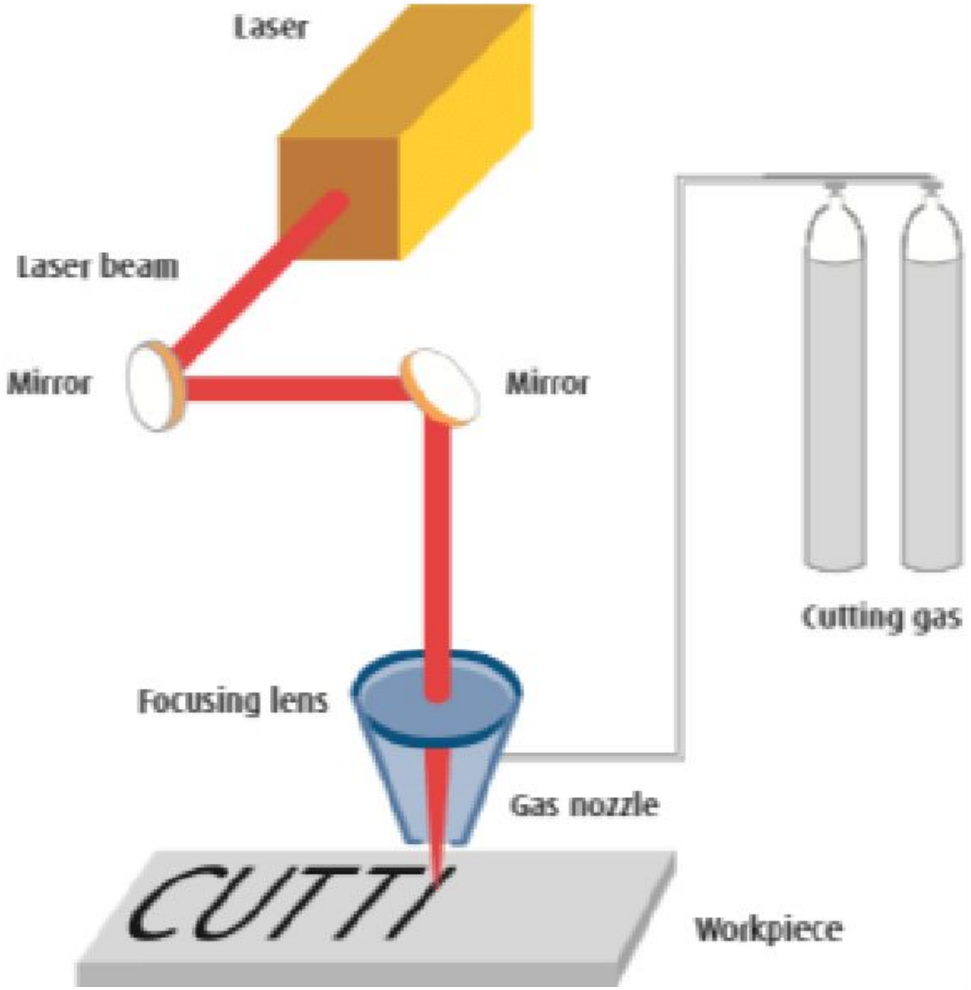
Computer controlled cutting

Intro

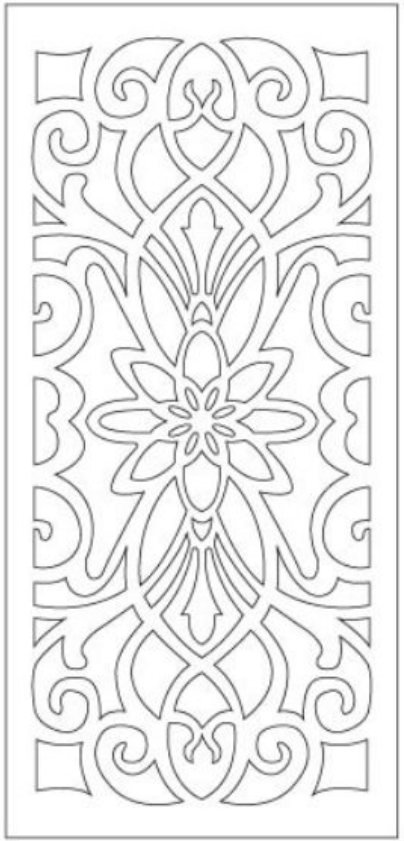
How does Laser Cutting work?

