CHAPTER 2

PRINCIPLE REVIEW

This chapter is basically introduce a principle concept of die and its benefit. To support the decision making, manager shall realize the basic principle of all die aspects so that manager is able to judge whether to it is suitable with organization or not. This chapter is based on text book and some literature researches in years. Throughout this chapter are involved the necessity of die such as all die types and its purpose, metal stamping process, force to be concerned, and the most important is the comparison of all die types VS its advantages and disadvantages.

2.1 Introduction of die

Die is mainly comprised of punches and die. It is widely called only " Die". The punch is attached to the ram of the press and is forced into the die capacity. The die is usually stationary and rests on the press bed. It has an opening to receive the punch, and the two must be in perfect alignment for proper operation. Punches and dies are not interchangeable. A single press may do a large variety of operations depending on the dies used.

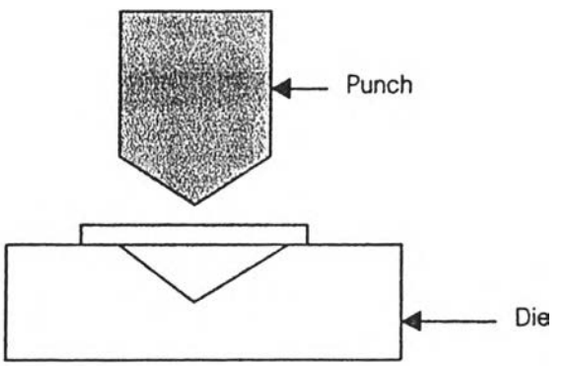

Figure 2.1 Element of single die

2.2 The types of press working

There are several types of press work with die performing. It is used in difference of work to be performed as below

1. Blanking is a process of cutting out flat area to desired shape
2. Piercing is a process for punch hole in required size
3. Trimming is a process for removal unwanted excess metal from around the edge of part after forming the part into shape
4. Bending is a process for fold metal it can be V shape or U shape
5. Forming is a process for forming flat sheet in required shape
6. Drawing is a process for forming shape in which punch is pressed sheet to hollow mould in die in order to make produce with seamless material

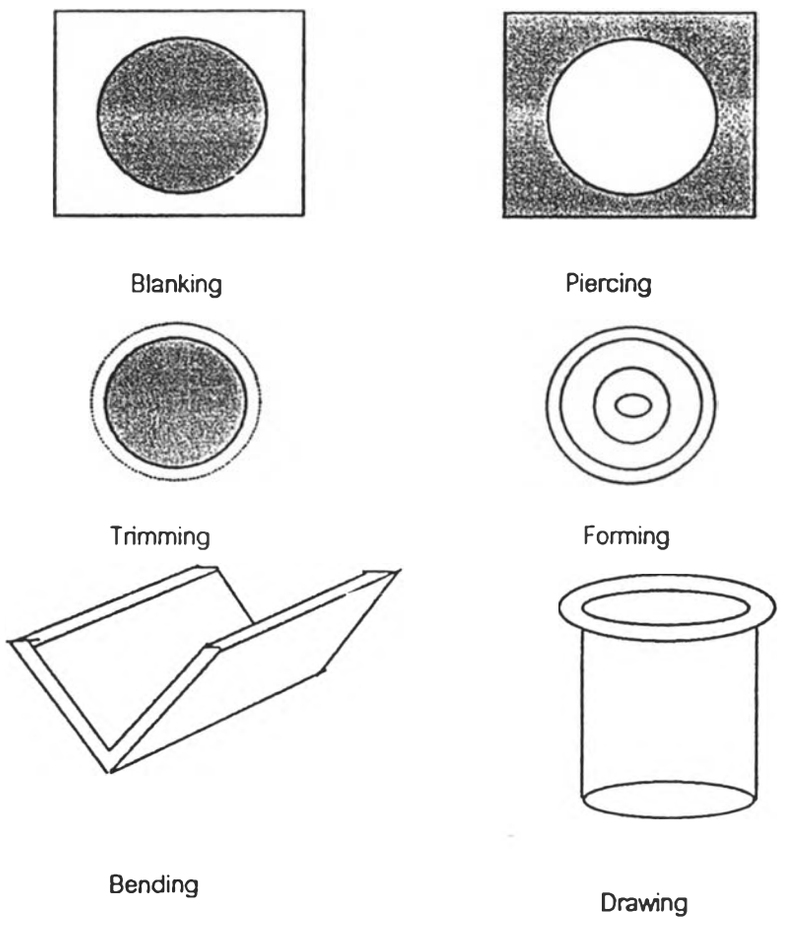

Figure 2.2 Types of press working

2.3 Types of die

There are many types of die classified by construction. This thesis concerned in 5 dies construction as below

1. Single die
2. Compound die
3. Combination die
4. Conventional die
5. Progressive die

1. Single die(conventional die)

Single die is die with one single operation only. It can be any one of those mentioned such as, piercing, bending forming, drawing or trimming.

