

UNIT I

INTRODUCTION

UNCONVENTIONAL MACHINING PROCESS:

Unconventional manufacturing processes is defined as a group of processes that remove excess material by various techniques involving mechanical, thermal, electrical or chemical energy or combinations of these energies but do not use a sharp cutting tools as it needs to be used for traditional manufacturing processes. Extremely hard and brittle materials are difficult to machine by traditional machining processes such as turning, drilling, shaping and milling. Non-traditional machining processes, also called advanced manufacturing processes, are employed where traditional machining processes are not feasible, satisfactory or economical due to special reasons as outlined below.

- Very hard fragile materials difficult to clamp for traditional machining
- When the work piece is too flexible or slender
- When the shape of the part is too complex

Several types of non-traditional machining processes have been developed to meet extra required machining conditions. When these processes are employed properly, they offer many advantages over non-traditional machining processes. The common nontraditional machining processes are described in this section.

NEED :

- Extremely hard and brittle materials or Difficult to machine material are difficult to machine by traditional machining processes.
- When the workpiece is too flexible or slender to support the cutting or grinding forces
- When the shape of the part is too complex.

CLASSIFICATION- BRIEF OVERVIEW :

Manufacturing processes can be broadly divided into two groups:

- a) primary manufacturing processes : Provide basic shape and size
- b) secondary manufacturing processes : Provide final shape and size with tighter control on dimension, surface characteristics.

Material removal processes once again can be divided into two groups

1. Conventional Machining Processes
2. Non-Traditional Manufacturing Processes or Unconventional Machining Processes

Conventional Machining Processes mostly remove material in the form of chips by applying forces on the work material with a wedge shaped cutting tool that is harder than the work material under machining condition.

The major characteristics of conventional machining are:

- Generally macroscopic chip formation by shear deformation
- Material removal takes place due to application of cutting forces – energy domain can be classified as mechanical
- Cutting tool is harder than work piece at room temperature as well as under machining conditions

Non-conventional manufacturing processes is defined as a group of processes that remove excess material by various techniques involving mechanical, thermal, electrical or chemical energy or combinations of these energies but do not use a sharp cutting tools as it needs to be used for traditional manufacturing processes.

Material removal may occur with chip formation or even no chip formation may take place. For example in AJM, chips are of microscopic size and in case of Electrochemical machining material removal occurs due to electrochemical dissolution at atomic level.