Basics explained


Laser
Laser beam
Mirror
Mirror
Cutting gas
Focusing lens
Gas nozzle
CUTTI
Workpiece

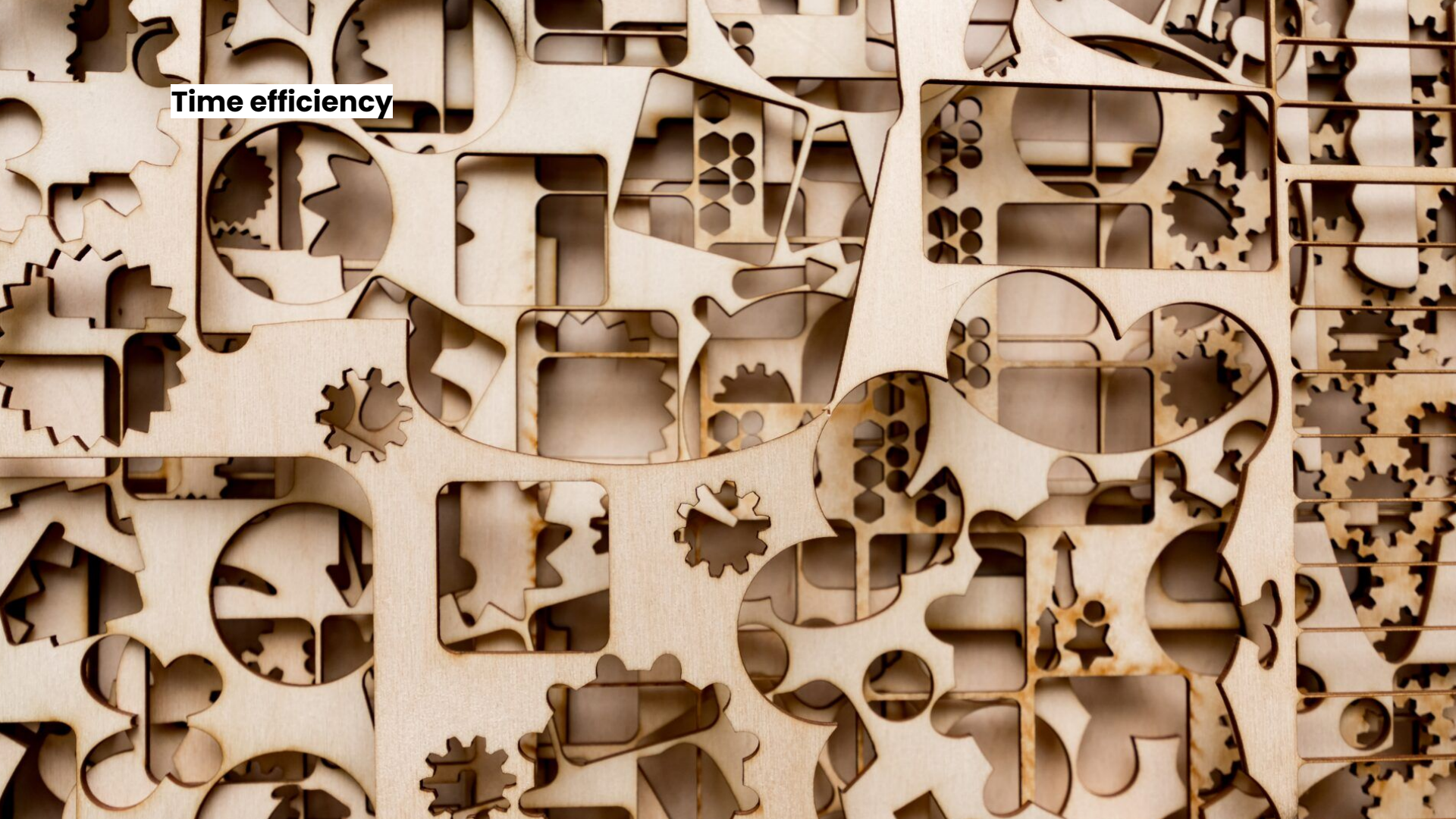
