Lesson 8   Box Structure

Learning Objectives

Students will:

1. learn about what a box structure is;

2. learn about finger joints;

3. master the uses of **LaserBox**.

Preparations:

1. Engraving materials: 3mm basswood sheets

2. Wood Glue

3. **LaserBox**

Session 1   Lead-in

Ask students: "When speaking of a cube, what's the first thing that pops up in your mind? What is a cube used for?"

Invite two students to write down their answers on the blackboard and tell the rest to think about the two questions as well.

Encourage students to share what they think.

Then give your explanations: "Well, a cube can make us think of so many things. The most common cubes must be those packaging boxes. They take on square shapes and have straightforward designs. A pen holder is also an item that takes on a cube shape."

Session 2   Show Examples

A Delivery Box

Pen Holder

Cube Tissue Box

Cube-shaped designs are everywhere in our daily life. Next, walk students through the following laser cut cube artworks.

Laser Cut Cube Artwork

Source: Boxes #2 by OBUQ

Give Spend Save Money Box

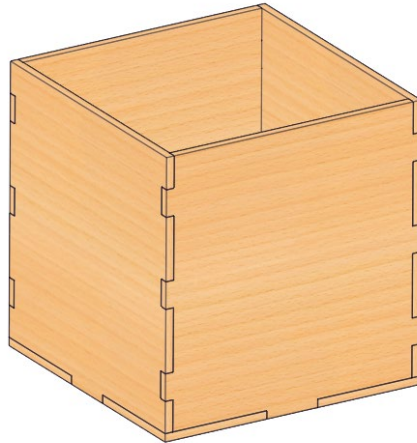Source: Give Spend Save Money Box by Jonathan_K1906

Laser Cut Storage Box

Source：Boxes by OBUQ

Session 3   In-class Task

The aim of this lesson is to design a little box using **LaserBox**. In this lesson, students will learn to make a new structure, **Box Structure**.

Ask students: "Take a close look at the laser cut projects I just showed you. Can you identify one thing they have in common?"

Have students ponder the question.

Explain to students: "Do you notice? All these boxes have convex and concave parts on their edges. In these boxes, a finger joint is applied."

In a finger joint, the concave part is called a socket and the convex part is called a protruding pin. All the sides take on rectangular or square shapes.
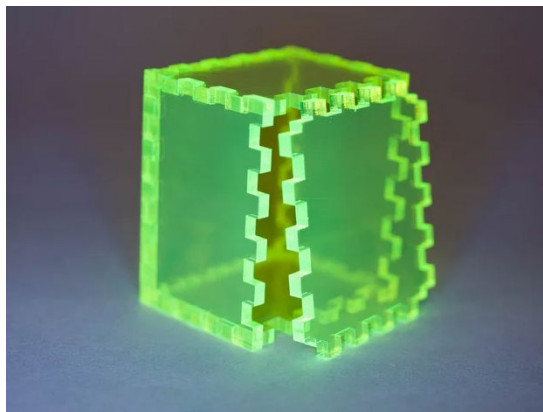
Source: Customizable Box with Finger Joints by txoof

How should we design a finger joint in our laser cut project? During the process, we need to make sure each protruding pin has a complementary socket that perfectly matches it. The wood thickness is another factor we should consider. Take a 3mm-

