A New Process of Nonferrous Metal Surface Processing-nylon Brush Roller Grinding

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Abstract. The new process method of combining nylon brush roller grinding technology as agrinding and polishing with the grinding of high precesion, high efficiency, loe coast and other advantage, is a kind of processing method can be used in grinding process and objective, new abrasives used for new this procedure(nylon brush roller) is described, using the new process and the problems existing in the application were described, the problems we use konwledge to sovle problems arising from it. But in the current application of nylon brush roller mechanism study on nonferrous metalgrinding is not deep enough, so in order to further study, increase the accumulation of the nonferrous metal grinding on the knowledge, to expand the application of grinding process and the develpment of non-ferrous metal grinding in the future play a certain role.

Overview of Nonferrous Metal Surface Grinding Process

The Purpose and Significance of Non-ferrous Metal Processing

There are a lot of problems often encountered in surface grinding process, especially in the non-ferrous metal surface processing, the application of this new technology is to:

(1)Application of nylon brush roller grinding can remove the defects of non-ferrous metal surface.

(2)Can improve the roughness of the surface of non-ferrous metal

(3)To prevent the generation of grinding heat burns produced in non-ferrous metal surface

(4)Used for polishing non-ferrous metal surface light plays the role of decoration

(5)Remove the oxide layer and the other defile

Application of nylon brush roller for nonferrous non-ferrous metal grinding can improve grinding efficiency, change the past, grinding methods, the former has a lot of nonferrous metal grinding is adopted by hand operation mode. Nonferrous metals in its internal structure, in the ordinary way by grinding of non-ferrous metal surface grinding process will produce sunburn and on grinding tool grinding edge between caused by blocked on the surface, the application of this new technology process would avoid such drawbacks, improve efficiency and high production value.

The Existence of Non-ferrous Metal Surface Processing Problems

Because in the engineering used to need to finish machining nonferrous metal general for aluminum alloy or copper alloy, and the plasticity and toughness of non-ferrous metal, and its relatively low hardness, grinding wheel will block or abrasive belt grinding gap between grains so that grinding difficult, because the gap between the abrasive if the tool is planned, play a role of abrasive grains before and after angular size doesn't exist. So in order to eliminate the disadvantages brought the traditional grinding, grinding process of new, technological method of using nylon brush roller instead of the traditional grinding processing of the surface of nonferrous metals.

Brief Introduction of Nylon Brush Roller

Nylon Brush Roller

China in the 80's when the first nylon brush roller developed containing abrasive, meet the needs of users, breaking the United States, Western Europe and other countries monopoly. Figure 1 is a

nylon brush roller contour map, Figure 2 is a section of nylon brush roller. Remove surface grease and dirt, iron powder by mechanical action [1] brush roller. Nylon brush roller in this paper is nylon coated abrasive in the brush roller, the general use of silicon carbide abrasive nylon silk because of this, the body flexibility is good, can be on the machining surface of the workpiece deburring and polishing[2]. Brush wire nylon brush roller in the roller is applied on the surface of nylon yarn, and then use the abrasive coated on the surface of nylon silk, made of nylon brush roller grinding tool such. The main parameters of nylon brush roller are nylon coated abrasive after the bending strength and tensile strength, the effective grinding radius, and the diameter of the nylon filament.

Fig. 1 Nylon brush roller

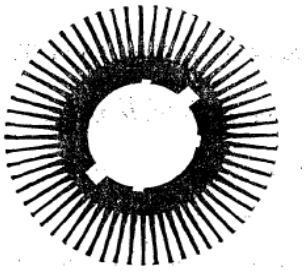

Fig. 2 Nylon brush roller section part

Nylon brush roller when performing grinding, abrasive grain with negative rake angle smaller, can make the cutting edge sharp, nylon wire nylon brush roller are arranged evenly distributed, so the grinding, abrasive multi input, the grinding removal rate is high, and the nylon wire nylon brush roller elastic, not easy to be affected by vibration, can obtain the very good processing quality.

Abrasive and Grinding Roll

Abrasive is a subject in the grinding process, need a certain degree of hardness, heat resistance, physical stability and chemical stability, but also should have certain toughness, used to bear certain grinding force

Brush wire nylon brush roller contains two kinds of silicon carbide abrasive abrasive size and alumina abrasive grains from 180# to 500#, the effective length of wire brush from the 12~20mm[4].

Abrasive and the Relationship between the Surface Roughness

Common choice of abrasive, abrasive particle size on the surface we need different after grinding roughness to a certain extent, grinding size of particle size of abrasive and reaction reaction, an important indicator of the workpiece surface roughness and machining efficiency of large size, the surface roughness value to be low, the surface grain size small the roughness value to. In the grinding wheel abrasive belt abrasive granularity will also affect the grinding heat generation and the abrasive surface of the plug. But the nylon brush roller in the flushing coolant not on longevity brush wire between jam In different grinding grain granularity are different roughness values as shown in table 1.