planning

outcome

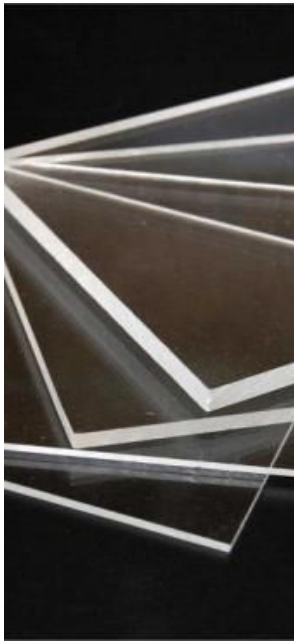


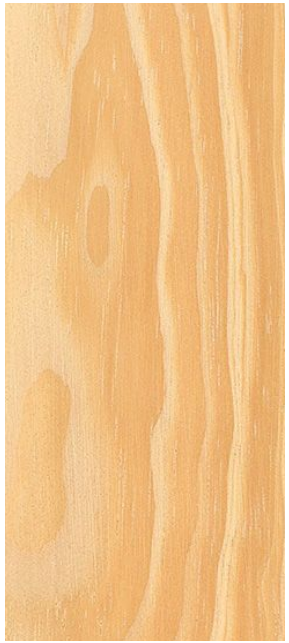
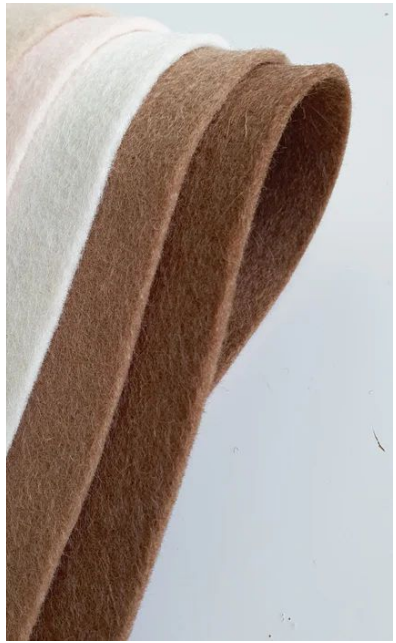
DXF


