Titel

Abrasive Disc Performance in Dry-Cutting of Medium-Carbon Steel

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Abstrakt

Abrasive-cutting processes are widely used to obtain semi-finished products from metal bars, slabs, or tubes. Thus, the **abrasive cutting-off** process is applied when requiring precision **cutting** and productivity at a moderate price. **Cut-off tools** are **discs** composed of small **abrasive** particles embedded in a bonding material, called the binder. This work aims to compare the **cutting** performance of **discs** with different composition, in dry **cutting** of steel bars. To do that, **disc** wear was measured and **disc** final topography was digitalized in order to determine both **disc** surface wear patterns and if the **abrasive** particles bonding into the binder matrix was affected. In addition, X-Ray inspection gave information about the **abrasive** grit-binder bonding. Therefore, the method here presented allows identifying **discs** with a superior **abrasive-cutting** capability, by combining profilometry and tomography to define micrometrical aspects, grit size, and binder matrix structure. Results led to the conclusion that **discs** with high grit size and protrusion, high grit retention by bond material, and closer mesh of fiberglass matrix binder were the optimal solution.

Veröffentlichungsjahr

2020

Quelle

METALS

Klassifikation

Materials Science
Metallurgy & Metallurgical Engineering

Schlagworte des Autors

DRY-CUTTING
abrasive-cutting
cutting disc
wear
cut-off abrasive wheel

Thesaurusbegriffe

GRINDING PROCESS
WHEEL
GRAIN
WEAR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 126

Titel

Combined effects of **abrasive** type and **cooling** mode on fatigue resistance of AISI D2 ground surface

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Abstrakt

This paper explores the benefits of the controlled **grinding** surface of the AISI D2 steel. The effect of Sol-gel **abrasive wheel** and cryogenic **cooling** mode on surface integrity has been proved. These results **lead** to the higher level of compressive residual stresses and lower density of micro-cracks compared to combination of Al2O3 **abrasive wheel** and soluble oil **cooling** mode. Using controlled **grinding**, the fatigue **life** has been improved to three time. The Dang Van multiaxial fatigue criterion was used to predict the combined beneficial controlled **grinding** effects on the high cycle fatigue limit of AISI D2 **tool** steel.

Veröffentlichungsjahr

2020

Quelle

INTERNATIONAL JOURNAL OF FATIGUE

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

CONTROLLED **GRINDING**
Residual stress
Micro-cracks
Fatigue
AISI D2

Thesaurusbegriffe

RESIDUAL-STRESSES
STAINLESS-STEEL
CRACK NUCLEATION
WEAR BEHAVIOR
INTEGRITY
STRENGTH
LIFE
TEMPERATURE
IMPROVEMENT
GRINDABILITY

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 127

Titel

Coupling Effects of CH4/H-2/Ar Gas Ratios and Hot Filament-Substrate Distance on the Growth of Nanocrystalline Diamond

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Abstrakt

Due to the special shape of **cutting** or **grinding tools** used nowadays, hot filament (HF)-substrate distance is usually unavoidable during the process of diamond deposition by hot filament chemical vapor deposition (HFCVD), which will **lead** to difficult deposition process for nanocrystalline diamond (NCD). Based on this problem, the coupling effects of different CH4/H-2/Ar gas ratios and HF-substrate distances on the growth of NCD films are systematically studied. SEM and Raman are used to analyze the surface morphology andsp(3)/sp(2)contents of the diamond films deposited on different areas of each specimen. The results indicate that the proper increase of HF-substrate distance and concentration of CH(4)or Ar encourage the growth of NCD. Under the condition of lower concentration of CH(4)or Ar, NCD with uniform grain size can also be realized at a certain range of HF-substrate distance. A graph that shows the growth conditions of MCD, MCD/NCD and NCD is creatively presented by summarizing the deposition parameters and experimental results. This work provides a path to coat NCD onto the special-shaped cutting or grinding tools by HFCVD.

Veröffentlichungsjahr

2020

Quelle

JOURNAL OF SUPERHARD MATERIALS

Klassifikation

Materials Science

Schlagworte des Autors

KEYWORDS
hot filament chemical vapor deposition (HFCVD)
nanocrystalline diamond (NCD)
hot filament (HF)-substrate distance
grain size

Thesaurusbegriffe

CHEMICAL-VAPOR-DEPOSITION
CEMENTED TUNGSTEN CARBIDE
LOW-TEMPERATURE
FILMS
FABRICATION
RAMAN

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 128

Titel

DEVELOPMENT OF THE TECHNOLOGY FOR MANUFACTURING AND INTRODUCING A NEW CLASS OF **TOOLS** WITH CVD DIAMOND FOR **GRINDING** HIGH-PRECISION GEAR **WHEELS** OF SPECIAL GEAR UNITS

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Abstrakt

Introduction. The trueing **tool** used by machine-building enterprises of Ukraine creates a fundamental constraint for improving the accuracy of shaping of the working profile of **abrasive wheels** and, accordingly, the accuracy of the products made with its use. Problem Statement. The creation of CVD diamonds **tools** is in the process of being finalized by leading foreign developers. This class of CVD diamond trueing **tool** has never been developed or manufactured in Ukraine. Purpose. The development of a technology for manufacturing precision products from.VD diamond for providing the process of **grinding** the gear **wheels** of special reducer units at **mechanical** engineering enterprises. Materials and Methods. Techniques and special stands for precise positioning of **elements** from CVD diamond and for testing the trueing instrument, methods for determination of metallic binder's structure. Results. The rational positioning of CVD diamond **elements** on the cases of complex shapes has been studied. The manufactured **tools** for trueing abrasive wheel have been finished and tested. It has been shown that the use of such elements provides a high resistance to the erosion influence of sludge in the trueing area and is expedient to be used in contact with the main components of abrasive wheels, due to exceptional tribological characteristics. The use of structured metallic binders has been shown to provide low vibrations in the trueing area and a stable and reproducible topography of the cutting surface of an abrasive tool with a large number of cutting edges and with the capability of directional influence on the orientation of the edges by selecting efficient trueing conditions. Conclusions. For the first time in Ukraine, at the Bakul Institute for Superhard Materials of the NAS of Ukraine, the truing tools equipped with CVD diamond elements have been created and adapted to the processing chains of high-precision gear wheels of reducer units with enhanced operational characteristics, which enable replacing the imported parts at the machine-building enterprises of Ukraine.

Veröffentlichungsjahr

2020

Quelle

SCIENCE AND INNOVATION

Klassifikation

Science & Technology - Other Topics

Schlagworte des Autors

CVD DIAMOND
structured metallic binders
superhard materials

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 129

Titel

Effect of **cutting** process on the stress corrosion susceptibility of AISI 304L stainless steel.

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Abstrakt

During manufacturing of a component, **cutting**, turning, **grinding**, and milling **operations** are inevitable and these **operations** induce surface residual stresses. In this study, it is shown that, depending on the process employed for **cutting**, residual stresses generated at the **cut** surfaces can vary widely and they can, in turn, make the **cut** surfaces of austenitic stainless steel (SS) prone to stress corrosion cracking (SCC). An austenitic SS 304L plate was **cut** using three different procesess: bandsaw **cutting**, **cutting** using the **cut-off wheel**, and shearing. Surface residual stress measurement using the X-ray diffraction (XRD) technique is carried out close to the **cutting** edges and on the cross-section. SCC susceptibility studies were carried out as per ASTM G36 in 45% boiling magnesium **chloride** solution. Optical microscopic examination showed the presence of cracks, and confocal microscopy was used to measure the depth of cracks. The study confirmed that high tensile residual stresses present in the **cut** surfaces produced by cut-off wheel and shear cutting make the surfaces susceptible to SCC while the surfaces produced by bandsaw cutting are resistant to SCC. Hence, it is shown that there is a definite risk of SCC for product forms of austenitic SS with cut surfaces produced using cutting processes that generate high tensile residual stresses stored for a long period of time in a susceptible environment.

Veröffentlichungsjahr

2020

Quelle

Materials and Corrosion * Band 71 (2020) Heft 7, Seite 1081-1090 (10 Seiten, 10 Bilder, 2 Tabellen)

Klassifikation

3KEB Staehle, Stahlguss
3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3KXU Chemische Werkstoffeigenschaften, Korrosions- und Erosionsverhalten

Schlagworte des Autors

Magnesiumchlorid
Eigenspannung
Chrom-Nickel-Stahl
nichtrostender Stahl
Spannungsrisskorrosion
Spannungskorrosion
Scheren
Roentgendiffraktion
Oberflaechenspannung
Bandmesser
Trennscheibe
Risstiefe
Zugspannung
austenitischer nicht rostender Stahl
konfokale Mikroskopie

Thesaurusbegriffe

nicht belegt

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 130

Titel

Influence of the **cutting** direction angle on the **tool** wear behavior in face plunge **grinding** of PcBN

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Abstrakt

Polycrystalline cubic boron nitride (PcBN) is a highly wear resistant material. Due to its high hardness this material is typically machined with diamond **grinding tools**. The high hardness and high-temperature hardness of PcBN **leads** to a significant **grinding tool** wear. The applied **cutting** direction angle during face plunge **grinding** offers the possibility to influence the geometry of the contact area between the **grinding tool** and the PcBN workpiece. However, the underlying principal mechanisms and influences of parameters are not fully understood today. The contact zone geometry is described by the width of **cut** and the geometric contact length. The paper provides a mathematical description of these two parameters for S-shapes PcBN **cutting** inserts depending on the workpiece geometry and the **cutting** direction angle. It is shown that the contact length significantly determines the wear mechanism.

Veröffentlichungsjahr

2020

Quelle

WEAR

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

GRINDING
PcBN
Tool wear
Cutting mechanisms
Vitrified bond

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 131

Titel

Effects of electric **discharge** dressing parameters on polycrystalline diamond micro-tool surface topography and their micro-grinding performances

Autor

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Abstrakt

Polycrystalline diamond (PCD) micro-grinding **tools** are shaped by using different electro-discharge machining processes, among which wire electro-discharge **grinding** (WEDG) process is widely accepted due to its capability of producing highly precise, ultra-thin and dimensionally accurate **tools**. Observing the effects of different WEDG conditions on the **tool** surface and analyzing the **tool**'s topographic features relevant to micro-grinding are of utmost importance. Current study deals with dressing of polycrystalline diamond **tool** blanks at different combinations of wire tension and **discharge** energy to observe the effects of dressing parameters on the **tool** surface morphology and statistics. Surface roughness, ridge type surface defects and diametrical error in the fabricated **tool** are analyzed with respect to **discharge** energy and wire tension. High wire tension produces **tools** with consistence surfaces and desired diameter. Binder material cobalt is efficiently melted and flushed out from the **tool** surface at high wire tension, which leads to proper segregation and protrusion of diamond abrasives from the surface. Static abrasive grit density measured by processing the 3D surface data of the tool is found to be approximate to 165-170 per mm, as compared to theoretically determined value of approximate to 200 per mm. Micro-slot grinding experiments are carried out on BK7 glass, to quantify the effects of the dressing parameters on the micro-grinding performances of the PCD micro-tools. Cutting forces for all the tools are found to be within 1 N whereas normal force exceeds beyond 1 N. Cutting forces are found to be higher for the tools dressed at high wire tension due to large diameter of the tool as compared to that of undersized tool obtained at low wire tension. Cutting nature is found to be mix of ductile-brittle for the machining conditions adopted in this paper.

Veröffentlichungsjahr

2019

Quelle

INTERNATIONAL JOURNAL OF REFRACTORY METALS & HARD MATERIALS

Klassifikation

Materials Science
Metallurgy & Metallurgical Engineering

Schlagworte des Autors

PCD MICRO-TOOL
WEDG
Discharge energy
Watershed algorithm
Grit density
Surface roughness

Thesaurusbegriffe

GLASS
PARALLEL
BRITTLE
PCD

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 132

Titel

Fabrication of novel resinous diamond composites with acrylonitrile butadiene styrene/polyvinyl chloride/dioctyl phthalate/diamond by hot pressing molding

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Abstrakt

Uniform distribution of diamond grains is difficult to achieve using traditional fabrication of the micro grinding wheel. The design and performance of novel resinous diamond composites (RDCs) fabricated by hot pressing molding were studied to fabricate micro resinous diamond grinding wheels. The physical and mechanical properties of RDCs were analyzed by constructing and simulating five kinds of RDCs, including acrylonitrile butadiene styrene (ABS)/polyvinyl chloride (PVC)/dioctyl phthalate (DOP)/diamond materials with different mass ratios. Diamond grains presented good compatibility with the ABS-PVC-DOP copolymer, which resulted in improved mechanical properties of RDCs. RDC1-RDC5 samples were fabricated, and their hardness, surface roughness, and infrared spectra were analyzed. The optimal mass ratio of ABS/PVC/diamond/DOP for fabricating RDCs was 62.5/18.6/10.6/8.3. The results provide guidance in fabricating novel materials for resinous diamond grinding wheels with desirable performances for precision and ultraprecision machining.

Veröffentlichungsjahr

2019

Quelle

JOURNAL OF MATERIALS RESEARCH

Klassifikation

Materials Science

Schlagworte des Autors

POLYMER
simulation
hot pressing

Thesaurusbegriffe

MECHANICAL-PROPERTIES
GRAPHENE OXIDE
ABS
FORCE
SIMULATION
DENSITY
COMPASS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 133

Titel

Improving the effectiveness of combined **grinding** processes for processing superhard materials

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Abstrakt

Metal bond diamond **grinding wheels**, which are used to process superhard materials, maintain their **cutting** ability through an electrochemical process that removes the bonds to reveal new grains on the working surface. The effectiveness of this method can be improved by increasing the material removal rate and decreasing the consumption of **grinding** grains through the introduction of a periodic impact load on the **wheel**. A proof-of-concept laboratory device was prepared, and experiments were carried out with the application of constant or periodic pressure. The experimental results clearly indicate up to a 1.8-fold increase in the material removal rate and up to a 1.9-fold decrease in the specific consumption of diamonds using the proposed periodic pressure method instead of the method with a constant load. By suitably altering the amplitude and frequency of the periodic load, a nearly 10-fold increase in the removal rate and decrease in the diamond consumption can be achieved. Furthermore, the study reveals the optimal conditions for practical implementation of the process. The analysis indicates that through the application of a periodic load with controlled amplitude and frequency on a wheel, better and more efficient use of a grinding wheel can be achieved, leading to a significant reduction in the specific cost of the wheel dressing procedure.

