DEPARTMENT OF ROBOTICS & MECHATRONICS ENGINEERING
UNIVERSITY OF DHAKA

Course code : RME 3212
Course name : Manufacturing Process with CNC Programming Lab

Experiment no : 02
Experiment name : Developing Logo of DU with Laser Cutting Machine.

Group no : 06
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Objective:

- Learn laser cutting process
- Learn to operate laser cutting machine

Theory:

Laser cutting is mainly a thermal process in which a focused laser beam is used to melt material in a localized area. A co-axial gas jet is used to eject the molten material and create a kerf. A continuous cut is produced by moving the laser beam or workpiece under CNC control. There are three major varieties of laser cutting:

- Fusion cutting:In fusion cutting, an inert gas (typically nitrogen) is used to expel molten material out of the kerf. Nitrogen gas does not exothermically react with the molten material and thus does not contribute to the energy input.

- Flame cutting: In flame cutting, oxygen is used as the assist gas. In addition to exerting mechanical force on the molten material, this creates an exothermic reaction which increases the energy input to the process.

- Remote cutting: In remote cutting, the material is partially evaporated (ablated) by a high-intensity laser beam, allowing thin sheets to be cut with no assist gas.

The laser cutting process lends itself to automation with offline CAD/CAM systems controlling either three-axis flatbed systems or six-axis robots for three-dimensional laser cutting.Improvements in accuracy, edge squareness and heat input control means that the laser process is increasingly replacing other profiling cutting techniques, such as plasma and oxy-fuel. There are many state of the art laser machines on the market for cutting purposes, which can be used to cut metals, woods and engineered woods.

Equipment:

- Laser cutting machine

- Wood piece

- Laptop

Procedure:

- First we design the process in the software and set the correct dimensions that we need to cut on the wood piece.
- After connecting the laptop with the laser cutting machine, we place the wood piece inside the workstation in the machine.
- Then after properly plugging in the wood piece, we turn the machine on.
- Then we turn the coolant fan on.
- We upload the design from the software and select the design from the machine interface.
- As we turn on the process, the machine starts and finishes the design.
- Then we turn the coolant fan off and get the design on the wood piece.

Result:

Discussion:

We got our expected design on the wood piece. It was perfect. We got to learn the laser cutting process with the laser cutting machine.

Reference:

- https://www.twi-global.com/technical-knowledge/job-knowledge/cutting-processes-laser-cutting-052

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