Accuracy

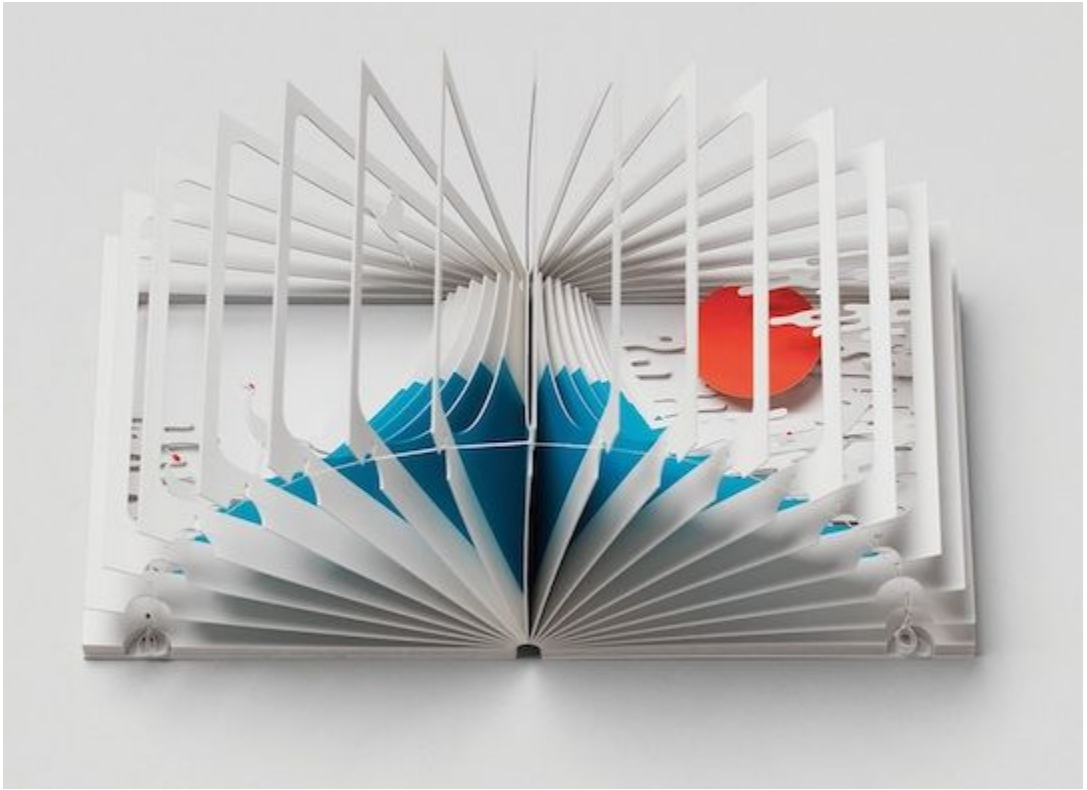

Time efficiency

Materials

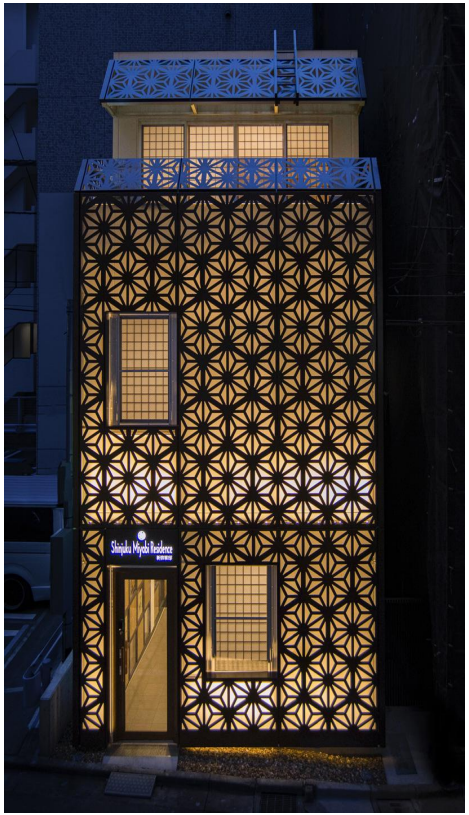


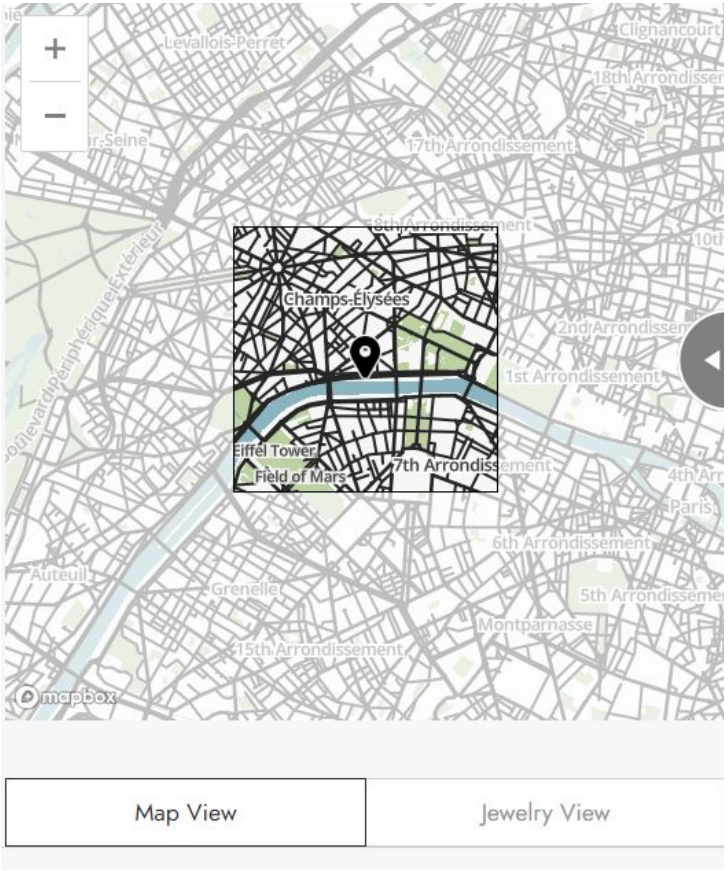