Veröffentlichungsjahr

2019

Quelle

JOURNAL OF MANUFACTURING PROCESSES

Klassifikation

Engineering

Schlagworte des Autors

SUPERHARD MATERIALS
Synthetic polycrystalline diamond
Diamond **wheel**
Grain self-sharpening
Percussion load
Contact pressure

Thesaurusbegriffe

DIAMOND GRAIN
WHEEL
SIMULATION
MECHANISM
WEAR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 134

Titel

Morphological evolution and **grinding** performance of vitrified bonded microcrystal alumina **abrasive wheel** dressed with a single-grit diamond

Autor

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Abstrakt

Dressing experiments under different conditions were carried out on a vitrified bonded microcrystal alumina **abrasive wheel** with a single-grit diamond dresser. The **grinding** performance of the as-dressed **abrasive wheels** was investigated. The dressing force, **grinding** force and the surface morphology of **abrasive wheel** and machined workpiece were studied to shed light on the relationship among the dressing processing vectors, morphology of **abrasive wheel** and the **grinding** performance. The results obtained show that the dressing forces increase with the increasing volume of the **abrasive wheel** material removed per unit time. The sensitive analysis reveals that the dressing feed speed take a greater effect than the single dressing depth on the dressing force. The self-sharpness of vitrified bonded microcrystal alumina **abrasive wheel** brings into some functions under certain dressing conditions, but a deep dressing depth would **lead** to an excessive **abrasive** self-sharpness, i.e. **abrasive** grits fall off and embed into the workpiece surface.

Veröffentlichungsjahr

2019

Quelle

CERAMICS INTERNATIONAL

Klassifikation

Materials Science

Schlagworte des Autors

MICROCRYSTAL ALUMINA **ABRASIVE**
Dressing
Single-grit diamond
Dressing force
Surface morphology

Thesaurusbegriffe

PROCESS MODEL
WEAR
PARAMETERS
TOPOGRAPHY
MICROSTRUCTURE
GRINDABILITY
MECHANISMS
INTENSITY
BEHAVIOR
STRESS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 135

Titel

Progress in pressureless sintering of boron carbide ceramics - a review

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Abstrakt

Boron carbide (B4C) ceramics has many outstanding performance, such as extremely high hardness, low density, high melting point, high elastic modulus, high thermoelectromotive force, high chemical resistance, high neutron absorption cross section, high impact and excellent wear resistance. Therefore, B4C ceramics can be used in various industrial applications, such as lightweight ceramic armour, high temperature thermocouples, neutron absorber, reactor control rods in nuclear power engineering, polishing media for hard materials, **abrasive** media for lapping and **grinding**, and wear resistant components (blasting nozzles, die tips and **grinding wheels**). Pressureless sintering is the method with industrialised application value for B4C ceramics, however, it is impossible to sinter pure B4C ceramics to high densities without **additives** by pressureless sintering. So sintering **additives** must be used to promote the densification of B4C ceramics. The different sintering **additives** used to promote the densification of boron carbide will be described in this review, including carbon additives, metallic additives, oxide additives, non-oxide additives, combined additives and rare earth oxide additives. Finally, the recent research trends for sintering methods and sintering additives of B4C ceramics will also be proposed.

Veröffentlichungsjahr

2019

Quelle

ADVANCES IN APPLIED CERAMICS

Klassifikation

Materials Science

Schlagworte des Autors

BORON CARBIDE (B4C)
pressureless sintering
additive
relative density
mechanical property

Thesaurusbegriffe

MECHANICAL-PROPERTIES
B4C-TIB2 COMPOSITES
SIC CERAMICS
MICROSTRUCTURE
DENSIFICATION
B4C
BEHAVIOR
HARDNESS
STRENGTH
RESISTANCE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 136

Titel

Towards the understanding of creep-feed deep **grinding** of DD6 nickel-based single-crystal superalloy

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Abstrakt

DD6 nickel-based single-crystal superalloy has been treated as an ideal material for the high-valued and high-performed aero-engine components; however, it was found difficult to remove material from the DD6 nickel-based single-crystal superalloy in **cutting** and **grinding**. Although creep-feed deep **grinding** (CFDG) has been widely employed for various nickel-based superalloys (i.e., Inconel 718, DZ4, IN738LC), very few efforts however have been focused on the nickel-based single-crystal superalloy. With this, this paper focuses on CFDG of DD6 nickel-based single-crystal superalloy to gain the more in-depth understandings, targeting **grinding** force, specific **grinding** energy, **grinding** temperature, surface integrity, and **wheel** wear condition. Scheduled experimental observation proved that (i) microcrystalline alumina **abrasive wheel** generally shows more superior **grinding** performances in aspect to **grinding** force, force ratio, and specific **grinding** energy than that of brown alumina **abrasive wheel**; (ii) **grinding** temperature is decreased by 35% by using the microcrystalline alumina abrasive wheel compared to brown alumina abrasive wheel, and therefore the microcrystalline alumina abrasive wheels have the potential to be applied in the high-efficiency grinding; (iii) the surface ground by the microcrystalline alumina abrasive wheel is found smooth without any grinding-induced damage; and (iv) microcrystalline alumina abrasive wheels easily lead to micro-fractures and therefore result in better self-sharpness ability and longer service life in CFDG of DD6 nickel-based single-crystal superalloy.

Veröffentlichungsjahr

2019

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

SINGLE-CRYSTAL SUPERALLOY
Creep-feed deep **grinding**
Alumina **abrasive wheel**
Grinding force
Grinding temperature

Thesaurusbegriffe

OF-THE-ART
SURFACE INTEGRITY
TEMPERATURE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 137

Titel

Wear mechanisms of CVD diamond **tools** for patterning vitrified corundum **grinding wheels**

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Abstrakt

Grinding is one of the last manufacturing steps in the production chain of modern workpieces. Thus, product quality is more important compared to the productivity and is therefore the limiting factor. Exemplarily, thermal load due to the **grinding** process **leads** to thermal induced damage such as **grinding** burn or tensile residual stresses. Previous studies showed the capability of **grinding wheels** with **mechanically** induced patterns to reduce the thermal load on a workpiece throughout the **grinding** process. In this paper the patterning **tool** is investigated in regard to the grade of CVD thick layer diamond (CVD-D). In detail, three CVD-D grades are investigated in terms of their features and their wear mechanisms. SEM and X-Ray diffractometry as well as Raman measurements are conducted. A wear mechanism of surface fatigue is found to be dominant. Pole figures as well as the microscopic measurements indicate a correlation between the texture of the CVD-D grade and the wear extension.

Veröffentlichungsjahr

2019

Quelle

WEAR

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

RESIDUAL-STRESS
RAMAN-SPECTROSCOPY

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 138

Titel

An experimental study of the effects of dressing parameters on the topography of **grinding wheels** during roller dressing

Autor

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Abstrakt

Vitreous-bonded **grinding wheels** are widely used for machining features on aerospace components achieving high material removal rates under high pressure **coolant**. Dressing is a vital stage in the **grinding** process to ensure a consistent **wheel** topography and performance. However, the effects of roller dressing on functional performance of vitreous **grinding wheels** as well as its influence on different **abrasive** grit morphologies have not been fully characterised. This paper studies the influence of dressing parameters on the topography, morphology and characteristics of the surface of different vitrified **abrasive wheels** in order to better understand the process and therefore optimise the preparation of **grinding wheels** for industrial machining. Alumina **grinding wheels** with conventional and engineered grit shapes were dressed at two different infeed rates over a range of seven different speed ratios (from -0.8 to +1). An experimental methodology has been developed incorporating a range of known techniques to define the abrasive wheel condition including measured power consumption and ground graphite coupons as well as using optical microscopes to measure grain fracture flats, peak density and abrasive grain shape. It has been found that power consumption of the grinding wheel spindle increases at higher infeed rates and speed ratios. This leads to increased fracturing of the grains and whole-grain pull out. According to the results the infeed rate has a more substantial effect on wheel topography than speed ratio and the response of engineered grit morphologies to dressing is dependent on grit orientation. (C) 2017 The Society of Manufacturing Engineers. Published by Elsevier Ltd. All rights reserved.

Veröffentlichungsjahr

2018

Quelle

JOURNAL OF MANUFACTURING PROCESSES

Klassifikation

Engineering

Schlagworte des Autors

DRESSING
Grinding
Topography

Thesaurusbegriffe

SURFACE MEASUREMENT TECHNIQUES
WEAR
GENERATION
SIMULATION
MODEL

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 139

Titel

Analysis of rectangular-profiled high-strength **grinding wheels** designed for crankshaft **grinding** applications

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Abstrakt

The continued development of high-speed rotating **grinding wheels** for **grinding** crankshafts has led to the use of high-performance materials such as carbon fiber matrix structures with **abrasive** segments bonded to them. The use of porous reinforcing centers in order to improve safety and increase rotational speed to gain the benefits associated with high-speed **grinding** is investigated. A 2-D finite-element model is developed which calculates rotational stresses and compares them with stresses predicted using closed-form solutions developed by Chree and Frost and Whitcomb for rotating rings. A 3-D finite-element model is developed for more complex **grinding wheels** that contain a porous reinforcing center that predicts stresses and deflections with remarkable accuracy. The paper also takes account of the strength of biaxially stressed brittle **abrasive** materials where the geometry of segments differs significantly from the prismatic geometry associated with flexural bending strength test pieces that are subjected to three-point loading conditions. Owing to lower design stresses and associated rotational speeds with high survival probability of ceramic abrasive structures (> 99.99%), it is assumed that the failure of abrasive segments is dominated by volume and/or surface flaws. The results predict accurate safety factors than previously calculated owing to the geometry of the abrasive segment loaded under plane stress conditions. The paper will be of interest to manufacturers who design and make such complex grinding wheel structures.

Veröffentlichungsjahr

2018

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

ADVANCED MANUFACTURING
Crankshafts
Grinding
Design
Safety
Abrasives
Vitrified cBN

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 140

Titel

CROSSING AXES OF WORKPIECE AND **TOOL** AT **GRINDING** OF THE CIRCULAR TROUGH WITH VARIABLE PROFILE

Autor

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Abstrakt

In the article the method of **grinding** with crossed axes of the **tool** and the workpiece got further developed. The work **discloses** a method of processing details having an external surface with a profile in the form of an arc of a circle of variable radius (for example, rolls of pipe rolling mills). The particular three-dimensional geometric models of the processing, shaping and profiling of **abrasive wheels** have been developed. A method for controlling the **grinding** process, which ensures the removal of allowances along equidistant curves has been offered. The developed method of **grinding** provides a constant depth of **cutting** according to the coordinate of profile processing. This is achieved at the expense of the synchronous inclination of the **wheel** and its insertion by the size of the allowance. The diameter of **grinding wheel** affects on the maximum angle of orientation of the **wheel** has been proven. It has been shown that increasing the diameter of the **abrasive wheel** has led to a slight decrease in value orientation angle.

Veröffentlichungsjahr

2018

Quelle

ACTA MECHANICA ET AUTOMATICA

Klassifikation

Engineering

Schlagworte des Autors

CIRCULAR TROUGH
Grinding
Equidistant Curves
Cutting Edge
Abrasive Surface
Abrasive Materials
Crossed Axes
Abrasive Wheel
Orientation Angle
Grinding Performance

Thesaurusbegriffe

SIMULATION
MODEL

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 141

Titel

Cylindrical plunge **grinding** of twist free surfaces by structured **wheels**

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Abstrakt

The high specific energy expended in **grinding** **leads** to large heat generation in contact zone of **grinding** **wheel** and workpiece, which is the great challenge in the **grinding**. Aiming to reduce the **grinding** forces and temperature, employing structured **wheels** has lately become a subject of special interest. Creation of spiral form structures on the surface of **grinding** **wheels** is one of the structuring methods showing great advantages in **grinding** in terms of **grinding** force and temperature reduction. However, transfer of the spiral form of the **wheel** surface to the workpiece surface is a problem with this method. This paper focuses on **grinding** of twist free surfaces by structured **grinding** **wheels**. The kinematics of **grinding** by the structured **wheels** was analyzed and simulated with the help of MATLAB. It was found that the ratio of the **grinding** **wheel** rotational speed to the workpiece rotational speed plays the key role in **grinding** of twist free surfaces. The experimental results proved that using the kinematic simulation, the appropriate grinding parameters could be derived to grind a twist free surface.

Veröffentlichungsjahr

2018

Quelle

PRECISION ENGINEERING-JOURNAL OF THE INTERNATIONAL SOCIETIES FOR PRECISION ENGINEERING AND NANOTECHNOLOGY

Klassifikation

Engineering
Science & Technology - Other Topics
Instruments & Instrumentation

Schlagworte des Autors

TWIST FREE
Lead free
Structuring **grinding** **wheels**
Cylindrical **grinding**

Thesaurusbegriffe

TOOLS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 142

Titel

Influence of high-energy ball milling and **additives** on the formation of sphere-like alpha-Al2O3 powder by high-temperature calcination

Autor

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Institution

nicht belegt

Abstrakt

In comparison with the typically worm-like alpha-Al2O3 powders formed from an unground Al(OH)(3) precursor calcined at 1450 degrees C, spherical alpha-Al2O3 powders with similar to 1 mu m in size were prepared by the calcination of a ground Al(OH)(3) precursor with 5 wt.% [NH4](+) **BF4**- under the same calcination conditions. The influence of a high-energy ball milling pretreatment as well as of the **additives** on the morphological evolution of alpha-Al2O3 powders was studied using the commercial precursor Al(OH)(3) as raw material. The results indicate that the morphology of alpha-Al2O3 powders is closely related to the morphology of the Al(OH)(3) precursor and to the introduction of different **additives**. The refinement of the Al(OH)(3) precursor in aggregate size and of the primary crystal size by high-energy ball milling has effectively suppressed the neck growth of alpha-Al2O3 grains. In contrast to the findings made previously with the introduction of 5 wt.% [NH4]**Cl**-+(-), the morphology of the alpha-Al2O3 particles could be significantly improved from a ground Al(OH)(3) precursor with the addition of 5 wt.% [NH4]+BF4-, which resulted in the formation of spherical alpha-Al2O3 powders with 1 mu m size at 1450 degrees C.

Veröffentlichungsjahr

2018

Quelle

ZEITSCHRIFT FUR NATURFORSCHUNG SECTION B-A JOURNAL OF CHEMICAL SCIENCES

Klassifikation

nicht belegt

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

nicht belegt

Recherchedatum

12.03.2021

Dokument Nr. 143

Titel

A new algorithm to solve the **grinding wheel** profile for end mill groove machining

Autor

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Abstrakt

Groove is one of the key structures of end mills. Some of them could be machined by standard **grinding wheels** (1A1 or 1V1 type), some others must design new **wheel** profiles. Based on the enveloping and analytic geometry theories, a novel algorithm was proposed to calculate the **wheel** profiles for special groove machining. The machining process was analyzed, the contact line principles were **discussed**, and the calculation procedure was detailed. In addition, the algorithm was implemented on a personal computer by using the MATLAB programming language. Therefore, the desired **wheel** profile could be computed automatically with four input parameters, namely, the groove **lead**, the **wheel** axial vector, the point coordinates on the **wheel** axis, and the **discrete** points on the groove profile (or groove profile expression). The proposed algorithm and the corresponding program were finally verified by three different examples. The results demonstrated good agreements with the practical **wheel** profiles.

