Study of chip breaker

(King Saud University–College of Engineering–Industrial Engineering Dept.)

Supervision:

Dr: Ahmed M. El-Sherbeeny, PhD

(1)

Done By:

Anas A. Alhammad	432103317
Abdulrahman A. Alsamhan	432100530
Mohammed K. Alshmlan	432100175
Abdullah A. Alzuhairi	432105365

Introduction:

If we manufactured the parts we want by various shaping processes, they often required finishing processes, these processes classified as a material removing. As a result, the processes produce chips.

*There are many types of chips, but the main types are:

 a) Continuous Chip

 b) Built-Up Edge Chip

 c) Serrated Chip

 d) Discontinuous Chip

This report will study the different situations and the development of the Chip Breakers.

Chip Breakers prevent the chip from tangle around the cutting tool by converts the long pieces into small pieces in chips.

The influence of the scientists on studying the chip breaker:

There was a lot of research and studying for the chip breaker and the develop that happened with time.

Karahasan found the optimum chip breaker form by examining different types of chip breaker using the development in the technology.

Mesquita and Barata Marques used the research that done before to develop a method which can know the cutting force before it is done. This method is based on the formation of chip breaker geometry and calculation of effective side relief angle. **The area effect** and **Fc (force of cutting)** known by the experimental studies.

On the other hand, **Fang** did experimental showed the replacement of a symmetric grove type to that of symmetric type is practical when **a (depth of cut)**, Feed Rate, and the chip breaking performance is taken into consideration.

Kim and Kweun modeled a method for the chip flow using various cutting tools with different geometries.

In addition, there is a lot of research from many scientists along with what we wrote earlier, like **Kramar and Kopac** who did the application of high pressure cooling, or **Kim et al**. who on the research that published on 2009, evaluated the performance of commercial chip breakers using a neural network that was trained through a back propagation algorithm.

Finally, the influence of chip breaker geometry on the performance was shown in these researches. The researches and the developing in chip breaker is continue and developing in every second.
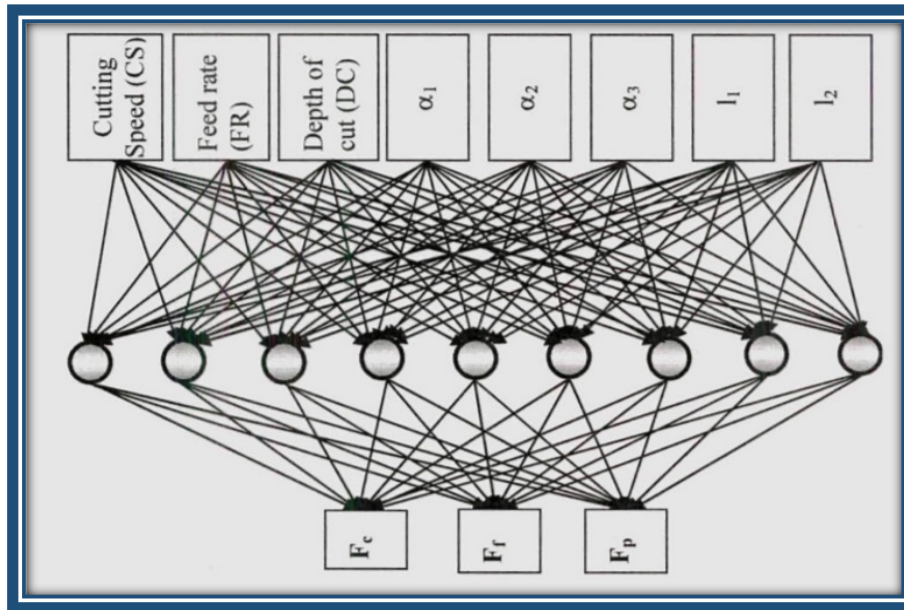
Artificial Neural Networks:

Artificial Neural Networks is used to determine the strength of machinery and surface roughness. Also it used to determine the components of the cutting force for chip breaker. The Evaluation for the performance of cutting tools it can be done by Artificial Neural Networks and the variables that must be known are: cutting speed, depth of cut, and feed rate and that will affect the results. The Factors cutting force that when the power cut during cutting.IN addition, ANNs is a mathematical method used in many applications such as engineering, medicine, economics, and math. ANNs used for solving complex problems to make it simple and clear.