360 BOOK / Yusuke oono link



Himematsu architecture LINK



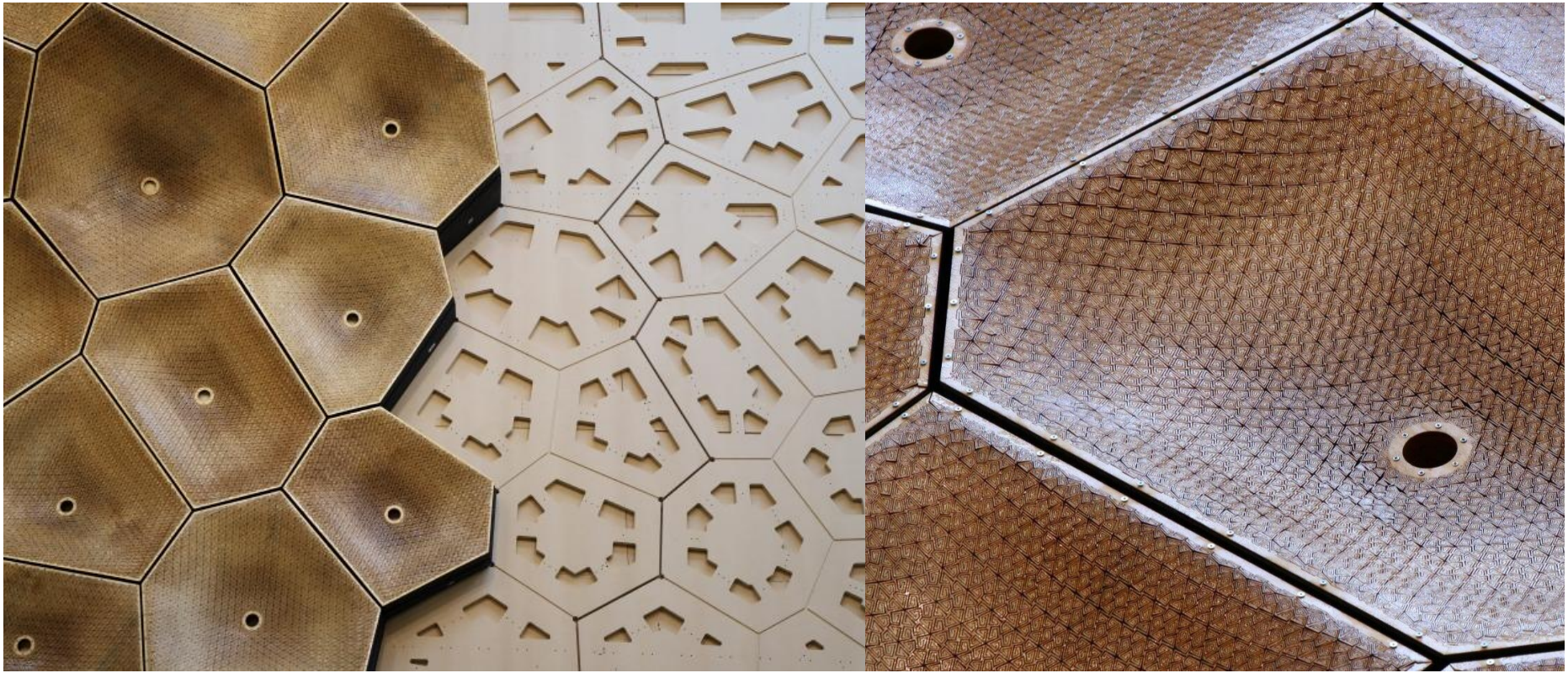
Talia Sari [LINK]