Veröffentlichungsjahr

2017

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

ENVELOPING
Contact line
Wheel profile
End mill
Groove machining

Thesaurusbegriffe

DESIGN
SIMULATION
CARBIDE
TOOLS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 144

Titel

Activation of Magnesium Lignosulfonate and Kraft Lignin: Influence on the Properties of Phenolic Resin-Based Composites for Potential Applications in **Abrasive** Materials

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Abstrakt

Magnesium lignosulfonate and kraft lignin were activated by different oxidizing agents for use in phenolic resin composites used for the production of **abrasive** components. The physicochemical properties of the oxidized materials were analyzed by Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS), dynamic **mechanical-thermal** analysis (DMTA) and inverse gas chromatography (IGC). The homogeneity of the model **abrasive** composites containing the studied products was assessed based on observations obtained using a scanning electron microscope (SEM). FTIR and XPS analysis of the oxidized products indicated that the activation process **leads** mainly to the formation of carbonyl groups. The IGC technique was used to assess changes in the surface energy and the acid-base properties of the studied biopolymers. The changes in the acid-base properties suggest that more groups acting as electron donors appear on the oxidized surface of the materials. DMTA studies showed that the model composites with 5% magnesium lignosulfonate oxidized by H2O2 had the best thermomechanical properties. Based on the results it was possible to propose a hypothetical mechanism of the oxidation of the natural polymers. The use of such oxidized products may improve the thermomechanical properties of abrasive articles.

Veröffentlichungsjahr

2017

Quelle

INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES

Klassifikation

Biochemistry & Molecular Biology
Chemistry

Schlagworte des Autors

MAGNESIUM LIGNOSULFONATE
kraft lignin
activation agents
abrasive tool components
physicochemical and morphological characteristics

Thesaurusbegriffe

PHYSICOCHEMICAL CHARACTERIZATION
PERMANGANATE OXIDATION
MECHANICAL-PROPERTIES
GAS-CHROMATOGRAPHY
PRODUCTS
WOOD
ADHESIVES
BAGASSE
CHITIN

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 145

Titel

Experimental and modeling characterization of wear and life expectancy of electroplated CBN grinding wheels

Autor

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Abstrakt

Wear and life expectancy of a nickel-electroplated monolayer of cubic boron nitride grinding wheels are characterized based on the wheel surface topological evolution, observed after grinding Inconel 718 super alloys. The wheel is for surface or cylindrical grinding, and having 250 mm diameter, 10 mm thickness and B40/50 coarse grit size. A unique grit-workpiece interaction process, leading to a non-uniform spatial distribution of the grit wear has been identified. Largest grits have been observed to pullout rapidly, resulting in load redistribution to their surroundings, and leading to the attritious and fracture wear phase. The detailed analysis showed that the stresses on the cutting grits arising from the thermal shock are 3-5 folds those arising from mechanical cutting forces, and reach an order of magnitude differences for the high efficiency deep grinding (HEDG) process. It is also found that the grit wear rate is primarily dependent on the workpiece feed rate rather than the grinding wheel speed. The total wheel life is then constructed as the sum of pullout life (Phase-I) and attritious and fracture wear life (Phase-II). Model predictions for the total wheel life compare well to the experimental observations. This facilitates comparisons of different types of grinding configurations and design space exploration. As an example, the HEDG process is compared to a regular high speed grinding, and it is observed that HEDG configuration can deliver much higher material removal for the same amount of wheel wear.

Veröffentlichungsjahr

2017

Quelle

INTERNATIONAL JOURNAL OF MACHINE TOOLS & MANUFACTURE

Klassifikation

Engineering

Schlagworte des Autors

GRINDING WHEEL WEAR
Cubic boron nitride
Nickel alloys
Life expectancy
Monolayer electroplated super-abrasive
High speed grinding

Thesaurusbegriffe

BONDING MECHANISM
SILICON-NITRIDE
DIAMOND WHEELS
PART 1
STRESSES
GRAINS
TOOLS
PERFORMANCE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 146

Titel

Experimental and numerical analysis of thermal phenomena in the wear of single point diamond dressing **tools**

Autor

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Abstrakt

Grinding technologies represent a critical step in the production of high added-value and high precision parts for strategic industrial sectors such as aerospace, automotive, biomedical, and wind generation. Whilst a number of factors related to the **grinding wheel** are important for optimizing the **grinding** process, there is no doubt that the **wheel** surface topography is the most influential factor. Surface topography is induced not only by the nature of the **wheel** itself, but also, more importantly, by the dressing process. Dressing is periodically carried out in order to recover the **abrasive** capacity of the **wheel** once excessive wear of **abrasive** grits has occurred. The high temperatures and contact forces present in dressing **lead** to wear of the diamond dressing **tool**, which in turn damages the topography of the **wheel** surface. Although the scientific literature has paid attention to the phenomena involved in dressing **tool** wear, some issues are still in need of explanation. Thus, the aim of the present study was to address the unresolved issue concerning the relationship between dressing temperatures and dressing tool wear. Using a combined empirical and modeling approach, the work reported here shows that temperatures on the surface of the dressing tool can be reduced by as much as 35% when using high conductivity materials in the tool holder. In addition, a methodology has been devised in order to estimate accurate values of the heat partition ratio towards the diamond dressing tool. The results show that the heat partition depends primarily on the dressing mechanism involved. Its values range from 0.97 (when friction between the dressing tool and the grinding wheel prevails) to 0.54 when grain breakage and pull-out occur at higher dressing depths. It has been analyzed and measured the wear suffered by the diamond under interesting designed tests. It has been demonstrated that the effective reduction of temperatures during process led us to take a lower wear rate of the diamond. (c) 2017 The Society of Manufacturing Engineers. Published by Elsevier Ltd. All rights reserved.

Veröffentlichungsjahr

2017

Quelle

JOURNAL OF MANUFACTURING PROCESSES

Klassifikation

Engineering

Schlagworte des Autors

DIAMOND
Temperature
Dressing
modelling
Wear

Thesaurusbegriffe

BONDED **GRINDING WHEELS**
SURFACE
STEEL
HEAT

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 147

Titel

Experimental investigation on high-efficiency **grinding** of Inconel 718 with heat pipe **grinding wheel**

Autor

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Abstrakt

Grinding heat is a significant problem for **grinding** difficult-to-machine materials such as nickel-based superalloys, which restricts their applications. A majority of existing **cooling** methods ensure **cooling** by simply increasing the volume of **coolant**. However, lubricants often lose efficacy due to film boiling and have adverse health and environment effects. To dissipate **grinding** heat in the contact zone and guarantee workpiece surface quality, a novel **cooling** method that dissipates **grinding** heat assisted by forming rotating heat pipe inside the **grinding wheel** (HPGW) is proposed. Tests were performed to determine its heat transfer capacity in high-efficiency **grinding** of Inconel 718 alloy. The results show that **grinding** with HPGW **leads** to lower **grinding** temperatures and lower thermal damages to the workpiece when compared to **grinding** with non-HPGW. Better heat transfer capacity of HPGW is explained by heat transfer resistance analysis for both **grinding wheels**. The analysis proves that the value of HPGW is one order of magnitude lower than non-HPGW. Furthermore, in-depth studies of the ground surface showed no changes in microstructure or microhardness for the workpiece when using HPGW, whereas different degrees of burn were seen as indicated by different temper colors and corresponding changes in microstructure and microhardness.

Veröffentlichungsjahr

2017

Quelle

MACHINING SCIENCE AND TECHNOLOGY

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

INCONEL 718 ALLOY
grinding heat
heat pipe **grinding wheel**
heat transfer resistance
microhardness
microstructure

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 148

Titel

High-performance **grinding** of a 2-m scale silicon carbide mirror blank for the space-based telescope

Autor

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Abstrakt

Silicon carbide (SiC) is a competitive candidate material for building the space-based reflecting mirrors. However, SiC is also a typical difficult-to-machine material due to its extreme hardness. When SiC workpiece is machined by **grinding**, the **wheel** wears rapidly which **leads** to a deterioration of surface form accuracy. **Grinding** efficiency also becomes extremely low due to the frequent truing and dressing of **grinding wheels**. To achieve high-performance **grinding** process capable of producing accurate surface at high **grinding** efficiency, an ultrasonic vibration-assisted fix-point **grinding** technology was developed in this study. **Wheel** wear observation indicated that the **wheel** needs not to be dressed during the whole **grinding** cycle. Moreover, a laser tracker was used to achieve an on-machine measurement of the surface form error. A CNC **tool** microset was adopted to evaluate the **wheel** wear amount. On the basis of the above two results, surface form error could be predicted before **grinding**, and thus, an in-process compensation of surface form error was carried out. Using the above-mentioned grinding strategies, a SiC mirror blank with an aperture diameter of 2 m was successfully ground to a form accuracy of 18 mu m in peak-to-valley (PV). Therefore, this work provides an efficient and economical solution for grinding the large-scale SiC aspherical surfaces.

Veröffentlichungsjahr

2017

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

HIGH-PERFORMANCE **GRINDING**
Wheel wear compensation
Five-axis machining
Tool path generation
Reaction-bonded SiC

Thesaurusbegriffe

SURFACE-ROUGHNESS
SUBSURFACE DAMAGE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 149

Titel

Microstructuring strategies of cBN **grinding wheels**

Autor

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Abstrakt

A picosecond laser is utilized for microstructuring of a metal-bonded cBN **grinding wheel**. Two types of structure, both with 15% reduction of the **wheel** surface area, but with different patterns are produced. The effect of structuring on surface roughness and **grinding** forces in the cylindrical plunge **grinding** of 100Cr6 is studied. Reducing the **abrasive** layer area (15% reduction of the **wheel** surface area) causes the reduction of **grinding** forces up to 60%, while the roughness values increase up to 30%. The concentrated structuring approach led to better structure persistence of the **wheel** structure in comparison with the uniformly distributed structure. Furthermore, temperature measurement demonstrated that microstructuring **leads** to reduced **wheel** and workpiece contact zone temperatures.

Veröffentlichungsjahr

2017

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

PICOSECOND YB:YAG LASER
Thermal ablation
Microstructuring
cBN **grinding wheel**
Metal bond
Grinding force
Grinding temperature
100Cr6

Thesaurusbegriffe

TOOLS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 150

Titel

A novel ultrasonic-assisted dressing method of electroplated **grinding wheels** via stationary diamond dresser

Autor

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Abstrakt

To achieve fine surface roughness, tungsten carbides are mostly ground with resin or vitrified bonded diamond **wheels**. The use of cost-effective electroplated diamond **tools** (single layer) is, despite some specific improvements, such as geometrical flexibility, excellent profile holding, large chip spaces and good **cooling** characteristics, which allows even dry **grinding** processes, unusual when fine surface roughness is desired. It is generally due to the high grain protrusion (approx. 40 % compared to approx. 15 % with resin bonded or vitrified diamond **wheels**) which **leads** to the induced grooves on the ground surface combined with high surface roughness. Another disadvantage of single-layer bonded **grinding wheels** is their low range of dress ability. This article describes a possibility to overcome the drawbacks of the electroplated diamond **wheels** by ultrasonic-assisted fracturing of the diamond grains. For this purpose, an ultrasonic-assisted stationary dresser is used. The ultrasonic unit generates hits on the diamond grains. The grinding wheel rotates with a very slow circumferential speed, which is uncommon in conventional dressing methods, so that the grains are fractured by the oscillating movement of the dresser. However, numerous sharp cutting edges are generated due to the generated hits. This method allows the generation of cutting edges on relatively course grain sizes (in this case, D251) that have the properties of smaller grain sizes, and therefore, surfaces with lower roughness values are produced while the advantages of the electroplated grinding wheels, such as good profile keeping and good cooling characteristic, are maintained. Additionally, the service life of the electroplated wheel can be increased and the grinding parameters can be kept nearly constant. Experimental analyses have shown that the grinding of tungsten carbide with fractured electroplated D251 diamonds enables fine surface roughness from Ra < 0.1 mu m and Rz < 0.8 mu m.

Veröffentlichungsjahr

2016

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

DRESSING
Ultrasonic-assisted dressing
Electroplated diamond **grinding wheel**
Grinding
Tungsten carbide
Fracturing of diamonds

Thesaurusbegriffe

TUNGSTEN CARBIDE
SMALL HOLES
VIBRATION
PERFORMANCE
WEAR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 151

Titel

Application potential of coarse-grained diamond **grinding wheels** for precision **grinding** of optical materials

Autor

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Abstrakt

Fine-grained resin bonded diamond **tools** are often used for ultra-precision machining of brittle materials to achieve optical surfaces. A well-known drawback is the high **tool** wear. Therefore, **grinding** processes need to be developed exhibiting less wear and higher profitability. Consequently, the presented work focuses on conditioning a mono-layered, coarse-grained diamond **grinding wheel** with a spherical profile and an average grain size of 301 A mu m by combining a thermo-chemical and a **mechanical-abrasive** dressing technique. This processing **leads** to a run-out error of the **grinding wheel** in a low-micrometer range. Additionally, the thermo-chemical dressing **leads** to flattened grains, which supports the generation of hydrostatic pressure in the **cutting** zone and enables ductile-mode **grinding** of hard and brittle materials. After dressing, the application characteristics of coarse-grained diamond **grinding wheels** were examined by **grinding** optical glasses, fused silica and glass-ceramics in two different kinematics, plunge-cut surface grinding and cross grinding. For plunge-cut surface grinding, a critical depth of cut and surface roughness were determined and for cross-grinding experiments the subsurface damage was analyzed additionally. Finally, the identified parameters for ductile-machining with coarse-grained diamond grinding wheels were used for grinding a surface of 2000 mm(2) in glass-ceramics.

Veröffentlichungsjahr

2016

Quelle

PRODUCTION ENGINEERING-RESEARCH AND DEVELOPMENT

Klassifikation

Engineering

Schlagworte des Autors

ULTRA-PRECISION **GRINDING**
Coarse grains
Subsurface damage
Optical materials

Thesaurusbegriffe

GLASSES

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 152

Titel

Comparison of Cu and Zn on properties of vitrified diamond composites

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Abstrakt

The microstructures and properties of vitrified diamond composites, which are composed of diamond grains and vitrified bonds with varying Cu and Zn doping amounts, were comprehensively investigated in this work. The results including TG curves indicated that compared with Zn, Cu powders were more beneficial to prevent the oxidation of diamond. Both of them could consume oxygen and be oxidized to CuO or ZnO, which would enter into the glass network but not damage the structure. Hence, the vaporization of metals, especially Zn, would remain tiny voids and the lower refractoriness could easily **lead** the glass to foam. The incorporation of Cu or Zn in appropriate amounts (4 wt.%) not only decreased the refractoriness of vitrified bonds but also increased the wettability between diamond grains and vitrified bonds. The flexural strength of the diamond composites incorporating 4 wt.% Cu could reach 60.35 MPa, which increased by about 19.6% than the basic diamond composite and its growth rate was also higher than the value of composites containing 4 wt% Zn (7.8%). In general, the addition of Cu played greater role than Zn on the protection of diamond grains and properties of vitrified diamond composites. (C) 2016 Elsevier B.V. All rights reserved.

