Chapter 4

BULK DEFORMATION PROCESSES: BASICS AND RECENT DEVELOPMENTS

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INTRODUCTION

Plastic deformation processes are the operations for shaping the metals by the application of the forces using the dies and the tools. During the bulk deformation processes, the metal stocks are subjected to a high percentage of plastic deformation. The cross-sectional change takes place during all of the processes. Mostly, hot processing and warm processing are preferred. Some of the particular deformations are performed at ambient temperatures [(1)].

The molten metal is shaped by the casting to produce a slab, a billet or an ingot. A semi-fabricated product is the state prior to the manufacturing. These bulk deformation processes are categorized as rolling, drawing, extruding and forging [(2)].

In this chapter, the basics and the main categories of the bulk deformation processes have been briefly explained and the recent developments in these processes have been reviewed.

ROLLING OPERATION

In this process, radial pressure is the single stress type and this stress is utilized to deform the stock through the rollers as in Fig.1. The most common method among the bulk deformation processes is the rolling. The rolling process is categorized depending on the arranging of the rolls. The two-high mills are the first rolling mills giving a low amount of the products. In addition, this type of rolling is time consuming because the raw stock must be returned to the mill front. That is why a reversing type of a two-high mill was designed to perform the rolling in either of two directions [(3).]

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either for the common or for the specific industrial products and a number of them are still on the way. Consequently, it can be concluded that nowadays the metal manufacturing industry has a tendency to make a shifting towards the automation more than any other time.

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