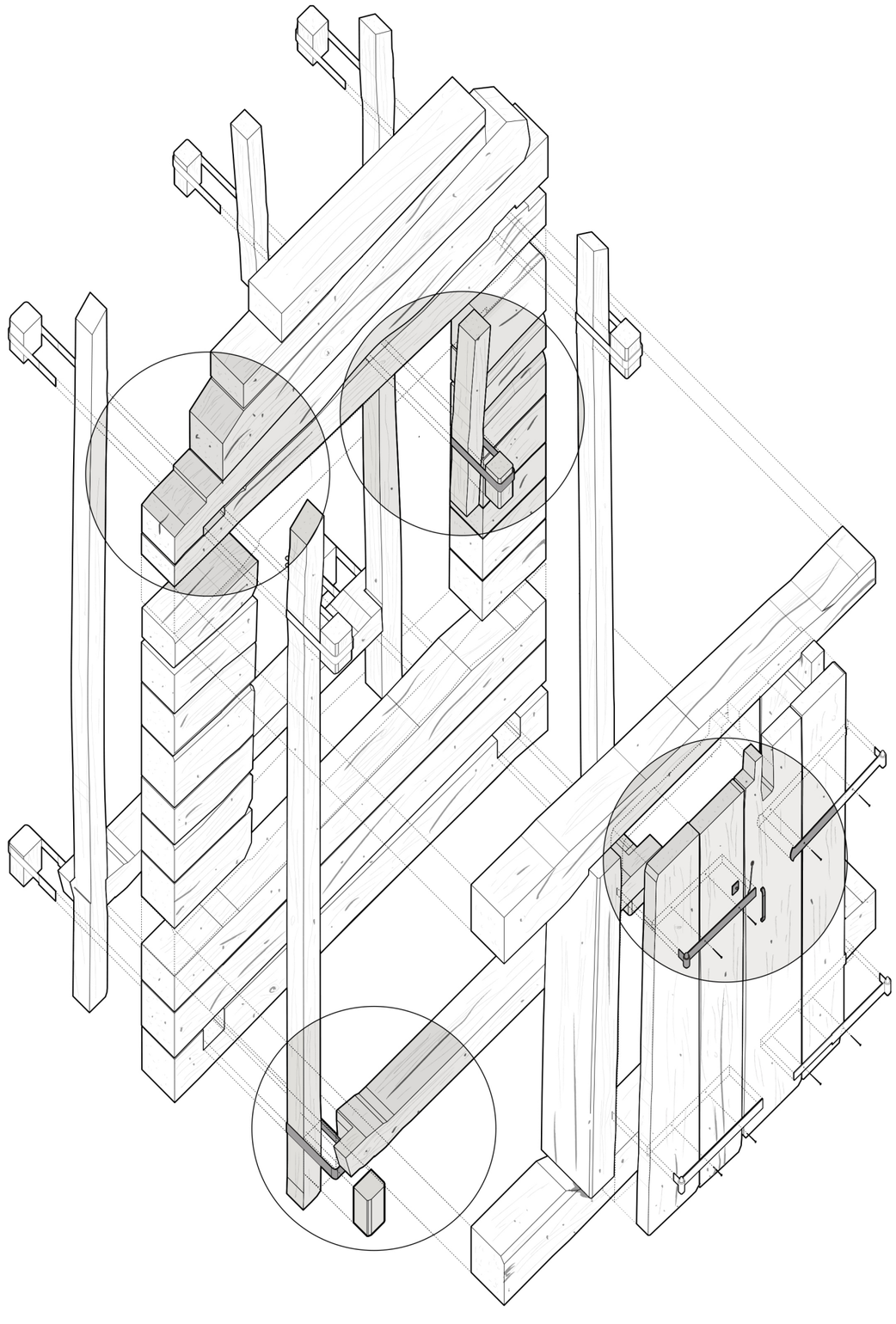
cracks and other details thinner (and/or gray)

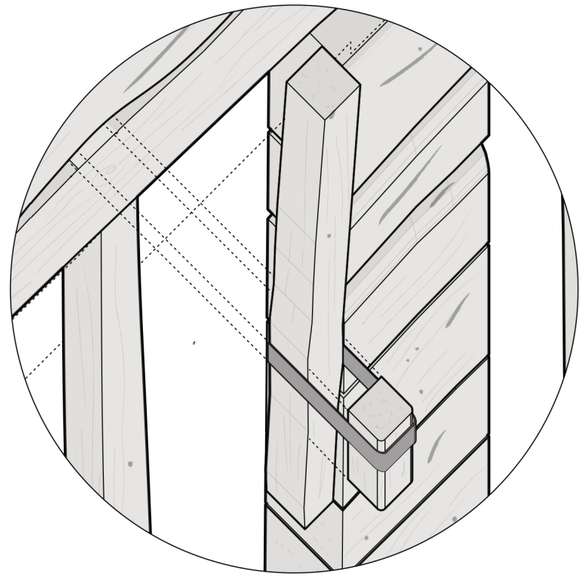


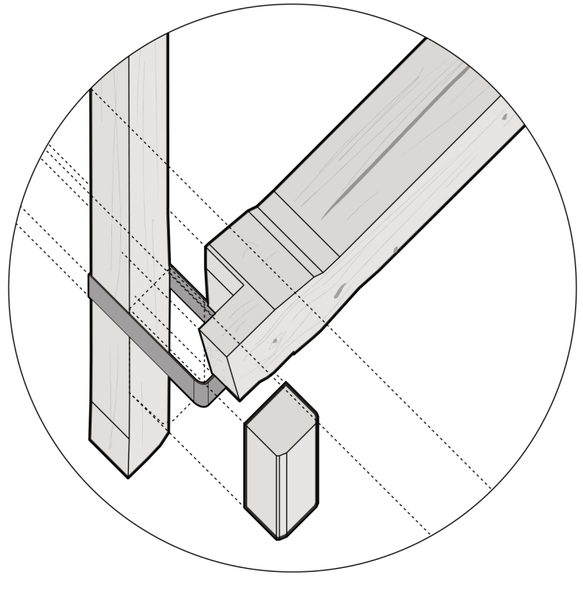
two colors (and their shades) to materialize