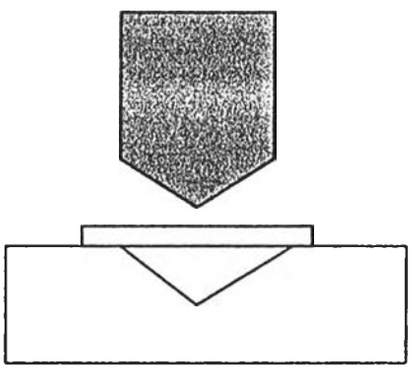

Figure 2.3 Single Bending die

2. Compound die

It is a die that pierces and blanks in the same time at the same position. This die is used for precise job. The compound die is economical. Rather than construct 3 dies to perform the operations more complicate die is made. Thus two presses and two operators are free for other work. Floor spaces and power savings are also realized. A more accurate part is obtained. For example, when part is blinked in one die and then

moved to another die for punching certain errors result in relocation of the part. These errors make it necessary to have greater tolerances on the dimensions involved. The compound die eliminates this relocation problem and resulting inaccuracy. In the compound die, the punched hole will always be in the same relationship when checked against the blank contour. Concentricity is more easily obtained in a compound die.

For certain part or blank shapes and size, the compound die is not practicable. Due to the fact that all die details must be crowed into one limit area, die construction may be hampered. For example when the punched hole is too close to the edge of the blank. The cutting edge would be so weal that failure would result.

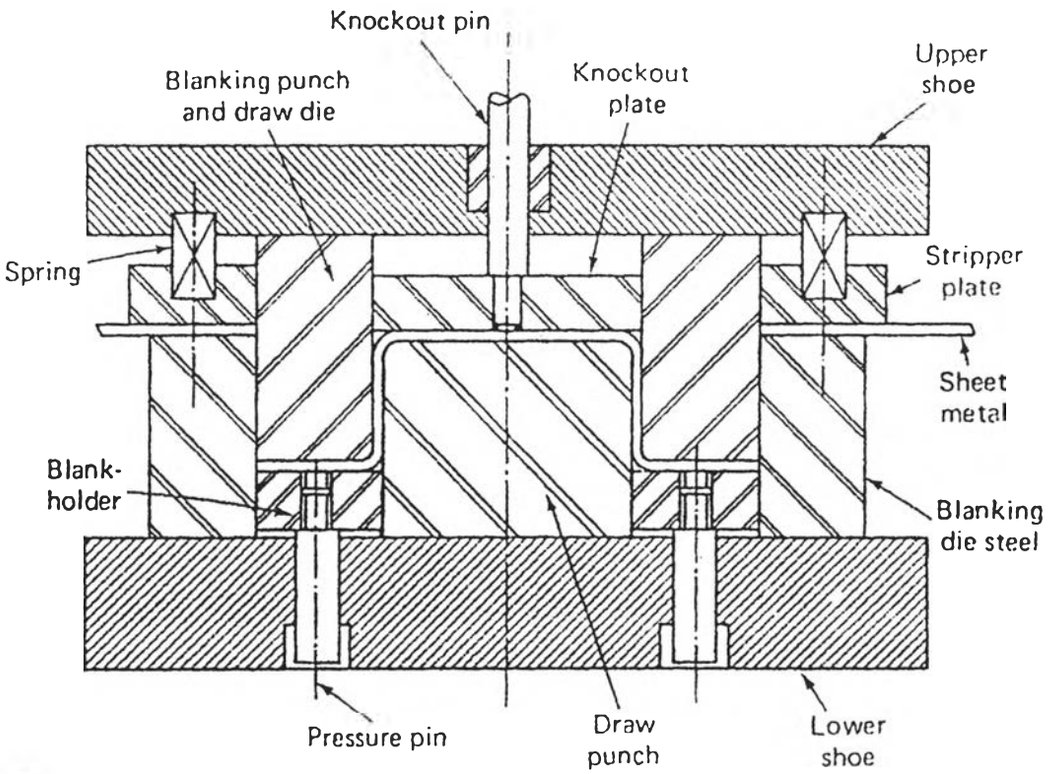

Figure 2.4 Compound die

3. Combination dies

It is an uncommon type of die. The die is make up of two or more stations. This die is differ from progressive die in that the part is fed from station to station with tongs held by the operator or by mechanical means. The stock strip is nor used to place the

part at each station as in a progressive die and different parts may be worked upon at the different stations of a combination die.