Tab. 1 Abrasive grain size and roughness value

Brush wire diameter	Abrasive grain	Abrasive type	After grinding surface roughness
Φ 0.9±0.1	180	Silicon	R_a3.2~1.6
Φ 0.9±0.1	240	Silicon	R_a1.6~0.8

Polishing Mechanism Research of New Method

A good grinding process can not only meet the needs of the production of high-end products, but

also reduce energy consumption, improve productivity[4]. The main object of the grinding process of grinding is grinding nonferrous metal surface, such as the surface of a printed circuit board processing, processing of the continuous casting machine crystallizer copper tube surface grinding of non-ferrous metals. Although the new technology that has been applied to nylon brush roller, but the mechanism of this new process is in the very small, so the mechanism of this new process is studied to get similar curves in figure 3. So in order to get the relationship curve, design experimental platform to complete the verification mechanism on the basis of the experimental curve. As shown in figure 4.

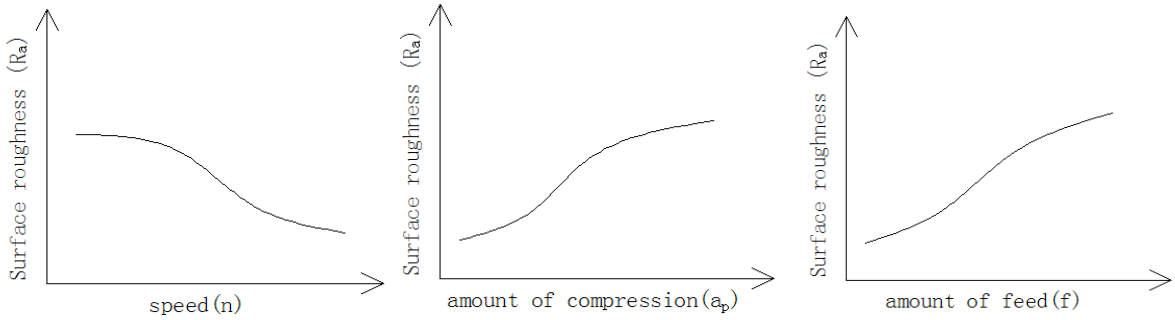

Fig. 3 Relationship curve

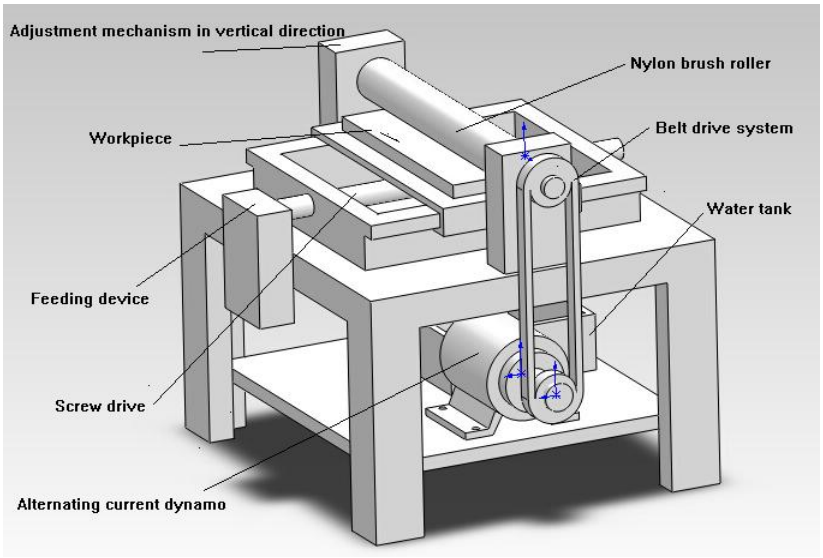

Fig. 4 Structure layout

Conclusion

With the continuous promotion of the use of grinding process, in the domestic machinery manufacturing industry development and innovation. Grinding process will receive further attention in the manufacturing industry will be play a positive economic effect. Application of nylon brush roller for nonferrous metal grinding of this new process method can get rid of some disadvantages of grinding or abrasive belt grinding of some, in order to provide a good experimental platform for nonferrous metal grinding in the future and its mechanism and Experimental Research on grinding, more a method of process efficiency and usability, fill in the non-ferrous metal grinding field blank and bring certain economic benefits.

References

[1]Liwei. Design and research of cleaning section strip scrubbing equipment[J].Shanghai: Mechanical research and application , 2014.

[2]Yexuming. Crystallizer copper pipe of continuous casting machine outside surface polishing and grinding plane development[J].Shenyang: Manufacturing technology and machine tool, 2004.

[3]Zhaobingkun, Donglvchun.Surface brightness copper processing method[J].Beijing: Optical fiber and cable and its application technology,1990.

[4]Libomin, Zhaobo. Modern grinding technology[M]Beijing:Machinery industry press, 2002.