Iris van herpen LINK

iris van herpen LINK

negar kalantar and alireza borhani link



Nervous system LINK

Ronan and Erwan Bouroullec

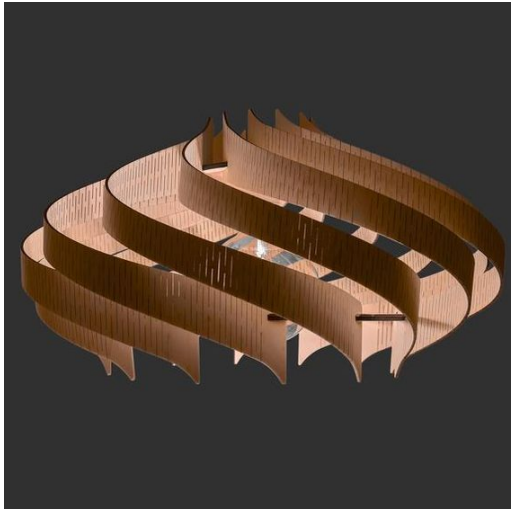
WEsearch lab

Orsi orban link

Orsi orban link



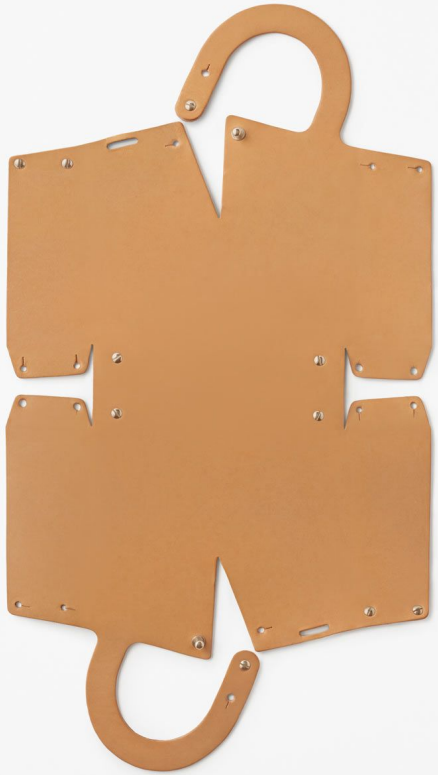
Methods: Kerfing, origami



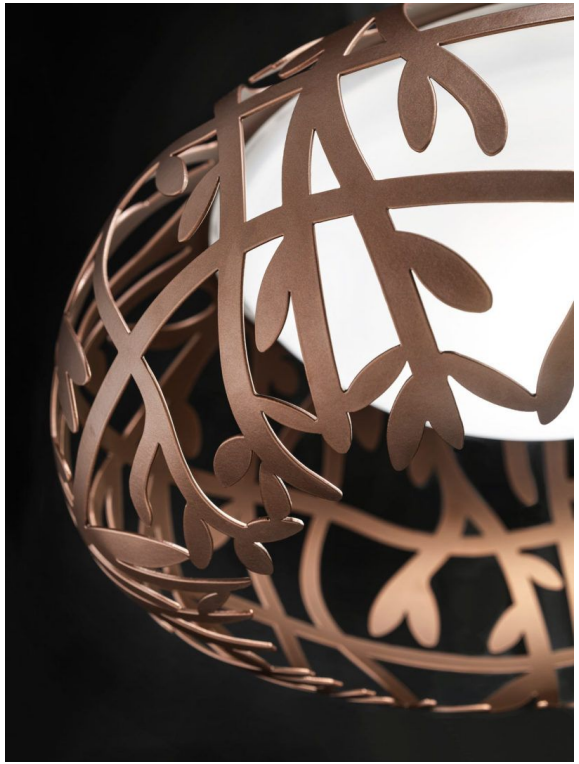
Oskar Zeita link

Fifti-fifti link

Nendo link

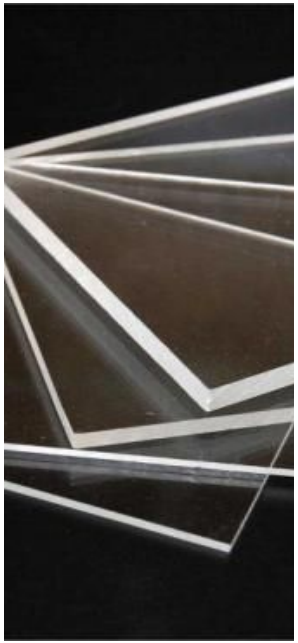


Marta Sansoni link



Break

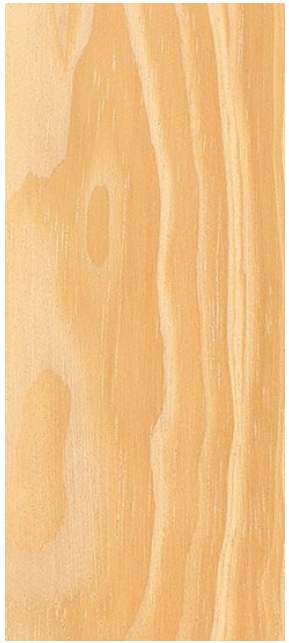
Materials



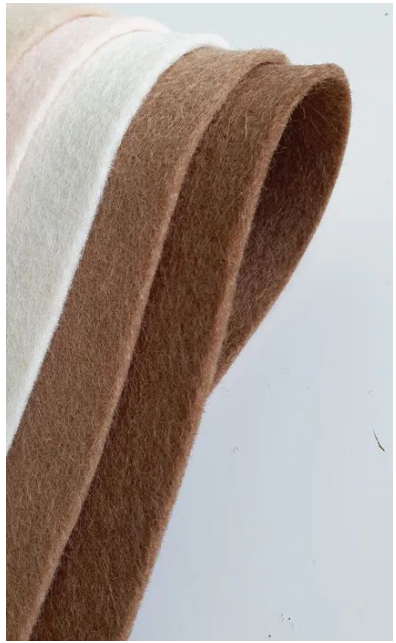
plexiglass

Ceramics

Cardboard and paper



Wood



Natural fabrics

- Vinyl
- Metal

Materials dimensions

Thickness

Birch 4 mm - 6mm

Cottonwood 4 mm - 6mm

Cardboard paper

Size (Depends on the type of machine)

Preparing files

File types:

DXF

VECTORS

VLS 6.60

Define

- Place on X,Y
- Material
- Thickness
- Layers - vector (cutting/engraving), raster (engraving+fill)
- Power, speed and PPI (points per inch) for each layer

File type DXF 2007

Tutorial 1 Tutorial 2 - very thorough

Colors and layer types

Blue line Marking/engraving

Red line cut

Black line Engraving with fill

Assignment 0: Variants

1. Choose one variant that you want to test.

- **Speed -** the rate at which the cutting of material occurs when using a laser.
- **Power -** the energy delivered by a laser beam per unit of time and per unit of area.

2. prepared 4 samples showing the experiment.

* On top of each sample, burn the experimental indicators

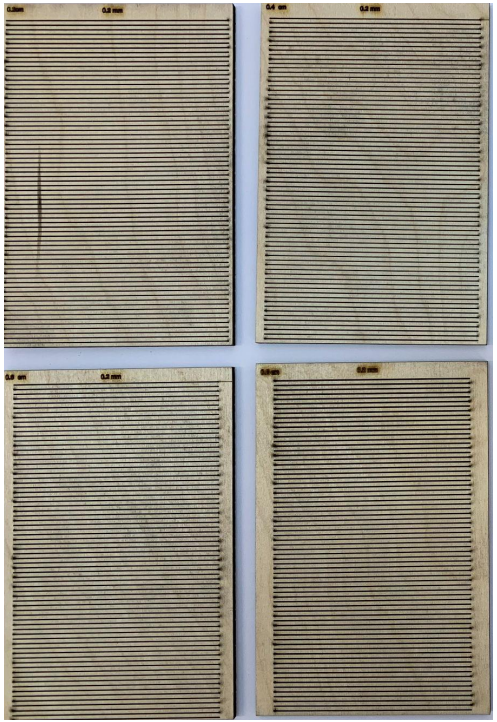
Example:

I want to test the "power" on birch 4 mm.

I will do 4 experiments, they will all be the same in everything but power.

Assignment 1: Guidelines for the experiments:

- Only one variant - everything else remain the same
- Documentation (on the wood itself)
- Power - 70% - 90% for cutting, 5% - 20% for engraving
- Speed - 2% - 16% for cutting, 20% - 50% for engraving
- use a simple shape for the sample



- **Material** (birch, cottonwood, cardboard paper)
- **Thickness** (4mm / 6mm)
- **Layers** - vector (cutting/engraving), raster (engraving+fill)
- **Power, speed and PPI** (points per inch) for each layer

Tips for good laser files

1. Calculate the material thickness
2. Make sure your polygons are closed
3. 'Overkill' in Autocad to eliminate double lines
4. Reduce lines as much as possible
5. Explode text and edit into single lines. Then 'join.
6. Save as DXF 2007
7. Make sure your design fits in the material and machine dimensions.

Break

Assignment 2: Caliber preparation

Use the following files, adapt them for laser cutting and assemble yourself a personal measuring tool.
Add at least one change/additional elements to the Caliber file.

link for file assemble

Assignment 2: Puzzle

1. Create an original puzzle
- with a maximum size of 30x30 cm.
- Consists of at least 20 parts.

*Try to stretch the limits of the basic puzzle we know

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5. Explode text and edit into single lines. Then 'join.
6. Save as DXF 2007
7. Make sure your design fits in the material and machine dimensions.

Summary