A combination die may be defined as a group of related or non-related dies mounted in a common die set. For example, if only small parts are being manufactured and a large press is available, several parts are made on this press with a combination die. If only on of the small parts was make in the large press, the press would not be utilized to the fullest extend. Because the station ate normally hand fed in the combination die, this type of die is used mainly for low or medium production of sheet metal parts and 4 operators may feed parts into a combination die.

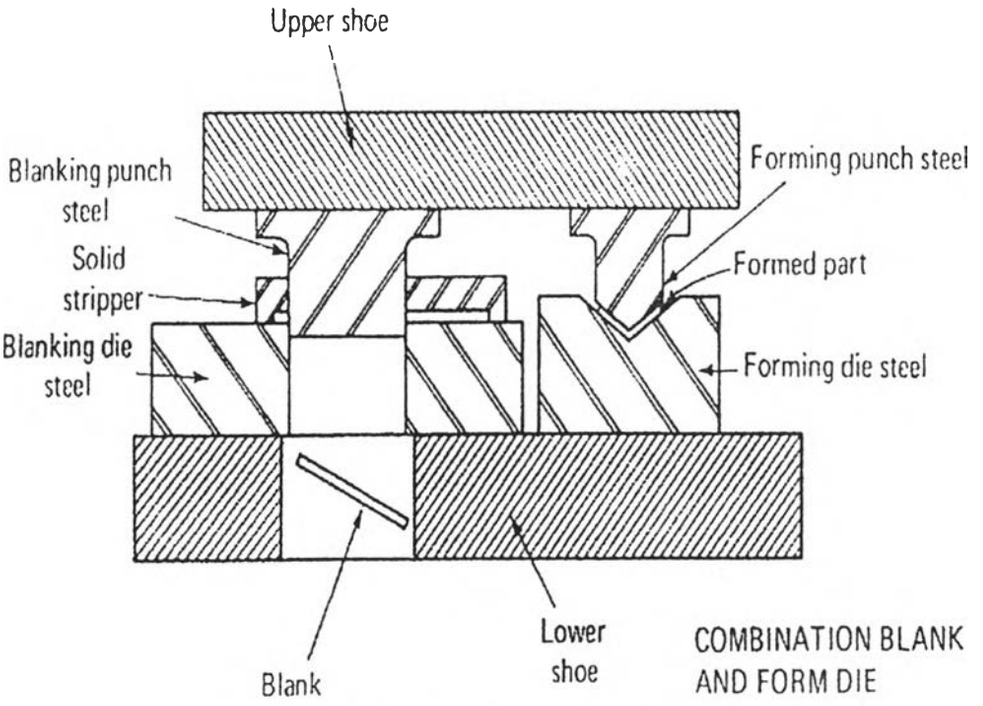

Figure 2.5 Combination die

4. Continental die

Continental die is the die for low - production or research work. The characteristics of this die make it unsuitable for high - production work. It is similar to other dies except it does not use a die set. Because of its simplicity, the continental die is very low in cost. More operators' time is requiring.