Why we should use Artificial Neural Networks:

ANNs are practical because of the following reasons:-

ANNs do a processing that connect and parallel with fault tolerance, and by that they can learn from the mistakes in experience. In addition, ANNs can bound many different information from many sources. ANNs have an advantage from the other method; this feature is it can bring the information before by a statistical distribution. One of the properties in ANNs it's determine the weight of all the data for the classification.

Types of chip breaker:
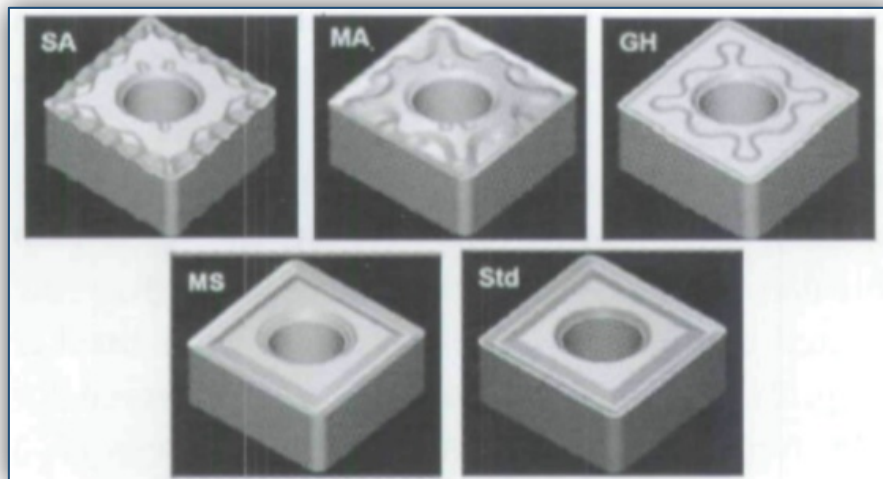
There are many types of chip breaker as it shown in the fig. above:

MS, MS U, MA, SA, GH, STD, STD U.

The (U) in the two types (MS , STD) that means it's coated, same type but the difference it's coated tool. In next page it is shown a study about the difference between the coated and uncoated tool.