thicked wood sheet as an example. You need to make sure the protruding end is 3mm long and the slot is 3mm thick. Using a finger joint can expand the contact area to increase the force of friction. The larger the contact area is, the greater the force of friction could be.
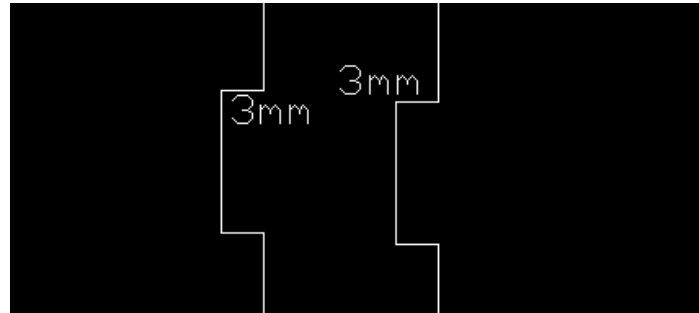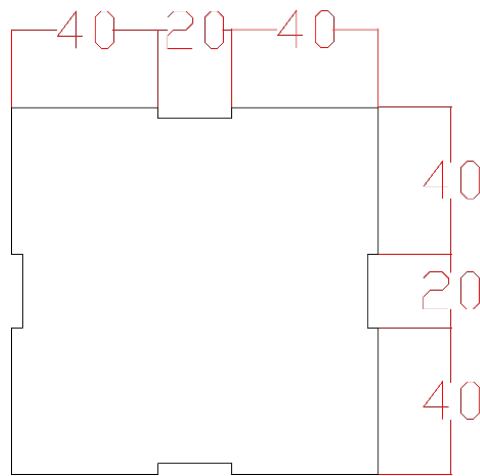

Demonstrate

- Import the LQ file.

- Use **LaserBox** to cut out the four sides of a box (students can be given time to work on image designs of the four sides, cutting and engraving. Or the teacher can do the cutting or engraving work for them.)

- Take a close look at how the box is constructed and then make finger joints for the bottom board.
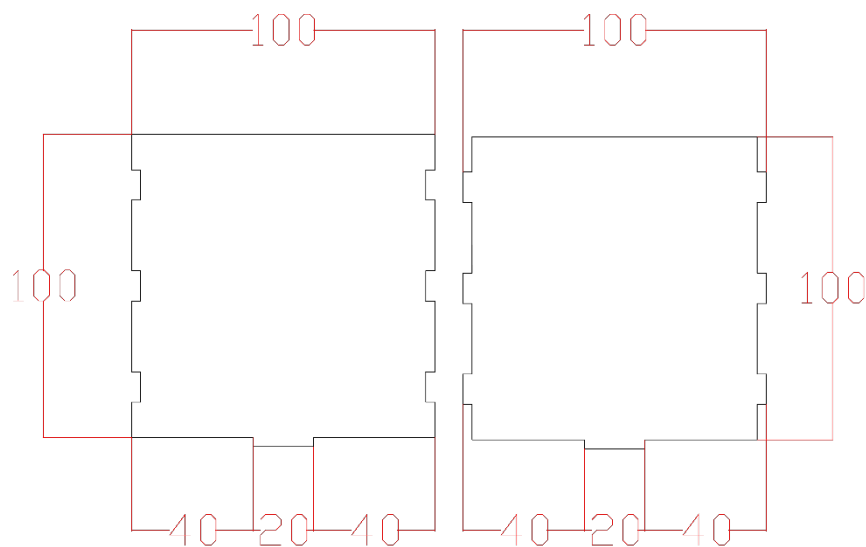
Dimensions

Bottom Board Dimension (Show students in the end)

Remind students: "Among the files I just sent you, you can find a wood sheet with a 20mm wide protruding pin. So when designing a bottom board, you need to leave a socket which is 20mm wide as well. Make sure the protruding pin perfectly fits into the socket, otherwise it will be hard for you to slot the pieces together."

- Use **LaserBox** to cut the shape.

- Slot the laser-cut parts together and glue them in place.

Let students work on their designs (Guide students to use the **Marquee** tool to design different images on the sides of the box).

Use **LaserBox** to cut and engrave students' designs.

Session 4   Share

Ask students to share their projects with the class and tell them to share the behind-the-scene stories: What do you learn from this experience? Tell us why you design your project in this way.

Session 5   Wrap-up

Conclude the lesson: "In today's lesson, we created a box by using **LaserBox**. We used a finger joint to increase the force of friction between two wood sheets, making the box more solid as whole. When designing a finger joint, we should make sure that each protruding pin and its socket is perfectly matched."

Session 6   Extension

Cube-shaped objects can be found everywhere in our life. A pen holder is an example. Try using a box structure to create a pen holder as you would like.