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A COMPARATIVE STUDY OF SINGLE POINT DIAMOND DRESSER AND MULTI POINT DIAMOND DRESSER FOR GRINDING WHEEL A REVIEW

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Abstract
Grinding is used mainly for finishing metal component. Grinding is applied in last stage. The main objective is to generate quality surface on the component. Grinding wheel is consisting of the many abrasive particles. Dressing is a process which remove loaded surface of grinding wheel and makes it sharp. There is a single point and multi- point dressers are there. Multipoint diamond dresser has certain advantages the single point diamond dresser. The multi-point diamond dresser produce good quality surface finish on the work piece, produces more cutting surfaces on grinding wheel.
Keywords: Grinding wheel, Single point diamond dresser, Multi point diamond dresser, etc.

1. Introduction

Grinding is a metal cutting process used in last stage. The main objective of grinding process id to generate good surface on part or component. It is mainly used in automobile industries. Grinding wheel is made from mainly silicon carbide and aluminum oxide. any grinding wheel consist of the three elements:1. Abrasive grit,2. Bond,3. Porosity, etc.
Dressing is a process of remove loaded and glazed of grinding wheel.it is used of resharpning of grinding wheels. there is single and multi-point dresser used for dressing operation.in presently in industry, industry CNC grinding machine. So wheels which are used for CNC machines are heavy. now a day, multipoint diamond dressers are used for dressing operation[4].
grinding process, depends upon grinding ratio. Grinding ratio is defined as volume of material removed per unit volume of wheel wear. Also there are several other factors i. e. shape of wheel, abrasive type of dresses used, dressing depth of cut, dressing cross feed rate, tip radius of diamond dresser and drag angle of dresser,[5] etc.

2. Review

2.1 Dhairyasneel Pawar et al. were done the comparative Study of the active surface condition. Here, they used the SEM image technique. SEM technique means scanning electron microscopy. This technique use focused beam of high energy electron to create variety of signals out the surface. That gives future chemical composition, crystalline Structure and orientation of material. This SEM technique is used for the analyses of the sample of different points.

They also use the GWAS. This technique is used for the effect of surface finish. for the experiment, they took silicon carbide (sic)and Aluminum oxide (AL_2 0_3) grinding wheel because they are mostly Used. On these two wheel they performed the dressing operation by using single point diamond dresser and multipoint diamond dresser.

for analysis of SEM technique, cut the sample from the dressed wheels cleaned by compressed air. The samples placed at the location of the vacuum chamber of microscope, for the purpose of capturing images for analysis.

The observation for loading of grinding wheel, grain size, cutting edge

2.1.1). While loading of grinding wheel, less number of work piece material particles are present when dressed by multipoint dresser. By comparing more no. 0f particles are dressed with present when dressed with single point dresser

2.1.2). Grain size

The size of the grain is obtained by using SEM image technique when dressing is done by single point dresser it gives 237 microns i.e. average grain size and dresser with multipoint dresser it gives 205 microns.

2.1.3). Cutting edge.

By observing image, they observe. Cutting edge are more in multipoint diamond dresser and less in single point dresser by comparing.

By Observing the observations, they conclude that multi point diamond dresser is more effective[1].

2.2.Frantisek Holesovsk et al. they work on the grinding operation to find the dressing effect on work piece Surface roughness. They used the way of Analysis of Variance(ANOVA).

Analysis of variance CANOVA) is collective models their procedure used for the analysis of different group of sample. This method used for comparing three or more group significance.

They are considering the three parameters i.e. Grinding wheel speed for dressing CVs), dressing depth Cut(ad) and type of dresser. They set the three levels of grinding wheel speed: 10 m/s, 20 m/s, 30 m/s and depths taken as 0.02mm,0.04 mm, 0.0 8mm. These were tested by these two dresser and cooling fluid applied. After doing grinding they checked thickness of work piece by Hummel tester T1000 profilometer. The result of these test gives in multipoint diamond dresser decreased the value by approximate 20 %. with those value single point diamond dresses were obtained as baseline. This show multi - point diamond dressing gives smooth surface than single point dressing. The experiment was applied on practical application of production. The wheel used is 10cr6. Here they changing the feed rate at different levels. Here they use the abrasive grain CUBITRON-II, hence depth was not changed. By giving constant speed 45 m/s and feed rate levels changing this test was verified. Here multipoint dresser used the result was they optimize the time of grinding i.e. the initial time the surface roughness a value gives 0.39 micron was measured.[2]

2.3. Yasushi Mochid et al. They done the experimentation to find out the forces using dynamometer. The dynamometer is used to measure the dressing force single point diamond dresser and multi point diamond dresser fixed to dynamometer one by one force calculated.

The experimentation was carried on a CNC internal grinding machine. They used the oil mist lubricate bearing in the experiment. They give 150, 000 rpm to the grinding wheel spindle while doing experiment, they took: dressing depth of cut = 5 micrometer, the width of cut = 5 micrometer. The value was taken 5 micrometers same for single point and multi point diamond dresser.

The experimental results are as follows

2.3.1)Dressing force
In single point diamond dresser while dressing with it, it gives drift and noise on the trace of dressing force. This is due to dressing tool movement. Start and end of the dressing can be identified by vibrations.
In multipoint diamond dresser, diamond grit come in contact with this tool hence pulse force is obtained.
While examine, they found that dressing force of worn edged single point diamond dresser was about twice of the sharp edged single point diamond dresser in multi-point diamond dresser dressing force gives the average peak value of dressing force pulse and it gives some value as that of worn edged single point diamond dresser. The result of worn edged single point diamond dresser and multi-point diamond dresser gives same result.

2.3.2)Grinding force
The grinding force increased by increasing depth of cut while dressing done with the sharp edged single point diamond dresser covers all rangers of grinding performance i.e. it can control grinding performance by maintaining lower dressing force.
The result is sharp edge single point diamond dresser gives low dressing forces and covers dressing performance of both worn edge single point diamond dresser and multi point diamond dresser.

2.3.3)Truing accuracy
by trucing, more dressing forces required when dressed with worn edge single point diamond dresser and mulita point diamond dresser. The dressing forces has same effect on trucing accuracy. While sharped edge single point diamond racer is more sensitive to dressing forces

They concluded that, the single point diamond dresser and multi-point diamond dresser induce same dressing force with wear width are equal.A strong relationship developed with dressing force+ grinding performance. lower dressing force giver better truing accuracy. This depend on edge shape of diamond is used in dresser[3].

3. Conclusion

It has been observed that multipoint diamond dresser is superior than single point diamond dresser.The average grain size of single point diamond dressed wheel gives 237 microns and the average grain size of multi point diamond dressed wheel gives 205 microns. More cutting edges formed on grinding wheel when dressed with multi point diamond dresser.Multi-point diamond dresser produces good surface finish on the component than single point diamond dresser.

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