

SHEET METAL FORMING - AN INTRODUCTION

Introduction

Sheet metal is simply metal formed into thin and flat pieces. It is one of the fundamental forms used in metalworking, and can be cut and bent into a variety of different shapes. Countless everyday objects are constructed of the material. Thicknesses can vary significantly, although extremely thin thicknesses are considered foil or leaf, and pieces thicker than 6 mm (0.25 in) are considered plate.

Metal Forming Process

Forming can be defined as the process in which the desired size and shape of the object are obtained through plastic deformation of material. The stresses induced during the process are greater than yield strength but should be less than the fracture strength. Different types of loading may be used depending on the process.

- ✓ Tensile
- ✓ Compressive
- ✓ Shear
- ✓ Bending

Classification of Metal Working Process

Metal working process may be classified as the ease with which metal may be formed into useful shapes by-

- ✓ Plastic deformation process
- ✓ Metal removal process

a) PLASTIC DEFORMATION PROCESS

In this the volume and the mass of the metal are conserved and the metal is displaced from one location to another.

b) METAL REMOVAL PROCESS

In this the material is removed from the stock in order to give it required shape.

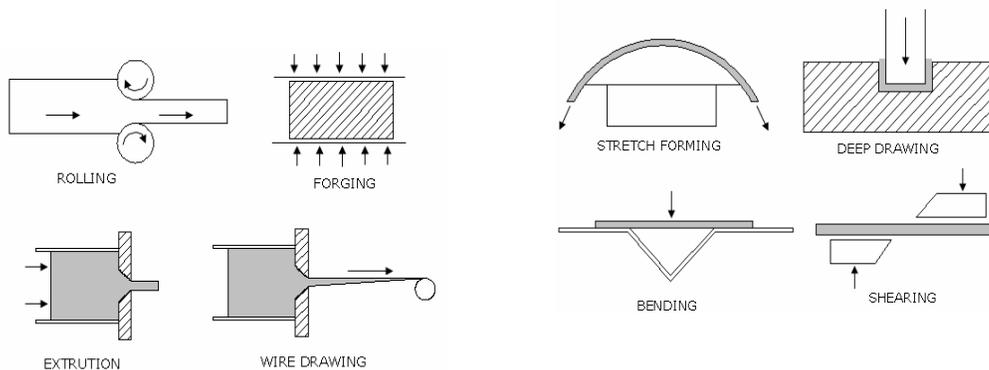
Classification of Metal Forming Process

Metal forming process may be classified on the basis of type of forces applied to the work piece as it is formed into direct shape.

- ✓ Direct compression type process
(e.g.-Forging, Rolling)
- ✓ Indirect compression process
(e.g.-Extrusion, Wire Drawing)
- ✓ Tension type process
(e.g.-Stretch forming)
- ✓ Bending process
- ✓ Shearing process

These categories are:

- 1) Direct – compression – type process
- 2) Indirect – compression processes
- 3) Tension type processes
- 4) Bending processes
- 5) Shearing processes



Sheet metal processing

The raw material for sheet metal manufacturing processes is the output of the rolling process. Typically, sheets of metal are sold as flat, rectangular sheets of standard size. If the sheets are thin and very long, they may be in the form of rolls. Therefore the first step in any sheet metal process is to cut the correct shape and sized 'blank' from larger sheet.

Sheet metal forming processes

Sheet metal processes can be broken down into two major classifications and one minor classification

- **Shearing processes** -- processes which apply shearing forces to cut, fracture, or separate the material.
- **Forming processes** -- processes which cause the metal to undergo desired shape changes without failure, excessive thinning, or cracking. This includes bending and stretching.
- **Finishing processes** -- processes which are used to improve the final surface characteristics.