Design and Development of Sheet Metal Bending Machine

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Keywords: Bending Machine, Stress, Small Jobs, Machine Cost

Abstract:

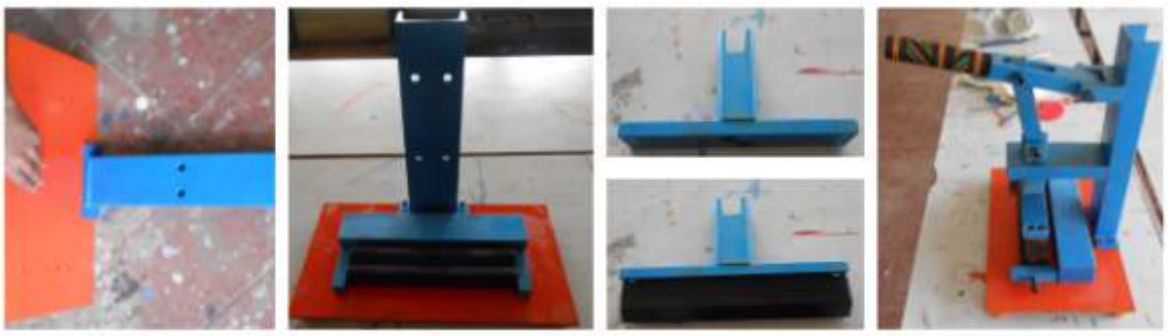
Bending machine is a common tool in machine shop that is used to bend a piece of metal. It is widely used in various industrial operations such as bending a tube to make coil or sheet metal to make certain shape such as V shape. There are many kind of bending machines that can be found in small scale industries which are not feasible for bending smaller sheet metal, Hence "Design and Development of Sheet Metal Bending Machine" is taken as a project.

By conducting literature review, it was identified that there is no machine available to bend the small jobs and also identified the cost of machine as too high. To understand the user and his environment, data collection process was carried out with small scale industries. Some of the problems were revealed such as to bending easily, attachment of multiple fixture, metal strip guide and also reducing the cost. By taking the users voices into consideration, Quality Function Deployment (QFD) was generated and from which Product Design Specification (PDS) was generated to design the sheet metal bending machine.

To solve the current problems and issues with the user workplace, five concepts of bending machine were generated. The best among the five concepts was selected as final concept by weighed ranking method and the final concept was digital rendered using software such as Creo, CATIA and Keyshot. Failure Mode Effective Analysis (FMEA) using Ansys software was carried out and the result obtained was 3.35 MPa for weak area and the mild steel yield strength was 250 MPa to withstand load to ensure that no stress problems are encountered on the proposed bending machine. A working model 1:1 scale bending machine was made for the final concept to validate the design with the user group and the feedback was positive and satisfactory.

Bending machine

Analysis and trial



Prototype of sheet metal bending machine showing portability and easy to assembly of