Veröffentlichungsjahr

2016

Quelle

DIAMOND AND RELATED MATERIALS

Klassifikation

Materials Science
Physics

Schlagworte des Autors

DIAMOND COMPOSITES
Metals
Oxidation
Flexural properties

Thesaurusbegriffe

THERMAL-CONDUCTIVITY
MECHANICAL-PROPERTIES
SINTERING PARAMETERS
GRINDING WHEELS
BOND
TOOLS
WETTABILITY
STRENGTH
BEHAVIOR
BI2O3

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 153

Titel

Fabrication and evaluation of micromill-grinding **tools** by electroplating CBN

Autor

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Abstrakt

The micromill-grinding **tool** is a compound **tool** that has both micromilling and microgrinding abilities. Local electroplating was employed to fabricate micromill-grinding **tools** with CBN **abrasive**. The grits topography of the flank face was measured, and the graphical investigation was carried out to evaluate the distribution of the grits. It is found that the coatings were well electroplated and the **abrasive** grains were distributed more evenly on the 1.5-mm **tool** than on the 0.9-mm **tool**. The experiments were performed to evaluate the machining characteristics of the micromill-grinding **tool**. The machined surface roughness and the forces were measured, and the effects of processing parameters on surface roughness were analyzed. The **tool** wear style was investigated. The results show that the surface topography of micromill-grinding is similar to that of microgrinding. Under the same conditions, its surface roughness is better than that of micromilling, but worse than that of microgrinding. The grits on the **tool** flank face lead to the decrease of the normal force but the increase of the tangential force in machining. The wear style of micromill-grinding tool is mainly abrasive grain shedding.

Veröffentlichungsjahr

2016

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

MICROMILL-GRINDING
Tool fabrication
Grain topography
Surface roughness
Force
Tool wear

Thesaurusbegriffe

PERFORMANCE
PRECISION
GEOMETRY
DESIGN
SHAFT

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 154

Titel

Grinding Tungsten Carbide Used for Manufacturing Gun Drills

Autor

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Abstrakt

This paper presents a study of **grinding** cemented carbide DK460UF (91 % WC and 9 % Co), a material used to produce **cutting tools** with solid **cutting** edges. The aim is to establish the manufacturing conditions that **lead** to high surface quality. A model of the main factors that influence the **grinding** process is presented first. Following that, **grinding wheel** wear and surface roughness are analysed. **Grinding wheel** wear is studied in experimental conditions under which small diameter gun drills were sharpened with two diamond **grinding wheels** of different grain sizes. Finally, the wear curve can be made. The "G ratio" is used to characterise the performance of the **grinding** process. Next, the experimental research examines how independent parameters, depth of **cut**, feed, grit, and speed influence roughness. The influence of the **grinding wheel** wear on roughness is also studied. The aspect of ground surfaces is examined by using a scanning electron microscope (SEM). The experimental study allowed the determination of the required grinding wheel grit (46 mu m) and the optimum processing parameters (depth of cut ap = 0.01 mm, feed = 0.005 mm/rev, cutting speed v = 55 m/s) to obtain the imposed surface roughness for cutting tool surfaces (Rz = 0.3 mu m). The maximum allowed radial wear (Delta r) of the grinding wheel is 30 mu m.

Veröffentlichungsjahr

2015

Quelle

STROJNISKI VESTNIK-JOURNAL OF MECHANICAL ENGINEERING

Klassifikation

Engineering

Schlagworte des Autors

TUNGSTEN CARBIDE
grinding
grinding **wheel**
roughness
grit
wear

Thesaurusbegriffe

SURFACE-ROUGHNESS
SIMULATION
WHEEL

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 155

Titel

Process study on large-size silicon wafer **grinding** by using a small-diameter **wheel**

Autor

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Abstrakt

Silicon (Si) is a fundamental material in the semiconductor industry. The advancement of semiconductor devices have offered convenience and comfort to our **life**. In order to raise productivity and economic efficiency, the semiconductor industry keeps looking for use of larger size Si wafers. The next generation wafer is expected to be sized as large as 450 mm in diameter. Many wafering processes including lapping, **grinding** and polishing have been studied and **grinding** technology stands out as the most promising process for large-size Si wafer manufacturing. In the current in-feed **grinding** scheme adopted for Si wafers, the **wheel** diameter used is generally equal to or larger than the wafer diameter. In turn, larger diameter **wheels** require larger size machine **tools** and production lines, which **lead** to increase in manufacturing costs. In this paper, both experiment and kinematical analysis have been carried out to investigate the feasibility of using small diameter **grinding wheels** to grind large size Si wafers, mainly focusing on the effects of wheel diameter on wafer geometry and surface roughness. The results show that both wheels generated a central convex profile on the wafer and the small wheel achieved a slightly better flatness than the large wheel. The surface roughness were similar one to another for most area of the wafer except the fringe around its edge. All these experimental results were predicable by the kinematic model established in this paper. Particularly, the kinematic analysis found that the cutting path made by small wheel with diameter equaling to the wafer radius was parallel each other at the fringe around wafer edge, which directly worsened the surface roughness.

Veröffentlichungsjahr

2015

Quelle

JOURNAL OF ADVANCED MECHANICAL DESIGN SYSTEMS AND MANUFACTURING

Klassifikation

Engineering

Schlagworte des Autors

SILICON WAFER
In-feed **grinding**
Wheel diameter
Wafer geometry
Cutting path density
Surface roughness

Thesaurusbegriffe

GENERATION MECHANISMS
MANUFACTURING METHOD
GROUND WAFERS
MM

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 156

Titel

Review on **Grinding Tool** Wear With Regard to Sustainability

Autor

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Abstrakt

Manufacturing processes have to become more sustainable. For **grinding** processes, this means that **tool** wear and performance need to be critically evaluated in their economic, environmental, and social impact. **Tool** wear affects several stakeholders. Different wear mechanisms on the grit and bond level **lead** to a change in **tool** profile and sharpness. For the user, wear changes **tool** costs, process stability, and maybe worker safety. **Tool** manufacturers need **tool** wear to sell replacements, whereas **tool** users might not like the higher waste and costs from **tool** wear but need **tool** self-sharpening.

Veröffentlichungsjahr

2015

Quelle

JOURNAL OF MANUFACTURING SCIENCE AND ENGINEERING-TRANSACTIONS OF THE ASME

Klassifikation

Engineering

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

WHEEL WEAR
DIAMOND
SPEED

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 157

Titel

Select of **abrasive wheels** while pendular **grinding** of parts from titanium alloy VT22 by high roughness parameters

Autor

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Abstrakt

At the present time, **grinding** of the titanium alloys parts is performed much less than other constructional materials that don't meet the demands of branches of engineering industries: aircraft, rocket, energy and others. This is due to the sticking of chips on the working surface of the **abrasive tools** from silicon carbide and electrocorundum because of the high adhesion activity between the titanium and the traditional **abrasives** at **cutting** working temperatures. To solve this problem, the high porous **wheels** (HPW) made of cubic boron nitride CBN30 with 100% concentration on a bond V (K27), a pore-forming KF40, varied grains: B76, B126, B151 (GOST R 53922 - 2010) - and hardness: M and O (GOST R 52587 - 2006) were used to grind titanium workpieces. Additionally the Norton **wheels** from green silicon carbide with a normal porosity 39C (46; 60) K8 VK and with different grain size were tested. With account for the instability of the **grinding** process and the random nature of roughness formation, the observation analysis was led using the statistical approaches. It allowed considering the random variables (RV), the characteristics of the one-dimensional frequency distribution which are measures of position (mean, median) and measures of scattering (standard deviation, range and quartile latitudes (QL)). In the technical applications parametric and nonparametric statistical methods were used. The first direction requires that the RV have homoscedasticity and normal distribution that is not fully secured in this study. For this reason, the nonparametric method was selected priority. Its characteristics are medians and QL. It is established that varying the process variables for each group of instruments is insignificant by measures of position. Norton wheels provide reduction of roughness height 1.6 - 1.7 times in comparison with boron nitride HPW. These are recommended for the finishing grinding stage and HPW CBN30 - the preliminary to reduce the thermal effects on workpieces. By processing stability, the Norton wheels with grain 46 rank the first, and among boron nitride HPW - CBN30 B76 100 OV K27-KF40.

Veröffentlichungsjahr

2015

Quelle

OBRABOTKA METALLOV-METAL WORKING AND MATERIAL SCIENCE

Klassifikation

Metallurgy & Metallurgical Engineering

Schlagworte des Autors

GRINDING
titanium alloy
roughness
statistic
mean
median
measure of position

Thesaurusbegriffe

nicht belegt

Sprache

RUSSIAN

Recherchedatum

12.03.2021

Dokument Nr. 158

Titel

The measurement and analysis of micro bonding force for electroplated CBN **grinding wheels** based on response surface methodology

Autor

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Abstrakt

The superabrasive (e.g. CBN or diamond) grain dislodgement occurrence on the **wheel** surface due to insufficient bonding force is the major failure phenomena in the **grinding** process with electroplated **grinding tools**. This failure **leads** to the abrupt increase of load on the immediate grains, accelerating more grain dislodgement on **wheel** surface. Ultimately, the aggregated grain dislodgement causes the workpiece profile accuracy degradation and catastrophic **wheel** sharpness loss. Therefore, the provision of sufficient and uniform micro bonding force all through the **wheel** surface is the critical task in electroplated superabrasive **grinding wheel** design. Considering the complexity in the micro bonding force enabling factors, e.g. the grain shape, dimensional size, spatial orientation, and bond layer thickness, it is vital to establish the quantitative and comprehensive relationship between these factors with the micro bonding force for optimal electroplated **grinding wheel** design. In this paper, an inclined micro-thread turning test is developed to measure the single grain micro bonding force. In addition, the finite element model of single CBN grain bonding force is established and validated to simulate the grain dislodgement. Finally, the response surface methodology (RSM) is applied to build the comprehensive correlation of the bonding force with its dimensional size, spatial orientation, and bond layer thickness. Therefore, the optimal bonding condition through regressed prediction model is identified to provide the quantitative basis for the electroplated CBN grinding wheels design, which indicates that the bonding force can be predicted for specific wheel manufacturing parameters and improved by related variable adjustment. (C) 2015 Published by Elsevier Ltd.

Veröffentlichungsjahr

2015

Quelle

ENGINEERING FAILURE ANALYSIS

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

CBN
Micro bonding force
Experimental measurement
Finite **element** modeling
Response surface methodology

Thesaurusbegriffe

OPTIMIZATION
BEHAVIOR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 159

Titel

Dicing of hard and brittle materials with on-machine laser-dressed metal-bonded diamond blades

Autor

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Abstrakt

The ultra-precision dicing of hard and brittle materials causes high wear on the **abrasive tool** which results in the deterioration of blade cross section as well as the decrease of diamond grain exposure. Resin-bonded diamond blades are used due to their in-process self-sharpening capability. Nevertheless, the shape of the blade cross section generated by self-sharpening is random which **leads** to poor accuracy when precise grooves need to be produced. Metal-bonded diamond blades feature higher **tool lifetime** and shape accuracy compared to resin-bonded blades, but are not capable of performing self-sharpening. In this study, the laser dressing of metal-bonded diamond blades is investigated to enable their use in the ultra-precision dicing of hard and brittle materials by continuous laser dressing. We investigated laser dressing with and without the presence of **cooling** water. The sharpness (grain exposure) after dressing is measured by the **cutting** face surface roughness. The dicing performance is evaluated by observing the dicing results in terms of cutting depth consistency and by monitoring the spindle power during dicing. Dicing blades which have been laser dressed in an environment with coolant feature less grain exposure than dicing blades which have been laser dressed in dry condition. The dicing results show an improvement in the sharpness and durability of laser-dressed dicing blades in comparison with new or conventionally dressed blades. The ability to apply and perform laser dressing on a dicing machine in an environment with coolant shows the feasibility of laser technology for continuous dressing.

Veröffentlichungsjahr

2014

Quelle

PRECISION ENGINEERING-JOURNAL OF THE INTERNATIONAL SOCIETIES FOR PRECISION ENGINEERING AND NANOTECHNOLOGY

Klassifikation

Engineering
Science & Technology - Other Topics
Instruments & Instrumentation

Schlagworte des Autors

LASER DRESSING
Dicing
Hard and brittle materials

Thesaurusbegriffe

GRINDING WHEELS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 160

Titel

Experimental investigation on variation of machined residual stresses by turning and **grinding** of hardened AISI 1053 steel

Autor

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Abstrakt

Residual stresses in machined surfaces are of great importance to the **service life** of a component under various loading conditions. In many cases, the material damage initiates from the weakest spot with the least compressive stress in the component surfaces. This situation **leads** to the consideration of residual stress moving beyond the traditional thinking of single or average values to the inclusion of variation of stress values on different measurement points. In this paper, we experimentally investigated the surface and in-depth residual stresses in hardened AISI 1053 steels machined using hard turning and surface **grinding** processes. Cubic boron nitride (CBN) **cutting tools** were used in both processes. The effects of depth of **cut** and number of passes were also studied. It was found that both processes produce a significant amount of compressive stress on the machined surfaces, as well as steep stress gradients underneath the surfaces. Compared with hard turning, surface **grinding** produces higher magnitudes of average compressive residual stresses, but it also generates up to 14 times higher scattering of residual stresses, indicated by the standard deviation of the residual stress measurements. As a result, the benefits of a highly compressive average residual stress will be offset by highly scattered individual measurements. The stochastic nature of abrasive grit distribution and orientations in grinding wheels is believed to be the contributing factor for the significant scattering. Meanwhile, for hard turning, the variation of surface and in-depth residual stresses greatly increases, up to 3.8 times, with a larger depth of cut and the use of multiple passes; however, this trend is less significant for surface grinding.

Veröffentlichungsjahr

2014

Quelle

INTERNATIONAL JOURNAL OF ADVANCED MANUFACTURING TECHNOLOGY

Klassifikation

Automation & Control Systems
Engineering

Schlagworte des Autors

HARD MACHINING
Grinding
Surface integrity
Residual stress
Variation

Thesaurusbegriffe

SURFACE INTEGRITY
FATIGUE **LIFE**
PHASE-TRANSFORMATION
ROLLING-CONTACT
TURNED SURFACES
BEARING STEEL

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 161

Titel

Influence of **grinding** parameters on the quality of high content PCBN **cutting** inserts

Autor

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Abstrakt

Plunge-face **grinding** is commonly used to finish PCBN **cutting** inserts. In order to reach an adequate process design, an investigation of the influence of the **grinding** parameters on the quality of high content PCBN inserts is carried out in this work. For this, the inserts are ground with different **grinding wheels** (including a variation of grain size and bonding), dressing feed rates, feed and **cutting** speeds and the **edge** chipping and flank face roughness are measured. It was found that a reduction of the **abrasive** grain size as well as an increase of the dressing feed rate **lead** to an improvement of the insert **edge** and surface quality. Moreover, a variation of the **cutting** and feed speeds has only a small influence on the PCBN insert quality. (C) 2013 Elsevier B.V. All rights reserved.

