Graduation Project Summary

This project presents the design and simulation of an automatic sheet metal forming machine using a progressive die system to manufacture a metal component used in air compressor assemblies. The project aims to provide a high-precision and efficient manufacturing solution capable of improving production quality and reducing material waste.

The proposed system consists of three main sections: an automatic feeding mechanism for the sheet metal strip, a progressive die responsible for sequential punching, slotting, cutting, and bending operations, and a mechanical press that provides the required forming force. The entire system was designed using SolidWorks software, where detailed 3D models and assemblies were created. Motion simulation and stress analysis were also conducted to verify the reliability and efficiency of the design before actual manufacturing.

The project included engineering calculations related to cutting and bending forces, die and punch clearances, spring selection, flywheel design, and crank-slider mechanism analysis. Suitable engineering materials were selected according to their mechanical properties such as tensile strength, hardness, and wear resistance.

Special attention was given to practical manufacturing considerations, including ease of maintenance, replaceable components, efficient material utilization, and compliance with industrial safety standards. This project contributes to the development of automated sheet metal manufacturing systems and supports local industrial production with accurate and reliable engineering solutions.