Experimental shown the difference between the coated and the uncoated tool:
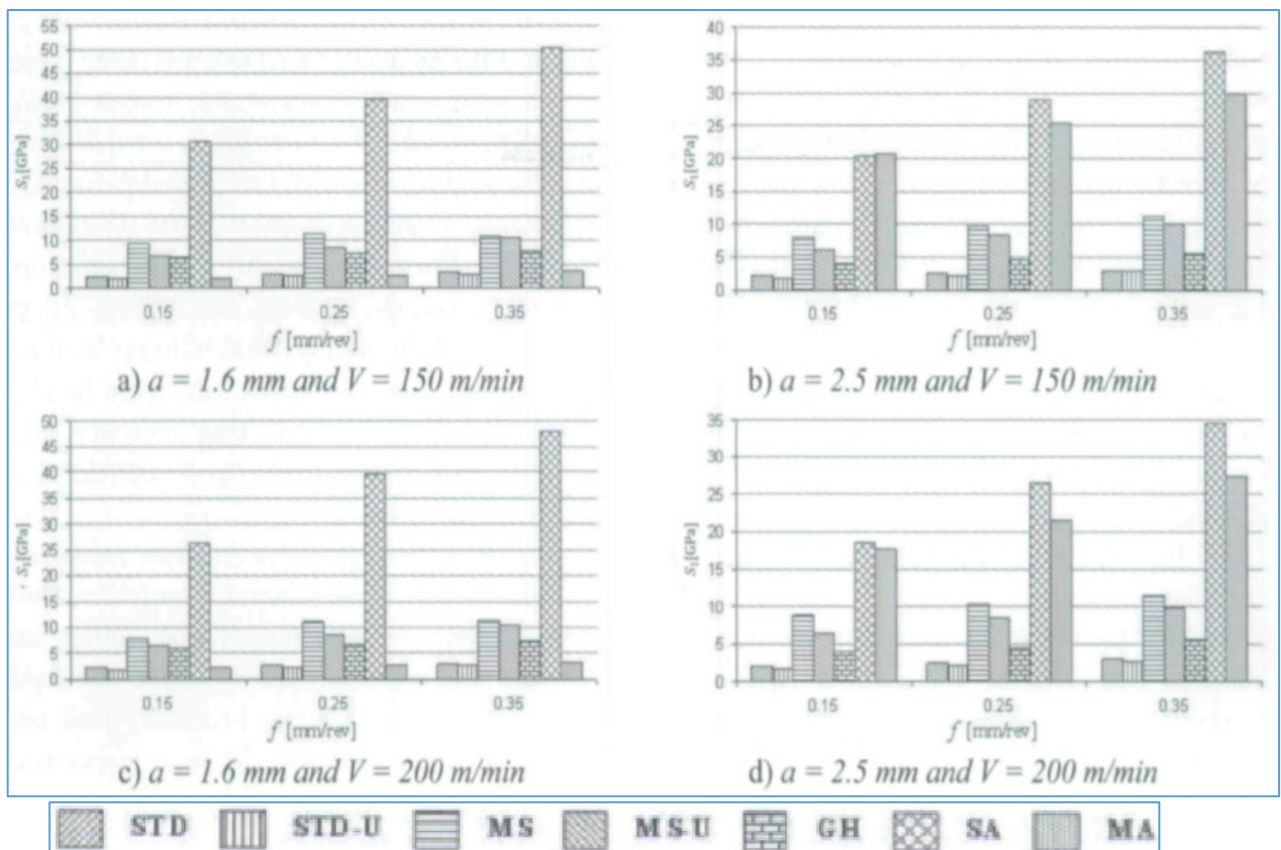
There is a difference if we used a coated tool or uncoated tool.

The uncoated tool is faster in cutting than the coated tool on carbide.

But on the other hand if we coated the tool, life is increased

If the speed of the tool cutting increased, the force will decree.

The most complex type of chip breaker must use high cutting force, but the parts that not complex the cutting force will be

a) a = 1.6 mm and V = 150 m/min
b) a = 2.5 mm and V = 150 m/min
c) a = 1.6 mm and V = 200 m/min
d) a = 2.5 mm and V = 200 m/min

STD   STD-U   MS   MSU   GH   SA   MA

low. One of the good properties of the coated tool is having high strength and great toughness.

In the figure above, the 7 types of chip breaker change in the feed rate including the change of depth of cut and speed of cut.

Conclusion:

(2)

At the end, It comes to know now the use of chip breaker, and from the results that it have seen before it can be known what is the best type of chip breaker based on the operation from the 7 types of chip breaker. In addition it can be known that Increasing cutting speed was generally found to decrease the main cutting force (Fc) for all the chip breaker.

Team Work

As a team there was a specific mission for each member, **Mohammed Alshamlan** was the responsible for translating and the introduction including the scientists' studies part.

Anas Alhammad his task was the Artificial Neural Networks understanding, and summarizes it for this report.

Abdullah Alzuhairi did the study for the types of chip breaker and he was the connecter between the group and the **Dr. Ahmed Sherbeeny**.

Last but not least **Abdulrhman Alsamhan** did the conclusion part, and the slides for the power point show.

References

(1)

http://www.machinery.co.uk/machinery-products/ntks-mogul-bar-novel-chipbreaker-solve-boring-chip-control-/problem-swiss-machines/59196

(2)

http://www.tungaloy.co.jp/ttj/english/info_x/p110136.html

(3)

Investigation of the effects of different chip breaker forms

on the cutting forces using artificial neural networks .

(4)

The Influence of Chip Breaker Geometry on Tool Stresses in Turning .