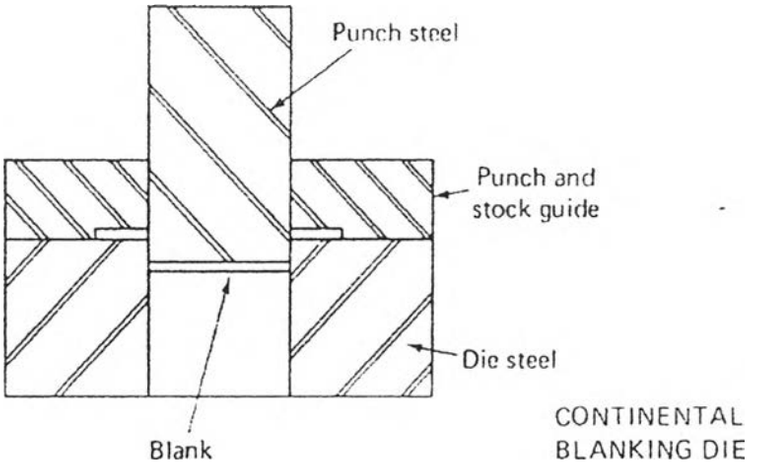

Figure 2.6 Continental blanking die

9. Progressive die

Progressive die is a series of fundamental sheet metal operations at two or more station during each press stroke in order to develop a work piece as the step, strip moves through the die. Each working station performs one or more distinct die operation but the strip must move form the first through each processing station to product a complete part. One or more idle station may be in incorporated in the die, not to perform work on the metal but to locate the strip, to facilitate inter -station strip travel, to provide maximum die section or to simplify their construction. The linear travel of the strip at each press stroke is called progression and die is called progressive die. The unwanted part of the strip are cut out as it advances through the die and one is more ribbon are left connected to each particularly completed part to carry it through the station of the die.

The cost of progressive die is high, and therefore they are use for high productions. It is a fully automatic press performed. Performing operation on the part that must remain in one position throughout the die is nor a simple matter in many cases. This type of die does reduce the operator requirements considerably. One operator may attend several progressive dies. However the weak point is a time consuming on place a new coil of stock in reel. Scrap produce is also high because nesting of the parts is limited.

Figure of progressive die is shown in next page.

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Table 2.1 Matrix of types of dies 's characteristics

		Criterion						
		Space	Investment cost	Manpower	Volume	Quality	Maintenance cost	Lead-time
Type of Die	Conventional die	H	L	H	M	M	L	H
	Compound die	L	M	L	M	M	L	M
	Combination die	M	M	M	M	M	M	M
	Continental die	H	L	H	L	L	L	H
	Progressive die	L	H	L	H	H	M	L

H = high L= low M= medium

As matrix table shows that progressive die is the most effective over than other types of die because it is low space , low manpower, shorten lead-time, high quality, high volume as the company requirement.

2.6 The principle of replacement

In regarding of replacement, the factors that need to consider are the utilization of equipment, life time, quality, capacity, the user that determine the decision making for replacement.

In decision making is normally measure on the expense in new machine and old machine and the forecasting trend in the future whether how much effect with the change.

It can be said that if machine or equipment still maintain in satisfied level where cost of product is acceptable, maintenance is not so high. The need of change is reasonably low. On the other hand if new machine have higher capacity, less work less time so it may be worth to switch to new thing.

2.7 The reasons for replacement

The four major reasons for replacement

2.7.1Physical impairment

The existing asset is worn out, owing to normal use or accident and no longer will render its intended function unless extend repairs are made.

2.7.2 Inadequacy

The existing die has sufficient capacity to fill the current and expected demands. The new requirements have changed from those were anticipated at the time the asset was acquired to meet the new demand.

2.7.3 Obsolescence

Obsolescence can be divided into two types

- Functional
- Economic

Both types result in loss of profits. In the case of functional obsolescence there has needed a decrease in the demand for the output of the asset thus a loss in revenue follows. For example the market may wish a higher quality product that it previously demanded. Economic obsolete is the reduction of there being a new asset that will produce at lower cost that can be obtained with the old asset.

2.7.4 Rental or lease possibilities

This is a variation of obsolescence, except that the replacement asset does not necessarily have to be different, in any respect form the existing asset. The possible economic advantage is due to advantageous financial factors that something may occurred from leasing. They usually involve income –tax considerations.

2.8 Factors to be considered in replacement studies

2.8.1 recognition of past " error"

The errors are related to the past and have no relevance to the replacement decision. For example, the existing machine is bought 6 years ago in 35,000 Bath the estimate of machine life is 10 years but if trade in, it cost 5000 Bath. In case of buying new machine that 10 years of life. The company need to compare the new machine 10 years with the exist machine in 4 years life (not 6 years).

2.8.2 The possible existence of a sunk cost

In the replacement , sunk cost in existing machine is not taken in the comparison with new machine. It is because this cost is unamortise cost that has already invested.

2.8.3 Remain life of the old property

2.8.4 Machine is normally end of life when machine is unable to work by measure from efficiency. But in term of economy, end of life of machine is when maintenance and operation cost tends to increase. Generally, the appropriate machine life is measured from the minimum average annual expense. This is one of the factors of consideration of replacement. In some case, the new machine does not need to replace when old machine has end of life but if study that when new machine is more economic or more efficiency than existing one.

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