Introduction of Machining

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Abstract: Machinery manufacturing industry on the world economy plays an important role, and the machining process is the establishment of machinery manufacturing technology and an important part of the critical work. In this paper, the output shaft is a fixture of the processing technology and design, focused on several important processing on the surface of a certain size, shape, location requirements, there are still some strength, surface roughness, andother requirements, but these will be reflected in the text .

Key words: manufacturing; output shaft; processing technology; fixture.

Have a shape as a processing method, all machining process for the production of the most commonly used and most important method.Machining process is a process generated shape, in this process, Drivers device on the workpiece material to be in the form of chip removal.Although in some occasions, the workpiece under no circumstances, theuse of mobile equipment to the processing, However, the majority of the machining is not only supporting the workpiece also supporting tools and equipment to complete.

Machining know the process has two aspects. Small group of low-cost production. For casting, forging and machining pressure, every production of a specific shape of the workpiece, even a spare parts, almost have to spend the high cost of processing. Welding to rely onthe shape of the structure, to a large extent, depend on effective in the form of raw materials. In general, through the use of expensive equipment and without special processing conditions, can be almost any type of raw materials, mechanical processing to convert the raw materials processed into the arbitrary shape of the structure, as long as the external dimensions large enough, it is possible. Because of a production of spare parts, even when the parts and structure of the production batch sizes are suitable for the original casting, Forging or pressure processing to produce, but usually prefer machining. Strict precision and good surface finish, Machining the second purpose is the establishment of the high precision and surface finish possible on the basis of. Many parts, if any other means of production belonging to the large-scale production, Well Machining is a low-tolerance and can

meet the requirements of small batch production. Besides, many parts on the production and processing of coarse process to improve its general shape of the surface. It is only necessary precision and choose only the surface machining. For instance, thread, in addition to mechanical processing, almost no other processing method for processing. Another example is the blacksmith pieces keyhole processing, as well as training to be conducted immediately after the mechanical completion of the processing.

Primary Cutting Parameters

Cutting the work piece and tool based on the basic relationship between the following four elements to fully describe : the tool geometry, cutting speed, feed rate, depth and penetration of a cutting tool.

Cutting Tools must be of a suitable material to manufacture, it must be strong, tough, hard and wear-resistant. Tool geometry -- to the tip plane and cutter angle characteristics -- for each cutting process must be correct.

Cutting speed is the cutting edge of work piece surface rate, it is inches per minute to show. In order to effectively processing, and cutting speed must adapt to the level of specific parts -- with knives.

Generally, the more hard work piece material, the lower the rate. Progressive Tool to speed is cut into the work piece speed. If the work piece or tool for rotating movement, feed rate per round over the number of inches to the measurement. When the work piece or tool for reciprocating movement and feed rate on each trip through the measurement of inches. Generally, in other conditions, feed rate and cutting speed is inversely proportional to。

Depth of penetration of a cutting tool -- to inches dollars – is the tool to the work piece distance. Rotary cutting it to the chip or equal to the width of the linear cutting chip thickness. Rough than finishing, deeper penetration of a cutting tool depth.

Wears of Cutting Tool

We already have been processed and the rattle of the countless cracks edge tool, we learn that tool wear are basically three forms : flank wear, the former flank wear and V-Notch wear. Flank wear occurred in both the main blade occurred vice blade. On the main blade, shoulderremoved because most metal chip mandate, which

resulted in an increase cutting force and cutting temperature increase, If not allowed to check, That could lead to the work piece and the tool vibration and provide for efficient cutting conditions may no longer exist. Vice-bladed on, it is determined work piece dimensions and surface finish. Flank wear size of the possible failure of the product and surface finish are also inferior. In most actual cutting conditions, as the principal in the former first deputy flank before flank wear, wear arrival enough, Tool will be effective, the results are made unqualified parts.

As Tool stress on the surface uneven, chip and flank before sliding contact zone between stress, in sliding contact the start of the largest, and in contact with the tail of zero, so abrasive wear in the region occurred. This is because the card cutting edge than the nearby settlements near the more serious wear, and bladed chip due to the vicinity of the former flank and lost contact wear lighter. This results from a certain distance from the cutting edge of the surface formed before the knife point Ma pit, which is usually considered before wear.

Under normal circumstances, this is wear cross-sectional shape of an arc. In many instances and for the actual cutting conditions, the former flank wear compared to flank wear light, Therefore flank wear more generally as a tool failure of scale signs. But because many authors have said in the cutting speed of the increase, Maeto surface temperature than the knife surface temperatures have risen faster. But because any form of wear rate is essentially temperature changes by the significant impact. Therefore, the former usually wear in high-speed cutting happen. The main tool flank wear the tail is not processed with the work piece surface in contact, Therefore flank wear than wear along with the ends more visible, which is the most common. This is because the local effect, which is as rough on the surface has hardened layer, This effect is by cutting in front of the hardening of t he work piece. Not just cutting, and as oxidation skin, the blade local high temperature will also cause this effect. This partial wear normally referred to as pit sexual wear, but occasionally it is very serious. Despite the emergence of the pits on the Cutting Tool nature is not meaningful impact, but often pits gradually become darker If cutting continued the case, then there cutter fracture crisis. If any form of sexual allowed to wear, eventually wear rate increase obviously will be a tool to destroy failure destruction, that will no longer tool for

cutting, cause the work piece scrapped, it is good, can cause serious damage machine. For various carbide cutting tools and for the various types of wear, in the event of a serious lapse, on the tool that has reached the end of the life cycle. But for various high-speed steel cutting tools and wear belonging to the non-uniformity of wear, has been found : When the wear and even to allow for a serious lapse, the most meaningful is that the tool can re-mill use, of course, In practice, cutting the time to use than the short time lapse. Several phenomena are one tool serious lapse began features : the most common is the sudden increase cutting force, appeared on the work piece burning ring patterns and an increase in noise.

