1. INTRODUCTION TO RESEARCH WORK

1.1 Motivation

Today, technology is one of the peak of our modern lifestyle and the basis for our prosperity, in which metal forming technology plays a central role. Alongside the manufacture of semi-finished products through rolling, wire drawing and extrusion, the production of discrete components using sheet metal and solid forming techniques is of major significance. At present, metal stampings are used in almost every mass-produced product. Consider the number of consumer and industrial products that include sheet metal parts: automobile and truck bodies, airplanes, railway cars, farm and construction equipment, appliances, office furniture, computers, and more. Stamping product qualities have always been one of the most important concerns of the industries. Any quality issues can be very costly to the manufacturer, creating difficulties in assembly, causing rework or repair in the production floor or the field, and resulting in customer dissatisfaction. Traditionally, the products quality is assured by inspecting parts in full or fractional after they have been manufactured against the specifications and standards such as dimensions, visual characteristics, mechanical and electrical properties.[3]

The machine tool, with its capacity to precisely guide and drive one or more tools for the machining of metal, has become a symbol of economic metalworking. In the past, the work processes typically seen in metal forming technology used to be executed in a series of individual operations on manually operated machine tools. Today, however, automatic production cells and interlinked individual machines through to the compact production line with integrated feed, transport, monitoring and finished part stacking systems are the state of the art.[22]

Developments in this field are still required on the technological basis to allow the benefits of formed work pieces, such as a more favorable flow line, optimum strength characteristics and low material and energy input, to be combined with higher production output, dimensional control and surface quality.[13]

1.2 Problem Definition and contribution of research work to problem definition

Extensive research has been done in exploring the deterministic effect of each factor on the part, but the impact of their variations on the fluctuation of output quality for the stamping process is
seldom addressed and quantified. The three major categories of sheet metal processes are cutting, bending, and drawing. Cutting is used to separate large sheets into smaller pieces, to cut out a part perimeter, or to make holes in a part. Bending and drawing are used to form sheet metal parts into their required shapes. Hence my focus is to eliminate the above foresaid problem by performing design and analysis. [39][35]