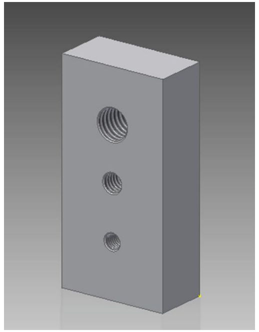
Manufacturing

TMJ2O

Milling Machine Drill and Tap Project

Project Outline

This project will teach students how to drill and tap various size holes on a milling machine. They will be required to cut a piece of rough stock aluminum and mill the ends of the block square. They will then layout 3 different hole positions on the block using the height gauge and surface plate. The student will finish the project by use the milling machine to drill and tap 3 different size holes.



Learning Goals

By the end of this project the students will:

- Learn the various designations of drill sizes
- Learn how taps are identified
- Be able to read a tap drill chart
- Understand the importance of proper drill size selection when tapping
- Demonstrate how to drill and tap a hole properly

Student Activities

Activity 1 – The Four Designations of Drill Sizes (30 minutes)

Activity 2 – Tap Identification (30 minutes)

Activity 3 – Reading a Tap Drill Chart (90 minutes)

Activity 4 – Project: Drill and Tap Block (180 minutes)

Activity 1

The Four Designations of Drill Sizes

The goal of this activity is for students to learn the ways in which drill sizes are designated. Students will be able to identify the four different designations (fraction, letter, number, metric) and be able to locate the drills in a standard drill set.

Additional Materials: Standard drill set, various drills to pass around to students

Activity 2

Tap Identification

The goal of this activity is for students to understand how taps are identified. They will learn about different types of taps and why it is important to choose the right tap for the job required.

Hand Taps Handout

Video: Tapping Essentials

Additional Materials: Tap set, various taps to pass around to students

Activity 3

Reading a Tap Drill Chart

The goal of this activity is for students to learn how to read a tap drill chart. They will learn how to select the proper size drill depending on the tap size required. The students will complete a quiz to assess their understanding form Activities 1, 2, and 3.

Tap Drill Chart

How to use a Tap Drill Chart

Twist Drill Comparison Placemat

Tap and Drill Sizes Quiz

Additional Materials: Tap drill chart

Activity 4

Project: Drill and Tap Block

The goal of this activity is to allow the students to use their knowledge of drilling and tapping to manufacture an aluminum block with various sized tapped holes. Students will use the milling machine to drill and tap the 3 different size holes in their piece of material.

They will hand in their project for evaluation using the attached rubric.

Tap Drill Chart

Tap and Drill Part Drawing

Tap and Drill Project Reference Images

Rubric

Additional Materials: Aluminum stock, center drills, drills, taps, end mill, height gauge, surface plate, band saw, milling machine

Lesson Plan

For complete lesson plans, instructional materials, and additional handouts click this link.