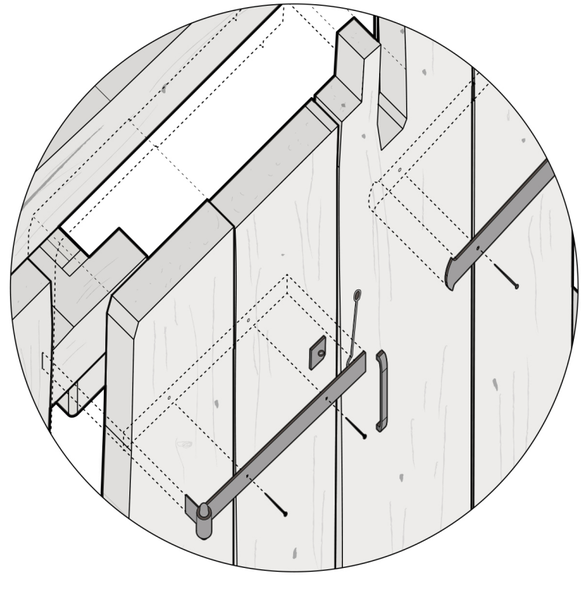


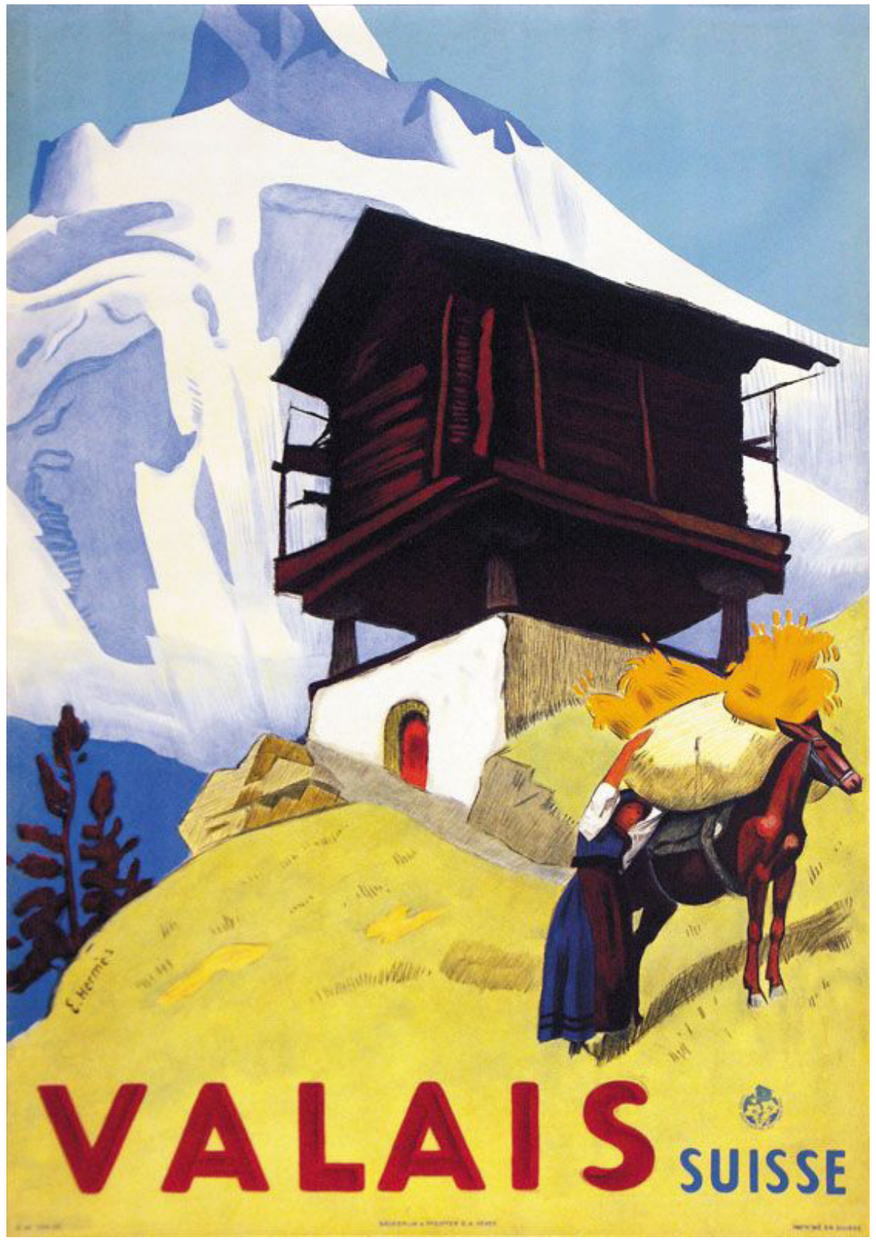












filippo.fanciotti@epfl.ch