The Effect of Changes in Cutting Parameters on Cutting Temperatures

In metal cutting operations heat is generated in the primary and secondary deformation zones and this results in a complex temperature distribution throughout the tool, workpiece and chip. A typical set of isotherms is shown in figure where it can be seen that, as could be expected, there is a very large temperature gradient throughout the width of the chip as the workpiece material is sheared in primary deformation and there is a further large temperature in the chip adjacent to the face as the chip is sheared in secondary deformation. This leads to a maximum cutting temperature a short distance up the face from the cutting edge and a small distance into the chip.

Since virtually all the work done in metal cutting is converted into heat, it could be expected that factors which increase the power consumed per unit volume of metal removed will increase the cutting temperature. Thus an increase in the rake angle, all other parameters remaining constant, will reduce the power per unit volume of metal removed and cutting temperatures will reduce. When considering increase in undeformed chip thickness and cutting speed the situation is more comples. An increase in undeformed chip thickness and cutting speed the situation is more complex. An increase in undeformed chip thickness tends to be a scale effect where the amounts of heat which pass to the workpiece, the tool and chip remain in fixed proportions and the changes in cutting temperature tend to be small. Increase in cutting speed, however, reduce the amount of heat which passes into the workpiece and this increase the temperature rise of the chip in primary deformation.

Further, the secondary deformation zone tends to be smaller and this has the effect of increasing the temperatures in this zone. Other changes in cutting parameters have virtually no effect on the power consumed per unit volume of metal removed and consequently have virtually no effect on the power consumed per unit volume of metal removed and consequently have virtually no effect on the cutting temperatures. Since it has been shown that even small changes in cutting temperature have a significant effect on tool wear rate, it is appropriate to indicate how cutting temperatures can be assessed from cutting data.

The most direct and accurate method for measuring temperatures in high-speed-steel cutting tools is that of Wright&Trent which also yields detailed information on temperature distributions in high-speed-steel tools which relates microstructural changes to thermal history.

Trent has described measurements of cutting temperatures and temperature distributions for high-speed-steel tools when machining a wide range of workpiece materials. This technique has been further developed by using scanning electron microscopy to study fine-scale microstructural changes srising from over tempering of the tempered martensitic matrix of various high-speed-steels. This technique has also been used to study temperature distributions in both high-speed-steel single point turning tools and twist drills.

Automatic Fixture Design

Assembly equipment used in the traditional synchronous fixture put parts of the fixture mobile center, to ensure that components from transmission from the plane or equipment plate placed after removal has been scheduled for position. However, in certain applications, mobile mandatory parts of the center line, it may cause parts or equipment damage. When parts vulnerability and may lead to a small vibration abandoned, or when their location is by machine spindle or specific to die, Tolerance again or when the request is a sophisticated, it would rather let the fixture to adapt to the location of parts, and not the contrary. For these tasks, Elyria, Ohio, the company has developed Zaytran a general non-functional data synchronization West category FLEXIBILITY fixture. Fixture because of the interaction and synchronization devices is independent, The synchronous device can use sophisticated equipment to replace

the slip without affecting the fixture force. Fixture specification range from 0.2 inches itinerary, 5 pounds clamping force of the six-inch trip, 400-inch clamping force. The characteristics of modern production is becoming smaller and smaller quantities and product specifications biggest changes.

Therefore, in the final stages of production, assembly of production, quantity and product design changes appear to be particularly vulnerable. This situation is forcing many companies to make greater efforts to rationalize the extensive reform and the previously mentioned case of assembly automati on. Despite flexible fixture behind the rapid development of flexible transport and handling devices, such as backward in the development of industrial robots, it is still expected to increase the flexibility fixture. In fact the important fixture devices -- the production of the devices to strengthen investment on the fixture so that more flexibility in economic support holders.

According to their flexibility and fixture can be divided into : special fixture, the fixture combinations, the standard fixture, high flexible fixture. Flexible fixture on different parts of their high adaptability and the few low-cost replacement for the characteristic.

Forms can transform the structure of the flexible fixture can be installed with the change of structure components (such as needle cheek plate, Multi-chip components and flake cheek plate), a non-standard work piece gripper or clamping elements (for example : commencement standard with a clamping fixture and mobile components fixture supporting documents), or with ceramic or hardening of the intermediary substances (such as : Mobile particle bed fixture and heat fixture tight fixture). To production, the parts were secured fixture, the need to generate clamping function, its fixture with a few unrelated to the sexual submissive steps :

According to the processing was part of that foundation and working characteristics to determine the work piece fixture in the required position, then need to select some stability flat combination, These constitute a stable plane was fixed in the work piece fixture set position on the clamp-profile structure, all balanced and torque, it has also ensured that the work features close to the work piece.

Finally, it must be calculated and adjusted, assembly or disassembly be standard

fixture components required for the position, so that the work piece firmly by clamping fixture in China. In accordance with this procedure, the outline fixture structure and equipped with the planning and recording process can be automated control.

Structural modeling task is to produce some stable flat combination, Thus, these plane of the work pieces clamping force and will fixture stability. According to usual practice, this task can be human-machine dialogue that is almost completely automated way to completion. A man-machine dialogue that is automated fixture structuremodeling to determine the merits can be conducted in an organized and planning fixture design, reduce the amount of the design, shortening the study period and better distribution of work conditions. In short, can be successfully achieved significantly improve fixture efficiency and effectiveness.

Fully prepared to structure programs and the number of materialcircumstances, the completion of the first successful assembly can save up to 60% of the time. Therefore fixture process modeling agencies is the purpose of the program have appropriate documents.