Veröffentlichungsjahr

2014

Quelle

JOURNAL OF MATERIALS PROCESSING TECHNOLOGY

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

TOOL GRINDING
PCBN **cutting** insert
Grinding wheel wear

Thesaurusbegriffe

DIAMOND
PERFORMANCE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 162

Titel

Powder injection moulding of metal ceramic interpenetrating phase composites

Autor

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Abstrakt

Materials that combine metallic and ceramic properties are of interest for various applications, such as surgical instruments or **grinding tools**. Powder technology offers the possibility to mix metals and ceramics in form of their powders and process them to complex shapes by means of powder injection moulding. Thus, different material combinations were chosen in order to demonstrate a broad applicability of this approach. The produced composite materials were characterised regarding their densities, **mechanical** properties and microstructures. It could be observed that the powder injection moulded samples showed rather typical densities for specimens produced by this process, up to 98.3% relative density. The **mechanical** properties varied strongly mainly dependent upon the materials used in the composites. Thus, the range of **mechanical** properties is wide and **leads** to various possibilities to adjust certain properties to a desired level. In combination with the possibilities of the powder injection moulding process to produce near net shape parts cost-efficiently in large quantities, these versatile composite materials can be made accessible for various applications.

Veröffentlichungsjahr

2014

Quelle

POWDER METALLURGY

Klassifikation

Metallurgy & Metallurgical Engineering

Schlagworte des Autors

COMPOSITE MATERIALS
Powder injection moulding
Metal/ceramic composites

Thesaurusbegriffe

PERCOLATION-THRESHOLD
TENSILE PROPERTIES
BEHAVIOR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 163

Titel

Surface roughness model in experiment of **grinding** engineering glass-ceramics.

Autor

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Abstrakt

The **grinding** experiment of mica glass-ceramics was conducted on the GM-D300-type surface grinder. The article investigated the influence of surface roughness on **grinding wheel** velocity, table feed speed, and **grinding** depth. The results indicated that surface roughness decreased with the increasing **grinding wheel** velocity and **grinding** depth in overall trend, and decreased with increasing table feed speed. Moreover, a modified surface roughness model, which introduced the maximum undeformed chip thickness, was developed based on Snoeys' empirical formula. The modified model was in good agreement with the experimental data in most cases. The disparity between experimental data and predicted results of surface roughness was attributed to the organization of pores randomly distributed within the mica glass-ceramics. Copyright SAGE Publications. Reproduced with permission.

Veröffentlichungsjahr

2014

Quelle

Proceedings of the Institution of Mechanical Engineers, Part B (Journal of Engineering Manufacture) * Band 228 (2014) Heft 12, Seite 1563-1569 (7 Seiten, 18 Quellen)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3MD Tribologie
3KXW Oberflaecheneigenschaften

Schlagworte des Autors

Rauigkeit
empirisches Modell
Spandicke
technische Keramik
Mica
experimentelle Daten
Schleifscheibe
Planschleifmaschine (Metall)
Versuchsmodell
empirische Formel

Thesaurusbegriffe

nicht belegt

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 164

Titel

Effect of PMMA pore former on microstructure and **mechanical** properties of vitrified bond CBN **grinding wheels**

Autor

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Abstrakt

Vitrified bond cubic boron nitride (CBN) **grinding wheels** with various porosities (36.5-43.5%) were fabricated by adding polymethylmethacrylate (PMMA) and activated carbon pore former. The effects of the type and content of pore formers as well as the size of PMMA on final porosity, microstructure and **mechanical** properties were investigated. PMMA was confirmed to be a more appropriate pore former for vitrified bond CBN **grinding wheels** than activated carbon. The porous specimens prepared with PMMA demonstrated quasi-spherical pores with more uniform pore size distribution, and higher bending strength and hardness than those prepared with activated carbon. The higher content of pore former led to increased porosity of sintered specimens, resulting in a decrease in the bending strength and hardness. Furthermore, as the size of PMMA increased, the total porosity remained almost unchanged, while the bending strength and hardness decreased firstly and then increased. Observations carried out by scanning electron microscope (SEM) and optical microscope showed that the size and shape of pores produced by PMMA were related to those of the initial PMMA microspheres, so that good control of pore size and microstructure could be obtained in vitrified bond CBN grinding wheels. (C) 2012 Elsevier Ltd and Techna Group S.r.l. All rights reserved.

Veröffentlichungsjahr

2013

Quelle

CERAMICS INTERNATIONAL

Klassifikation

Materials Science

Schlagworte des Autors

POROSITY
Mechanical properties
PMMA
Microstructure

Thesaurusbegriffe

PERFORMANCE
POROSITY
CATHODES
ALUMINA

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 165

Titel

Electrical **discharge** dressing and its influence on metal bonded diamond **wheels**

Autor

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Abstrakt

Although EDM is a thermal removal process, when it is applied for dressing diamond **grinding wheels**, usually little or no thermal damage is caused to the diamonds. In this work, a better explanation for this fact is provided. A thermo-electrical model is used to calculate the temperature distribution inside diamonds showing that even for high **discharge** energies small amount of graphitization occur. Here, the exceptional properties of diamond contribute to minimize thermal damages. Still, a concentration of **discharges** can occur around the diamonds and thus **lead** to thermal damages. However, this phenomenon is more evident for large diamonds. (C) 2012 CIRP.

Veröffentlichungsjahr

2012

Quelle

CIRP ANNALS-MANUFACTURING TECHNOLOGY

Klassifikation

Engineering

Schlagworte des Autors

WIRE EDM
Dressing
Diamond

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 166

Titel

Improving minimum quantity lubrication in CBN **grinding** using compressed air **wheel** cleaning. Verbesserung der Minimalmengenschmierung beim CBN-Schleifen durch **Schleifscheibenreinigung** mittels Druckluft.

Autor

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Institution

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Abstrakt

The application of minimum quantity lubrication (MQL) in **grinding** has emerged as an alternative for reducing the abundant flow of **cutting** fluids, thus achieving cleaner production. Although considered an innovative technique in **grinding operations**, its widespread application is hindered due primarily to the high heat generation and **wheel** pore **clogging** caused by machined chips, harming the final product quality and increasing **tool** wear on the machine. This study sought to improve MQL use in **grinding**. In addition to the conventional MQL injected at the **wheel**/workpiece interface, a compressed air jet was used to clean the mixture of MQL oil and machined chips from clogged **wheel** pores. Experiments were conducted using external cylindrical plunge **grinding** on AISI 4340 quenched and tempered steel, and a vitrified cubic boron nitride (CBN) **wheel**. The **cooling-lubrication** methods employed were the conventional flood **coolant** application, MQL (without cleaning), and MQL with a cleaning jet directed at the **wheel** surface at different angles of incidence. The main goal of these experiments was to verify the viability of replacing the traditional abundant flow of cutting fluid with MQL and wheel cleaning. The analyses were conducted by measuring the following output variables of the process: workpiece surface roughness and roundness errors, diametrical wheel wear, acoustic emission generated by the process, and metallographic images of the ground surface and subsurface. Results show the positive effects of implementing the cleaning jet technique as a technological improvement of minimum quantity lubrication in grinding in order to reduce the usage of cutting fluids. The MQL technique with cleaning compressed air jet, for a specific angle of incidence (30°), proved to be extremely efficient in the improvement of the surface quality and accurate workpiece shape; it also reduced wheel wear when compared to the other cooling-lubrication methods that were tested (without a cleaning jet). Copyright Elsevier B.V. Reproduced with permission.

Veröffentlichungsjahr

2012

Quelle

Journal of Materials Processing Technology * Band 212 (2012) Heft 12, Seite 2559-2568 (10 Seiten, 16 Bilder, 1 Tabelle, 30 Quellen)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3MD Tribologie
3KEB Staehle, Stahlguss
3PH **Trennen** fester, fluessiger, gasfoermiger Stoffe, disperser Stoffsysteme

Schlagworte des Autors

gehaerteter Stahl
Schleifen mit **Scheibe**
CBN-Schleifscheibe
Oberflaechenreinigung
Druckluftstrahlen
Minimalmengenkuehlschmierung
Materialeinsparung
Kuehlschmierstoff
Spaenebeseitigung
Werkzeugverschleiss
praktische Untersuchung
gebundenes **Schleifkorn**
Methodenvergleich
Tribotechnik
Verfahrenseignung
Rauigkeit
Schallemission
metallographische Pruefung
Einfallswinkel
Luftstrahl
Oberflaecheneigenschaft
Formgenauigkeit
Verschleissminderung
Chrom-Nickel-Molybdaen-Stahl

Thesaurusbegriffe

Schleifscheibenverschleiss
Reinigen mit Druckluftstrahlen

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 167

Titel

Experimental and numerical investigations on powder pressing with superimposed oscillations of two materials

Autor

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Abstrakt

The pressing process is of special importance for the production chain of powder-metallurgically produced components because in this production step the density distribution and thus the specific characteristics are set significantly. Especially the inevitable friction between the forming **tools** and the powder body **leads** to density gradients, which in turn cause sintering distortions and thus inhomogeneous material properties within the component. Therefore, the aim of the presented work was the systematic investigation on powder pressing with superimposed oscillations for the production of powder-metallurgically produced components in order to reduce friction-related density gradients. Subjects of the investigations were an aluminum powder (Alumix 13, ECKA) and a mixture of a **abrasives** and bond (Comet **grinding wheels**) as it is used for the production of ceramic bond **grinding wheels**. The results allow different material-related conclusions regarding the positive effects of superimposed oscillations on the pressing process. Thus, the existence of a favorable oscillation frequency of about 60 Hz for the investigated abrasive/bond mixture could be proven. Above that, experimental and numerical investigations showed that, with an adequate oscillation frequency, density distributions can be achieved which otherwise can only be observed for the significantly more complex double action pressing.

Veröffentlichungsjahr

2011

Quelle

MATERIALWISSENSCHAFT UND WERKSTOFFTECHNIK

Klassifikation

Materials Science

Schlagworte des Autors

POWDER TECHNIQUES
Friction
Density
Superimposed oscillations
Finite **Element** Analysis

Thesaurusbegriffe

nicht belegt

Sprache

GERMAN

Recherchedatum

12.03.2021

Dokument Nr. 168

Titel

Vibration analysis of rail **grinding** using a twin-wheel grinder

Autor

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Institution

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Abstrakt

Grinding is the final process of machining a rail. Conventionally, the rail's surfaces are ground by a single-wheel grinder. The vibrations caused by the **grinding** process can greatly influence the final surface roughness and dimensional accuracy of the rail. This research investigates performance achieved by using two **grinding wheels** simultaneously and symmetrically on two opposite surfaces of a rail. In practical terms, the feed force from the two **grinding wheels** cannot be aligned perfectly, and the imbalance and/or imperfect roundness of the **grinding wheels** will certainly result in vibrations during the **grinding** process. This study applies an impedance method to determine rail vibration and the **grinding** instability, such as chatter caused by feed force misalignment and **grinding wheel** imbalance. When compared to conventional single-wheel **grinding**, the results indicate twin-wheel **grinding** reduces rail vibration, leading to low incidence of **grinding** chatter and better **grinding** performance. However, feed force misalignment between the two grinding wheels can lead to increased chatter, and both resonance and chatter may occur at lower grinding speeds as feed force misalignment increases. Results also show that feed force misalignment has a greater effect on rail vibration and chatter than imbalance asynchronization between the two grinding wheels.

Veröffentlichungsjahr

2011

Quelle

JOURNAL OF SOUND AND VIBRATION

Klassifikation

Acoustics
Engineering
Mechanics

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

CHATTER

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 169

Titel

An Investigation into the Influences of Grain Size and **Grinding** Parameters on Surface Roughness and **Grinding** Forces when **Grinding**

Autor

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Institution

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Abstrakt

This study was carried out to investigate the effects of grain size on workpiece surface roughness and **grinding** forces when surface **grinding** AISI 1050 steel. A previously designed and constructed dynamometer was used to measure and record the forces developed during **grinding**. **Grinding** tests were carried out using different **grinding wheels** of different grains. Ground still ace roughness measurements were also carried out. The results showed that grain size significantly affected the **grinding** forces and surface roughness values. Increasing grain size and depth of **cut** increased the **grinding** forces and surface roughness values. For different grain sizes, depth of **cuts** of 0.01 and 0.02 mm did not result in any significant variations in the **grinding** forces but further increase in depth of **cut** led to variations of up to 50% in **grinding** forces. (C) 2010 Journal of **Mechanical** Engineering. All rights reserved.

Veröffentlichungsjahr

2010

Quelle

STROJNISKI VESTNIK-JOURNAL OF MECHANICAL ENGINEERING

Klassifikation

Engineering

Schlagworte des Autors

SURFACE **GRINDING**
grinding forces
surface roughness
grinding wheel
grain size

Thesaurusbegriffe

MECHANICS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 170

Titel

Effects of **abrasive tools** on surface finishing under brittle-ductile **grinding** regimes when manufacturing glass

Autor

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Institution

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Abstrakt

This paper addresses the effects of bonds and grains of **abrasive tools** on the **edge** aspect of ground glass surface. Diamond grains and silicon carbide (SiC) grains combined with two bond types, i.e., resin and metal. were considered for this study. The surface **edge** characteristics were characterized using scanning electron microscope (SEM) and interferometer observations. In particular, the spectrum of arithmetic mean was investigated for distinguishing the different scales of analysis. Experimental results showed that the **grinding** forces vary sensitively with bond type and **wheel** velocity. Using diamond grains' **wheel**, it was found that toughness level obtained with metallic bond is lower than that obtained with resin bond. However, using a resin-bonded **wheel**, two mechanisms of material removal were revealed according to grains' type. (i) A partial ductile regime, i.e., ductile streaks and brittle fracture. obtained with diamond grains, and (ii) a fully ductile regime obtained with SiC grains. Thus, it was found that ground surface obtained using SiC grains' wheel has a better roughness than that obtained using diamond grains wheel. Besides, SiC grains seem to lead to more marked streaks and form defects. (C) 2009 Elsevier B.V. All rights reserved.

Veröffentlichungsjahr

2010

Quelle

JOURNAL OF MATERIALS PROCESSING TECHNOLOGY

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

GLASS **GRINDING**
Abrasive wheels
Multi-scale analysis
Surface damage

Thesaurusbegriffe

DIAMOND
FLOW
WEAR

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 171

Titel

Wear analysis of electrolytically dressed **wheels** for finishing substrate materials

Autor

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Institution

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Abstrakt

Finishing of silicon wafers is a billion dollar global business. The present process chain consists of several processes, which **lead** to long production times and increase the cost of the finished materials. In the recent years, several processes have been experimented as an alternate process for finishing substrate wafers with stringent specifications. However, there are no successful alternate processes, which have been adopted by the wafer processing industries. The electrolytic in-process dressing (ELID) **grinding** is one of the processes that has already been experimented on silicon wafers for producing mirror surface finish. However, the flatness achieved from the ELID **grinding** is not reported. The main influence on the flatness of the wafers during ELID **grinding** may be due to the wear of the **grinding wheels**. The wear mechanism of electrolytically dressed **wheels** has not been fully understood and reported. The main objective of this study is to report the wear behaviors of the **wheels** during thinning and fine finishing of substrate wafers. The experimental results provide the conditions for utilization of the non-linear behavior of the electrolytically dressed grinding wheels for thinning and fine finishing processes. (C) 2009 Elsevier Ltd. All rights reserved.

