

Sheet Metal Forming for the Construction of a Standardized Steelpan Drum

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Abstract

This is a continuation of the project that was presented last year. This year the focus within the project is creating a smooth surface with minimal ripples on the surface of the steelpan drum. Firstly, we only dealt with cosmetic parts such as the spindle head/hammerhead. Secondly the design was focused on creating a smooth surface with minimal ripples. This was the main problem from last years project where the drum was created, but ripples were still visible.

Introduction

The production of a steelpan drum requires the percussion instrument to be pounded more than once to accomplish the smooth empty hollow shape in the normal assembling process. The notes are up or curved, contrasted with the concave surface. The manufacturing process of the drums is arduous and requires very skilled labors. Physical strength is required to hold down the pneumatic hammer to create the concave surface. The hammering creates noise too. This noise is too high, as this deals with bending the steel material, this may cause damage to the ears. For this year, the focus was solely on adjusting the G-code along with modifying the CNC machine in order to manufacture a better product as compared to last years team.

Methods and Materials

The steelpan drum was designed through Fusion360, in which the G-code was generated through the manufacturing application. The hammerheads used has a rubber tip added to reduce ripples and tears on the surface. The addition of the rubber would also make a smoother surface since there would be a buffer between the two surfaces.



Results

The main issue that was found during the testing was due to the pressure that was placed onto the surface of the steelpan drum. There wasn't enough force within the y-axis. This was seen when the circuit overheated and burned out due to excessive force being put onto the motor. Since the drum used is thick new motors were switched to accommodate the force that needed to be applied to obtain the concave shape of the steelpan drum. Another factor came from the stability of the spindle as it wasn't centered and swayed when it was supposed to be fixed. That created a misalignment that resulted in a drum with ripples.

Discussion

From the simulation that was generated through the G-code that was created, it seems that this process does indeed work. The only thing that would be needed is for further work to be done on the CNC machine to fix the stability of the spindle along with the motors that are used in order to apply pressure to the metal.

Conclusions

From the tests that were done throughout the spring semester it seems that this process is possible, but further work needs to be done on the CNC machine. As explained within the results a stronger motor is needed along with . If further development is done towards this process, then it would change the way in which steelpan drums are made. That in turn will reduce the strain put upon the people that manufacture these drums.

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