Veröffentlichungsjahr

2010

Quelle

TRIBOLOGY INTERNATIONAL

Klassifikation

Engineering

Schlagworte des Autors

GRINDING
ELID
Wear

Thesaurusbegriffe

SILICON-WAFERS
MECHANISM

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 172

Titel

Influence of material structure on creep feed **grinding** of high-speed steels. Einfluss der Werkstoffstruktur auf das Tiefschleifen von Schnellarbeitsstaehlen.

Autor

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CALISKANOGLU, D.
SCHLUETTER, D.
WEGNER, H.
KLOCKE, F.

Institution

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Abstrakt

During the last 20 years, **grinding** technology has progressed a lot regarding material removal rates, efficiency, quality and new fields of application. Nevertheless, only few research results have been presented about **grinding** of high-speed steels. At WZL at RWTH Aachen University comprehensive analyses of the **grinding** behaviour of different new high-speed steels have been conducted. The examination included the systematic variation of alloys and structures in an industry-related creep feed **grinding operation** with resin bonded CBN **grinding wheels**. It was found that higher matrix hardness **leads** to slightly higher workpiece roughness and **grinding** forces. For rough **grinding operations**, powder metallurgy steel has a clear advantage of smaller **grinding** forces. This can be explained by its finer grain size and more homogeneous grain distribution compared to conventional steel. Lower carbide concentration resulted in decreasing workpiece roughness, **grinding** forces and **wheel** wear. However, the maximum material removal rates which had no grinding burn did not depend on the HSS type ground in these examinations. For this process setup it occurred that appropriate process design is still more relevant for the maximum material removal rate than steel composition. However, choice of high-speed steel material still can be dominated by the further tool application rather than grinding process.

Veröffentlichungsjahr

2009

Quelle

Tool Steels - Deciding Factor in Worldwide Production, Tool, International Tooling Conference, 8 * (2009) Seite 1007-1015 (9 Seiten, 7 Bilder, 4 Quellen) Aachen: Mainz

Klassifikation

3KEB Staehle, Stahlguss
3KWG Kristallstruktur, Werkstoffgefuege und -textur
3LKB Spanende Bearbeitung, Zerspanen, Zerteilen

Schlagworte des Autors

Schnellarbeitsstahl
chemische Zusammensetzung
Spanbarkeit
Schleifen
Tiefschleifen
Werkstoffpruefung
Schleifdruck
Rauigkeit
Verschleiss
Haerte
Werkstoffgefuege
Carbid
Seigerung
Konzentrationseinfluss
Chrom-Molybdaen-Vanadium-Wolfram-Stahl

Thesaurusbegriffe

nicht belegt

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 173

Titel

Keramik schlaegt Zirkon um Laengen. Abtragsleistung und Stanzeit deutlich verbessert.

Autor

nicht belegt

Institution

nicht belegt

Abstrakt

Die neue Flaechenschleifscheibe Evolution G-AK mit Keramikkorn zeichnet sich aus durch extreme Abtragsleistung und hoher **Standzeit**. Durch das kontinuierlich selbstaendige Nachschaerfen des Keramikkorns ist es einem bisher verwendeten Zirkonkorundschleifband deutlich ueberlegen. Im Testverfahren kam der Edelstahl V2A zum Einsatz. Dabei hat sich gezeigt, dass die Faecherschleifscheibe Evolution G-AK mit Keramikkorn nach 70 min Dauereinsatz einen Materialabtrag von 1707 g erreicht. Im Vergleich dazu erzielt die Zirkonschleifscheibe einen Materialabtrag von nur 548 g. Das Testergebnis zeigt, dass die **Scheibe** mit Keramikkorn-Schleifband die 3-fache **Standzeit** aufweist. Auch bei der Abtragsleistung setzt die Evolution G-AK neue Massstaebe: Mit durchschnittlich 243 g Materialabtrag pro Zeiteinheit - gemessen wurde in 10 minuetigen Intervallen - ist sie drei mal schneller als die Zirkonkorund-Schleifscheibe mit 78 g Materialabtrag. Die keramischen **Schleifkoerner** sitzen bei dem neuartigen **Schleifband** Evolution G-AK auf einem robusten Polyesterruecken. Eine Vollkunstharzbindung mit schleifaktiven Zusatzstoffen garantiert auch bei hoher Belastung die anhaltende Festigkeit der Schleifkoerner auf der Unterlage. Das Schleifband wird in faecherartigem Aufbau auf einen Gewebeteller aufgebracht und bietet so beste Verwendbarkeit fuer einen Flaechen- und Kantenschliff. Das Sortiment umfasst: Evolution G-AK: Durchmesser 115 mm, Koernung 40, 60, 80; bombiert und gerade - Evolution G-AK: Durchmesser 125 mm, Koernung 40, 60, 80; bombiert und gerade.

Veröffentlichungsjahr

2009

Quelle

Industrieanzeiger * Band 131 (2009) Heft Sonderausgabe: ProduktReport 1/2009, Seite 50-51 (2 Seiten, 3 Bilder)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen

Schlagworte des Autors

Winkelschleifer
Schleifband
Keramik
Schleifkorn
Zirkon
Standzeit
Testverfahren
Materialabtragung
Sortiment

Thesaurusbegriffe

nicht belegt

Sprache

Deutsch

Recherchedatum

12.03.2021

Dokument Nr. 174

Titel

Submerged Arc Welding with Mixed into the Flux Materials Aiming to Obtain Hardened after Tempering Layer

Autor

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Abstrakt

The layers obtained by overlay welding of CT3 steel with CB 08 wire under AMS1 flux mixed with graphite, chromium, **molybdenum**, WC-8% Co, Fe - 70% Mn, modifiers SiCaBa and SB5 powder are investigated. Milled glass, unused **grinding wheels** SiC and B4C and hard metal T15K6 powder was used for overlay welding instead of a flux. Effect of overlay welding composition on the layers microstructure and hardness as well as hardness change due to tempering at 500 degrees C-650 degrees C temperatures are investigated. **Abrasive** wear tests were carried out and they showed that wear resistance of surfacing layers was higher than that of hardened **tool** steels. Use of secondary raw materials for overlay welding allows to obtain hard enough and high quality layers.

Veröffentlichungsjahr

2009

Quelle

MATERIALS SCIENCE-MEDZIAGOTYRA

Klassifikation

Materials Science

Schlagworte des Autors

POWDER
overlay welding
hardness
tempering
wear

Thesaurusbegriffe

ABRASIVE WEAR BEHAVIOR
MICROSTRUCTURE
ADDITIONS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 175

Titel

Dressing process model for vitrified bonded **grinding wheels**

Autor

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Abstrakt

A holistic dressing process model for vitrified bonded **grinding wheels** was designed. It regards the dressing process as a tribological system subjected to a complex load collective. The intensive analysis of the input variables and their impact on the system function led to new knowledge about the acting mechanisms. The model enables a qualitative prognosis of the **grinding wheel** topography, the dressing forces and the thermal dressing process load. (c) 2008 CIRP.

Veröffentlichungsjahr

2008

Quelle

CIRP ANNALS-MANUFACTURING TECHNOLOGY

Klassifikation

Engineering

Schlagworte des Autors

GRINDING WHEEL
dressing
process model

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 176

Titel

Post-treatment of thermal spray coatings on magnesium

Autor

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Abstrakt

Magnesium alloys have a beneficial combination of high strength to weight ratio, good machinability and high recycling potential. Despite this, the application of magnesium still is behind that of other constructive materials mainly due to low wear and corrosion resistance. For more demanding applications, a large amount of surface treatment methods are developed to overcome this problem. Thermal spraying is an efficient and flexible method of coating deposition and is widely used for protection of different materials against corrosion and wear. Nevertheless, the bonding of thermal spray coatings on magnesium alloys is not sufficient, so the following post-treatment processes are needed. One of such possibilities is high energy beam treatment of thermally sprayed coatings. During the heat treatment of magnesium substrates with coating the remelting of coating and a thin surface layer of substrate occurs. Depending on the combination of applied coating system and treatment method, different processes can be realised in modified layers: the alloying of magnesium substrate with other elements to improve corrosion properties, redistribution of hard particles from composite coating and new phases formation during the processing to improve the wear resistance of magnesium alloys. In the present work some examples concerning the laser and electron beam treatment of aluminium based composite coatings as well as infra red irradiation of zinc based coatings are described. Coatings are deposited on magnesium substrates (AM20, AZ31, AZ91) by are spraying with Zn, ZnAl4 and ZnAl15 solid wires and cored wires in aluminium core with powder filling containing different hard particles, such as boron, silicon and tungsten carbide or titanium oxide. Remelting of thermal spray coatings is carried out by means of continuous irradiation of CO2-laser in nitrogen or argon atmosphere, electron beam in vacuum and focused tungsten halogen lamp line heater in atmosphere. Microstructure of sprayed coatings as well as that of modified surface layers is investigated by metallographic methods. Corrosion properties are estimated by electrochemical measurements. Abrasion wear resistance of the modified layers is determined by scratch test, corundum grinding disk test and Rubber wheel test. It is shown that all methods applied for processing of thermal spray coatings lead to formation of modified surface layers in magnesium substrate with improved wear and corrosion properties. Different mechanisms of microstructure formation such as redistribution of chemical composition of composite coating components, partial remelting of hard phase particles, and new phases formation are discussed. Electrochemical behaviour of modified surface layers is mostly improved due to alloying, homogenization of element distribution and strong decrease of as-sprayed coating porosity. Abrasion wear resistance of processed magnesium substrates strongly depends on the microstructure and usually is 5 to 20 times higher compared with base material. (C) 2008 Elsevier B.V. All rights reserved.

Veröffentlichungsjahr

2008

Quelle

SURFACE & COATINGS TECHNOLOGY

Klassifikation

Materials Science
Physics

Schlagworte des Autors

MAGNESIUM ALLOYS
thermally sprayed coatings
post treatment
high energy beams
corrosion resistance
abrasive wear resistance

Thesaurusbegriffe

CORROSION BEHAVIOR
ALUMINUM
ALLOYS
INJECTION

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 177

Titel

Power and **wheel** wear for **grinding** nickel alloy with plated CBN **wheels**

Autor

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Abstrakt

Electroplated CBN **grinding wheels** are manufactured with a single layer of **abrasive** grains. The **grinding** performance of these plated **wheels** changes significantly as the **wheel** wears down. The present investigation was undertaken to understand the transient **grinding** behavior with electroplated CBN **wheels** in order to provide a logical basis for process control. In this paper, particular attention is directed to the effect of **wheel** wear and **operating** parameters on **grinding** of a nickel alloy. **Wheels** were worn to various stages and then used to perform **grinding** tests under various **grinding** conditions to measure **grinding** forces and power and to produce ground specimens. Based on models for **grinding** with conventional aluminum oxide **wheels**, a power model for **grinding** of a nickel alloy with plated CBN **wheels** was established and validated. Microscopic observations of the ground specimens reveal that thermal damage in the form of a White Etch Layer (WEL) appears only when **grinding** with a worn **wheel** under conditions that **lead** to high temperatures.

Veröffentlichungsjahr

2007

Quelle

CIRP ANNALS-MANUFACTURING TECHNOLOGY

Klassifikation

Engineering

Schlagworte des Autors

GRINDING
CBN
nickel alloy

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 178

Titel

Experimental investigation of burr formation in the surface grinding of tool steel

Autor

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Abstrakt

Increasing industrial requirements concerning the precision of edge geometry lead to the investigation of burr formation, particularly in finishing operations such as grinding. In the present paper, a fundamental investigation of burr formation in the flat surface grinding of tempered tool steel (90MnCrV8) is presented. Conventional and superabrasive grinding wheels with different grain sizes and materials are used under varying cutting conditions. In addition, a 'hybrid grinding wheel', which essentially is the wheel hub of a superabrasive wheel with an aluminium oxide abrasive layer, is used in order to isolate the influence of the abrasive material. The geometry of the generated exit burrs at the workpiece edge is investigated. The geometrical burr parameters are measured using optical microscopy. Furthermore, measured grinding forces and temperatures are correlated with the burr parameters. In addition, the microstructure of the burr material is analysed by metallographic sections. As a result of the experimental investigations, an approach to describing burr formation mechanisms in grinding as well as the influences of grinding wheel and cutting parameters on burr shape and size is obtained.

Veröffentlichungsjahr

2006

Quelle

PROCEEDINGS OF THE INSTITUTION OF MECHANICAL ENGINEERS PART B-JOURNAL OF ENGINEERING MANUFACTURE

Klassifikation

Engineering

Schlagworte des Autors

ABRASIVE PROCESSES
grinding
burr formation

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 179

Titel

Improved grindability and gold liberation by microwave pretreatment of a free-milling gold ore

Autor

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Pickles C.A.
Yen W.T.

Institution

nicht belegt

Abstrakt

The gravity concentration of gold is very efficient if the metal is fully liberated and the particle size of the gold is relatively coarse. Liberation is usually achieved by comminution, but due to the association of the gold with the other minerals in the ore, overgrinding occurs in conventional comminution circuits and slime generation **leads** to inefficient recovery. The liberation of minerals can be improved by adding **grinding** aids, which modify the **mechanical** properties of the ore and allow breakage at lower stress levels. In this research, microwave pretreatment was used to augment the **grinding** of a free-milling gold ore containing quartz, silicates and iron oxides. Under microwave irradiation, selective heating of the different mineral components resulted in thermal stresses that caused cracking. These intergranular and transgranular fractures were confirmed by scanning electron microscopy. After microwave processing, the grindability of the ore was improved and the crushing strength and the Bond Work Index were reduced by 31.2% and 18.5%, respectively. In addition to the enhanced grindability, gold was released from the matrix of the host minerals at a coarser size, resulting in a significant increase in free gold recovery by gravity concentration. For a gold ore with a head grade of 6.4 g t-1, the gold recovery improved from about 28% to 40% after microwave pretreatment.

Veröffentlichungsjahr

2005

Quelle

Mineral Processing and Extractive Metallurgy

Klassifikation

nicht belegt

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

nicht belegt

Recherchedatum

12.03.2021

Dokument Nr. 180

Titel

Surfaces of calcium **fluoride** single crystals ground with an ultra-precision surface grinder.

Autor

NAMBA, Y.
YOSHIDA, T.
YOSHIDA, S.
YOSHIDA, K.

Institution

Chubu University, Kasugai, JP
Osaka Institute of Technology, JP

Abstrakt

An ultra-precision surface grinder having an extremely-low thermal expansion spindle was used to finish high purity CaF2 single crystal surfaces. The CaF2 single crystals for next-generation optical lithography were fabricated with surfaces corresponding to the (001), (111), and (110) crystalline planes. The **grinding** process utilized an ultra-precision surface grinder and was optimized for resin-bonded SD3000-75-B diamond **wheels**. The following conclusions were drawn from the results of this study: 1) The ultra-precision **grinding** produces micro-crack-free surfaces on any crystalline plane when using a slow feed rate and small grain sizes of the diamonds in the **grinding wheels**. Thegrinding mode depends on the maximum grain size of the diamonds in the **wheel**. 2) Surface roughness in ultra-precision **grinding** depends on the average grain size in a diamond **wheel**, feed rate crystalline plane, and **grinding** direction. A surface roughness of less than 1 nm Ra can be obtained on any crystalline CaF2 plane. 3) The subsurface damage layer thickness is 0.3 micrometer on a (111) surface that was ultra-precision ground with an SD3000-75-B wheel. 4) The laser-induced damage threshold on an ultra-precision ground surface depends on the surface roughness and is higher than that on an optically polished surface.

Veröffentlichungsjahr

2005

Quelle

Manufacturing Technology - Annals of the International Institute for Production Engineering Research, General Assembly of CIRP, 55, in: CIRP Annals * Band 54 (2005) Heft 1, Seite 503-506 (4 Seiten, 10 Bilder, 1 Tabelle, 11 Quellen) Uetendorf: Edition Colibri

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3FF Herstellungstechnologien fuer elektronische Bauelemente und Schaltungen
3KEM Nichteisenmetalle (auch Sondermetalle), -legierungen, -gusswerkstoffe
3FE Herstellung von Halbleiterwerkstoffen

Schlagworte des Autors

Flachschleifen
Feinstbearbeitung
Spindel
thermische Eigenschaft
Calciumfluorid
Einkristall
Photolithographie
Diamantschleifscheibe
Anisotropie
Geschwindigkeit
Mikroriss
Oberflaechenrauigkeit
Subgefuege
Laserbestrahlung
Schaden

Thesaurusbegriffe

nicht belegt

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 181

Titel

Synergistic effects of thermo-chemical treatment and super **abrasive grinding** in gears' manufacturing

Autor

GAWRONSKI Z
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Institution

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Abstrakt

It was specified that the combined optimisation of both surface hardening processes by means of vacuum carburising and final **grinding** with use of modem **grinding wheels** made of cubic boron nitride, led to synergistic generation of favourable compressive residual stresses within the surface layer. This is the advantageous spectrum of residual stresses from the bending and contact fatigue resistance of the gear **wheels** point of view. The methodology adopted and examples of residual stresses distribution by means of FEM method modelling are presented in this paper. Also, the original special equipment that allows the experimental determination of contact fatigue resistance of gear **wheels** and their bending fatigue strength is described.

Veröffentlichungsjahr

2005

Quelle

JOURNAL OF MATERIALS PROCESSING TECHNOLOGY

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

SYNERGY
carburising
CBN **grinding**
surface integrity

Thesaurusbegriffe

RESIDUAL-STRESSES

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 182

Titel

A general algorithm for profiling and dressing **grinding wheels** when using a **grinding** spindle on a CNC lathe

Autor

ABBAS AT

Institution

Minist Mil Prod, Cairo, Egypt.

Abstrakt

Remarkable progress is being made in the technology for **grinding** complicated geometrical parts. Today, some factories are considering adding a **grinding** spindle to a turning lathe to save buying an additional expensive new **grinding** machine. The **grinding** spindle will be interchangeable with a turning boring bar and it will need two types of software. First is a program and subroutine to control the machine movement during the **grinding** pro. le of the work-piece. Second a program and a subroutine are needed to pro. le the new **grinding wheels** according to the **grinding** profiles of the work-piece, as well as dressing the **grinding wheels** after usage. In the case of a very small depth of **cut**, a long program will be required. Each different shape of **grinding wheel** will require different software. There are no detailed descriptions for this problem in the literature or machine manuals. This paper presents a general algorithm to make the pro. ling and dressing programs for **grinding wheels** easier. The programmer will use this algorithm for creating a subroutine suitable for the machine dressing system. This algorithm can be used on grinding machines as well as on an additional grinding spindle on a hollow spindle lathe. This subroutine will be used for pro. ling and dressing the most common shape of grinding wheels. The programmer will then only need to fill in the parameters which describe the contour of the grinding wheels. This algorithm has been applied on a hollow spindle lathe equipped with a numerical Sinumeric 840C control. Several grinding wheels have been pro. led and dressed using the proposed approaches, and satisfactory results were obtained.

Veröffentlichungsjahr

2004

Quelle

INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH

Klassifikation

Engineering
Operations Research & Management Science

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 183

Titel

Characterization of vitreous bonded **grinding wheels** for CNC crushing

Autor

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Catoni F

Institution

Univ Hannover, Inst Prod Engn & Machine Tools, D-30167 Hannover, Germany.

Abstrakt

Plunge **grinding operations** carried out by means of profiled CBN or diamond **wheels** make high demands on the **tool** profile generation process. The use of conventional plunge dressing processes based on the reproduction of the dressing roller profile into the **grinding wheel leads** to a considerable wear of the dressing **tool**. The innovative dressing process CNC crushing is particularly suitable for profiling and sharpening superhard **grinding wheels**. The working principle is based on a punctual contact between the **grinding tool** and the dressing **tool**. The shape of the dressing roller is independent of the **grinding wheel** profile which is generated by the CNC-system of the machine **tool** through a combined movement of its axes, making the process significantly flexible. By means of a closed loop system the dressing speed can be continuously controlled so that no relative speed occurs between the **tool** and the **grinding wheel**. This contributes to a reduction of the dressing roller wear. In order to be dressable through form crushing, the grinding wheel bonding system has to be sufficiently brittle, so that grits and bond material can be pulled out by the dressing normal forces, which are concentrated in the contact point. This contribution describes a test method aimed at characterizing the grinding layer of a wheel in regard to its mechanical properties. The method, based on the execution of penetration investigations by dint of a single grain diamond tool, allows determining elasticity and brittleness of a grinding layer and delivers a qualitative assessment of its suitability to be dressed through CNC crushing, as analogy investigations have shown.

Veröffentlichungsjahr

2004

Quelle

ADVANCES IN ABRASIVE TECHNOLOGY VI

Klassifikation

Materials Science

Schlagworte des Autors

DRESSING
CNC crushing
grinding
diamond **grinding wheels**

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 184

Titel

Fluid performance study for groove **grinding** a nickel-based superalloy using electroplated cubic boron nitride (CBN) **grinding wheels**

Autor

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Force E

Institution

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Lehigh Univ, Dept Mat Sci & Engn, Bethlehem, PA 18015 USA.
Lehigh Univ, Dept Ind & Syst Engn, Bethlehem, PA 18015 USA.

Abstrakt

The performance of three water-based **grinding** fluids was analyzed and compared to a neat oil tested under the same process conditions. Light optical and scanning electron microscopy observations show the mechanism of metal deposition that **leads** to CBN **wheel** failure for water-based fluids. To improve the performance of the water-based fluids, a new nozzle layout is proposed that would prevent metal deposition on the CBN **wheels**. The proposed solution is not chemical, but **mechanical** in nature and the presented setting should be optimized in the future to assure satisfactory performance of the CBN **wheels** with water-based fluids.

Veröffentlichungsjahr

2004

Quelle

JOURNAL OF MANUFACTURING SCIENCE AND ENGINEERING-TRANSACTIONS OF THE ASME

Klassifikation

Engineering

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

FLOW
ZONE

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 185

Titel

Performance and wear behaviour of diamond fibre **grinding wheels** when **grinding** glass

Autor

COMLEY P
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Pearce TRA
Smith DJ
Ashfold MNR

Institution

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Univ Bristol, Dept Mech Engn, Bristol BS1 5LT, Avon, England.
Univ Bristol, IGT, Bristol BS1 5LT, Avon, England.
Univ Bristol, Sch Chem, Bristol BS1 5LT, Avon, England.

Abstrakt

Diamond coated fibres have been produced by a hot filament CVD technique, where the surface of the fibres has a faceted structure making them suitable for use as an **abrasive** medium. **Grinding** trials to determine the performance of a metal bonded diamond fibre **grinding wheel** have been carried out using a 'state of the art' machining centre developed for the high precision ductile regime **grinding** of optics. Further work has been undertaken using a single fibre placed radially in a titanium **disc** to assess wear. Ductile ground surfaces were produced in BK7 glass with a surface roughness figure of 70 nm Ra, and less than 2 mu m sub-surface damage. The wear behaviour of the single fibre mounted in a **disc wheel** was monitored. Measurements showed that the initially sharp leading **edge** broke down to form a chamfered wear face, the profile produced by the fibre remaining similar. Diamond fibre **grinding wheels** have been shown to be capable of ductile **grinding**. These initial trials suggest that diamond fibres have the potential for longer wheel life, when grinding in the ductile region, compared with existing resin bond wheels.

Veröffentlichungsjahr

2004

Quelle

ADVANCES IN ABRASIVE TECHNOLOGY VI

Klassifikation

Materials Science

Schlagworte des Autors

GRINDING
precision
diamond fibre

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 186

Titel

Precision machining of calcium **fluoride**. Feinbearbeitung von Calciumfluoriden.

Autor

BRUNNER, E.

Institution

Staehli, Pieterlen/Biel, CH

Abstrakt

Gestiegene Anforderungen an die Leistungsfaehigkeit von Linsen fuer Hochleistungslaseroptiken im Laserwellenlaengenbereich bis 157 nm, wie sie zum Beispiel in der optischen Mikrolithographie und zur Herstellung von Speichermedien mit hoher Speicherdichte benoetigt werden, fuehren zur Abloesung der Quarzglaslinsen durch Linsen aus Calciumfluorid CaF2. Calciumfluorid-Linsen besitzen eine hoehere Lichtdurchlaessigkeit und Bestaendigkeit gegenueber Hochenergie-Laserstrahlen, Spannungsfreiheit und einen homogenen Brechungsindex. Allerdings stellen Calciumfluorid-Linsen auch sehr hohe Anforderungen an ihre Fertigungsverfahren, insbesondere an die Oberflaechenbeschaffenheit: CaF2 ist mit einer Mohs-Haerte von 4.0 deutlich weicher als Quarzglas und damit auch anfaelliger gegen kleinste Polierfehler, ausserdem ist der thermische Ausdehnungskoeffizient mit 18,85 x 10-6/K sehr viel hoeher (0,56 x 10-6/K bei Quarzglas), was konstante Bearbeitungstemperaturen notwendig macht, und als kristalliner Werkstoff sind die mechanischen Eigenschaften von (111)-CaF2 und damit auch die Abtragrate abhaengig von der Kristallorientierung und schwanken im Verlauf des Polierens. Der Poliervorgang muss rein mechanisch erfolgen, was die Verwendung chemisch wirksamer Poliermittel wie Ceroxide ausschliesst. Bei der A. W. Staehli AG wurde ein Polierkonzept entwickelt, das auf einem dreistufigen Polierverfahren der durch Diamantfraesen hergestellten Rohlinge beruht. Als Poliermittel dient eine Diamantsuspension (Diamantpartikelkoernung von 5 bis 1 Mikrometer) auf einer Polierfolie, die auf einer absolut flachen Polierscheibe mit 1270 mm Durchmesser aufgebracht ist (Umdrehungsgeschwindigkeit 20 U/min). Die Poliermaschine FLM-1270-FP erlaubt eine kontrollierte kontinuierliche und gleichfoermige Zufuehrung der Diamantsuspension und ist mit einer Polierscheibenabrichtung ausgeruestet, die die Verunreinigung der Polierfolie durch abgetragenes Linsenmaterial und Diamantsuspension verhindert. Durch das Polierverfahren werden Oberflaechenqualitaeten erreicht, die den Anforderungen der Abnehmer entsprechen: Ra = 0,001 Mikrometer (14 Angstroem), mittlere Rauhigkeit RMS = 0,002 Mikrometer (20 Angstroem) und Rauheitshoehe PV (Peak-to-Valley) = 0,033 Mikrometer (334 Angstroem).

Veröffentlichungsjahr

2004

Quelle

Industrial Diamond Review * Band 64 (2004) Heft 1, Seite 37,39 (2 Seiten, 4 Bilder, 1 Quelle)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3QB Mikrosystemtechnik
3KGB Minerale, natuerliche und synthetische Kristalle, Gesteine
3KXO Optische Werkstoffeigenschaften

Schlagworte des Autors

Optikpoliermaschine
optische Linse
mechanisches Polieren
Feinstbearbeitung
Calciumfluorid
Transmissionsvermoegen
Brechungsindex
Laserglas
Laserwerkstoff
Laserstabilitaet
Diamantwerkzeug
Poliermittel
Polierscheibe
polierte Oberflaeche
Polierteller
Mohs-Haerte
thermischer Ausdehnungskoeffizient
Schleifscheibenabrichtung
Verfahrensparameter
Rauigkeit
suspendierter Stoff
Korngroesse
Laseroptik

Thesaurusbegriffe

Polierfolie

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 187

Titel

Reduction characteristics of iodate ion on copper: Application to copper chemical **mechanical** polishing.

Autor

ANIK, M.

Institution

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Abstrakt

Potentiodynamic and potentiostatic polarization, and the rotating **disk** electrode technique were used to study the reduction characteristics of iodate (IO3-) ion on copper (Cu). Depending on the relative concentrations of (IO3-) and H+. two pH regimes were observed. The cathodic current in the first regime (pH > 3) was controlled by H+ diffusion from the solution to the metal surface. In the second regime (pH < 3 and up to 10-2 M (IO3-) concentration) the cathodic current was found to be under mixed control, involving reaction control via the electrochemical reduction of (IO3-) and transport control via the diffusion of I 2 (aq). It was concluded that (IO3-) was an effective oxidant for Cu chemical **mechanical** polishing (CMP) with strongly acidic (pH < 3) slurries but it was not convenient reagent as an oxidant for Cu CMP with weakly acidic (pH > 3) slurries.

Veröffentlichungsjahr

2004

Quelle

Journal of Applied Electrochemistry * Band 34 (2004) Heft 9, Seite 963-969 (7 Seiten, 27 Quellen)

Klassifikation

3LKG Chemisches und elektrochemisches Abtragen
3KEM Nichteisenmetalle (auch Sondermetalle), -legierungen, -gusswerkstoffe
3PL Chemische Verfahrenstechnik, chemische Reaktionstechnik

Schlagworte des Autors

Diffusion
Reaktionskinetik
elektrochemische Elektrode
Anion
Kathode
Katalyse
pH-Einfluss
Saeuregehalt
Schwefelsaeure
Elektrolyt
Iodat
Kupfer
chemisch-mechanisches Polieren

Thesaurusbegriffe

Diffusion in Festkoerpern
elektrochemisches Messen
Reduktionscharakteristik

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 188

Titel

A new generation of high-porous vitrified cBN **wheels**. Eine neue Generation hoch poroeser keramischer CBN-Schleifscheiben.

Autor

KREMEN, Z.I.

Institution

Ilyich Abrasive, St. Petersburg, RU

Abstrakt

Traditionelle keramische CBN-Schleifscheiben mit hoher Dichte, Haerte und geringer Porengroesse (0,01 bis 0,02 mm) leiden unter erhoehter Klebneigung der unter hohem Druck stehenden Spaene an der **Schleifscheibe**, schlechter Versorgung der Schnittflaeche mit Schneidfluessigkeit, Einbrandneigung und Tendenz zur Rissbildung an der Werkstueckoberflaeche. Abhilfe schafft eine Neuentwicklung der Ilyich **Abrasive** Company, St. Petersburg, Russland: AEROBOR-CBN-Schleifscheiben mit regulierbarer Porengroesse bis zum 6-fachen der mittleren CBN-Koernung, die einen verbesserten Transport der Schneidfluessigkeit und eine verbesserte Lueftung der Schnittkontaktflaeche bewirken. Die relative Kontaktlaenge liegt mit 0,008 bis 0,03 deutlich unter der traditioneller CBN-Schleifscheiben (0,7 bis 0,11), waehrend die mittlere Ganghoehe zwischen Kornspitzen 3-fach bis 4-fach hoeher ist, was zu einer kleineren Reibungsflaeche und groesserem Zwischenkornabstand fuehrt. AEROBOR-CBN-Schleifscheiben zeigen in Anwendungsversuchen zum Oberflaechenschleifen von Nickel-Chrom-Molybdaen-Legierungen (CrNi73MoBT) mit 73 % Ni ueberlegene Leistungen auch bei hoeheren Schnittiefen (bis 0,2 mm) bei stabiler Rauhigkeit der geschliffenen Flaechen (0,45 bis 0,7 Mikrometer) und hoher Oberflaechen-Mikrohaerte (4800 bis 5050 n/mm2). Weitere erfolgreiche Anwendungen der AEROBOR-Schleifscheiben sind das Formschleifen von Kugelumlaufspindelantrieben und Schraubgetrieben aus hochlegierten Staehlen (20CrNi3A, X40CrMoVNi, Ni45MoBT) und das Trockenschleifen von Schneidwerkzeugen aus Schnellarbeitsstaehlen (HSS R18, HSS R6M5V3), wo eine wesentliche Verkuerzung der Bearbeitungsdauer gegenueber traditionellen keramischen CBN-Schleifscheiben (30 bis 40 %) und gegenueber Aluminiumoxid-Schleifscheiben (90 %) sowie Verringerung der Schleifscheibenabrichtungen (um 60 %) zu verzeichnen sind. AEROBOR-CBN-Schleifscheiben stellen somit eine hervorragende Alternative dar auch fuer die Bearbeitung von Staehlen und Legierungen mit hoher Plastizitaet und niedriger Haerte.

Veröffentlichungsjahr

2003

Quelle

Industrial Diamond Review * Band 63 (2003) Heft 4, Seite 53,55-56 (3 Seiten, 7 Bilder, 4 Tabellen)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3KER Superlegierungen
3KEB Staehle, Stahlguss

Schlagworte des Autors

CBN-Schleifscheibe
Porositaet
Formschleifen
Anwendungsgebiet
Porengroesse
Trockenbearbeitung
Reibungsverhalten
Nickelsuperlegierung
Nickelmolybdaenstahl
hitzebestaendige Legierung
Schnitttiefe
Schleifgeschwindigkeit
Flachschleifen
Schleifeigenschaft
Rauigkeit
Mikrohaerte
hochlegierter Stahl
Chrom-Nickel-Molybdaen-Vanadium-Stahl
Schraubgetriebe
Bearbeitungszeit
Schleifscheibenabrichtung
Oberflaechenfehler
Produktivitaet
Schnellarbeitsstahl
Chrom-Nickel-Stahl
Nickel-Molybdaen-Stahl

Thesaurusbegriffe

poroese CBN-Schleifscheibe

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 189

Titel

ELID **grinding** of neutron Fresnel lens with forming **wheel**. ELID-Schleifen von Fesnel-Neutronen-Linsen mit formgebender **Scheibe**.

Autor

LIN, W.
OHMORI, H.
GUO, J.
MORIYASU, S.
IWAKI, M.

Institution

RIKEN Institute of Physical and Chemical Research, Wako, JP

Abstrakt

The new design of a fresnel lens refracting a cold-neutron beam is proposed in this paper. The authors applied an ultraprecision electrolytic in-process dressing (ELID) micro-grinding technique using cast-iron bonded diamond **wheels** whose edges have been sharpened by electrical and **mechanical** processes to fabricate the **element**, and successfully obtained the required **element** with a sharp and smooth V-faced fresnel structure using MgF2 glass. And relationship of the form accuracy of fabricated Fresnel lens and the change of **grinding wheel** shape had **discussed**.

Veröffentlichungsjahr

2003

Quelle

euspen, International Topical Conference on Precision Engineering, Micro Technology, Measurement Techniques and Equipment, 2003 * (2003) Seite 345-348 (4 Seiten, 14 Bilder, 2 Tabellen, 4 Quellen) Voerde: Rhiem

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen
3IDX Teilchenspektrometrie und -mikroskopie
3QB Mikrosystemtechnik

Schlagworte des Autors

elektrochemisches **Schleifen**
Fresnel-Linse
Neutronenstrahl
Diamantschleifscheibe
Gusseisen
Magnesiumfluorid
Formgebungsfehler
Profilschleifen

Thesaurusbegriffe

nicht belegt

Sprache

Englisch

Recherchedatum

12.03.2021

Dokument Nr. 190

Titel

Diamond-fluoroplastic composites for **abrasive tools**

Autor

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Institution

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Abstrakt

Composite materials based on polytetrafluoroethlene (PTFE) and natural technical diamond powders from Yakutia diamond deposits are developed. It is shown that the compositions based oil PTFE and a technical diamond powder at a content of lip to 60 wt.%, due to their good physicomechanical characteristics, low friction coefficient, and good wetting of diamond particles by polymer, make is possible to create **abrasive tools** for polishing and **grinding** hard metals and semiprecious and precious stones with high **serviceability** and **operational life** combined with a considerable increase in the quality of treated surfaces and **operational** stability Of the **tools**. It is found that PTFE, being a more elastic and softer matrix than the traditional ones, exhibits a self-sharpening effect of diamond grains upon **grinding** hard surfaces, when the grains go deep into the elastic matrix, the matrix wears out, and the working part of the **tool** becomes enriched with the diamond powder. These conclusions are confirmed by electron microscopic investigations. It is shown that the introduction of ultradisperse fillings (up to 2 wt.%) into such compositions allows us to improve the characteristics of abrasive tools considerably, especially for grinding hard semiprecious stones. The physicomechanical and frictional characteristics of the compositions and specific examples of their application in the jewelry industry and in stone working are discussed.

Veröffentlichungsjahr

2001

Quelle

MECHANICS OF COMPOSITE MATERIALS

Klassifikation

Mechanics
Materials Science
Polymer Science

Schlagworte des Autors

ABRASIVE TOOLS
polytetrafluoroethlylene
native/natural diamond powder
abrasivity

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 191

Titel

Failure analysis of an **abrasive cut-off wheel**

Autor

RIGA AT
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Institution

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TechCon Inc, Cleveland, OH USA.

Abstrakt

The relationship between composition, structure, properties and performance is central to the design, use and failure analysis of engineering components. Thermogravimetric analysis (TCA) and wavelength X-ray **fluorescence** (WRXF) were applied in evaluating the **elemental** composition and thermal properties, respectively, of a failed **abrasive cut-off wheel**. The **cutting tool**, consisting of a bonded **abrasive disc**, failed prematurely during the routine sectioning of a steel member. The **operator** was injured as a result. Analysis indicated an improper mixture of the organic constituents comprising the **wheel** bonding material. Instead of the uniform wear anticipated under normal **cutting** conditions, the improper mixture resulted in a degradation of the **wheel**'s **mechanical** properties, and catastrophic brittle fracture. (C) 2001 Elsevier Science Ltd. All rights reserved.

Veröffentlichungsjahr

2001

Quelle

ENGINEERING FAILURE ANALYSIS

Klassifikation

Engineering
Materials Science

Schlagworte des Autors

ABRASIVE WHEEL FAILURES
composites
tool and die failures
thermogravimetric analysis
X-ray analysis

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 192

Titel

A new tooth finishing method with cBN **wheel** for involute internal spline - Improvement of tooth accuracy with slant traverse method

Autor

MIZUNO S
Hoshino A
Morita T

Institution

Aisin Seiki Co Ltd, Kariya, Aichi 4488650, Japan.

Abstrakt

An improvement in shift feeling is essential for automobile transmission parts. For this purpose, it is important to increase the accuracy of an involute spline, that is, to perform profile modifications for a pair of teeth in a mesh and to improve roughness as well. Although a homing technique can be effective in meeting the above requirements, it has not been investigated in sufficient detail. A new tooth finishing experiment with a cBN (cubic Boron Nitrified) **wheel** for the involute internal spline is performed, and it is revealed that optimum tooth accuracy can be obtained using the slant traverse method, by reducing the speed ratio between revolutions and feeds. The maximum finishing roughness is improved approximately by 50% compared with that before honing. With a speed ratio of psi = 1, roughness values of 4.8 mu mRz in the tooth profile direction and 0.8 mu mRz in the tooth **lead** direction are obtained. At a revolution load torque of 3 Nm and machining time of 20 seconds, chips are smoothly removed and honing is effective. The conditions for obtaining optimum tooth accuracy and roughness are clarified.

Veröffentlichungsjahr

1999

Quelle

INTERNATIONAL JOURNAL OF THE JAPAN SOCIETY FOR PRECISION ENGINEERING

Klassifikation

Engineering

Schlagworte des Autors

SPLINE
honing
accuracy
roughness
super **abrasive** **wheel**
profile modification

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 193

Titel

The thermal conductivity of metallic ceramics

Autor

WILLIAMS WS

Institution

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Union Carbide Corp, New York, NY 10017 USA.
Case Western Reserve Univ, Dept Chair Mat Sci & Engn, Cleveland, OH 44106 USA.

Abstrakt

Transition metal carbides, nitrides, and borides can be called metallic ceramics because they are electronically conductive and extremely hard. Their various applications include **cutting** and **grinding tools**, thermal barrier coatings, diffusion-resistant thin films, interconnects, and superconductivity devices. In each case, the ability of the material to resist or permit heat flow is important. Because of the high concentration of non-metal atom vacancies in the carbides and nitrides, the carriers of heat-conduction electrons and phonons (the quanta of lattice waves)-are severely scattered, a nd the thermal conductivity K, is strongly affected, although differently in high-and low-temperature regions. Measurements of both the electrical and thermal conductivity of single crystal metallic ceramics at low temperatures and the application of the Callaway formalism help explain the puzzling temperature dependence of K. The finding of a large peak in K of NBC just below its superconducting transition temperature confirms phonon-electron scattering and could lead to a thermal switch. The single-crystal thermal conductivity behavior of TiC and WC is used to interpret the measured K values for cemented carbides TiC/Ni-Mo anti WC/Co through a broad temperature range.

Veröffentlichungsjahr

1998

Quelle

JOM-JOURNAL OF THE MINERALS METALS & MATERIALS SOCIETY

Klassifikation

Materials Science
Metallurgy & Metallurgical Engineering
Mineralogy
Mining & Mineral Processing

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 194

Titel

Reducing vibration exposure from hand-held **grinding**, **sanding** and polishing powertools by improvement in equipment and industrial processes

Autor

GREENSLADE E
Larsson TJ

Institution

IPSC NEW ZEALAND, WELLINGTON 1, NEW ZEALAND.

Abstrakt

Vibrating hand-held **grinding**, **sanding** and polishing **tools** (GSP) are used in production processes to control surface finish and quality. Their use has been associated with vibration disease for half a century, and may result in damage to the vascular, sensory or musculoskeletal systems. Few GSP manufacturers have addressed the problem of vibration in their products, with most of the grinders on the market only suitable for daily exposure of up to one hour. Observations and **discussions** in Swedish industry suggest that more controlled and consistent production processes are likely to remove, or reduce, the need for post-production quality control using GSP **tools**. As the production requirement for this **operation** is reduced, the duration of the **operator**'s exposure to vibration will also be lessened. Where an elimination of the problem cannot yet be achieved through production quality improvements, better **tool** design may help to reduce some of the vibration transmitted to the **operator**. The relatively recent availability on the marker of a grinder with an automatic balancing device, as well as the development of antivibration grinders, less vibration prone grinding wheels, and more effective antivibration handles and gloves, may lead to a reduced incidence of vibration disease. (C) 1997 Elsevier Science Ltd.

Veröffentlichungsjahr

1997

Quelle

SAFETY SCIENCE

Klassifikation

Engineering
Operations Research & Management Science

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

ARM VIBRATION
RAYNAUDS-PHENOMENON
WHITE FINGER
WORKERS
TOOLS
LUMBERJACKS

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 195

Titel

The evaluation of the influence of machining residual stresses on the bending strength of Al2O3 ceramics

Autor

HESSERT R
Eigenmann B
Vohringer O
Lohe D

Institution

nicht belegt

Abstrakt

Even after near net-shape processing, machining is often necessary to obtain the required surface quality and precision of dimensions. In industrial applications, machining is in most cases performed by **grinding** which **leads** to complex changes of the material properties in the near-surface layers. Since the effects of grinding-induced damage and residual stresses may have competing influences on the strength, the knowledge of these effects is of principal interest. Therefore, Al2O3 samples were machined with different **grinding** parameters. The near-surface distributions of **grinding** residual stresses were determined non-destructively by means of depth-resolved X-ray residual stress analyses. It was found that the compressive surface residual stresses increase with increasing depth of **cut** of the individual grains of the **grinding wheels**. In parallel, an increase of the 4-point bending strength of the samples was observed. Its magnitude was compatible with the effects of the **grinding** residual stresses on the bending strength which are expected according to fracture mechanics calculations. It was found that near-surface compressive residual stresses increase the bending strength even if failure from critical defects initiates at depths larger than the thickness of the compressively stressed surface layer.

Veröffentlichungsjahr

1996

Quelle

ZEITSCHRIFT FUR METALLKUNDE

Klassifikation

Metallurgy & Metallurgical Engineering

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

GERMAN

Recherchedatum

12.03.2021

Dokument Nr. 196

Titel

CHARACTERISTICS OF SHORT CAST-IRON FIBERS AND THEIR APPLICATION FOR DIAMOND **CUTTING WHEELS**

Autor

LI D
TIAN Y
CAI B
CHEN B

Institution

SUZHOU GRINDING WHEEL FACTORY,SUZHOU,PEOPLES R CHINA.

Abstrakt

A study on the effects of compaction and sintering parameters on microstructures and properties of sintered compacts of short cast iron fibres has led to the development of a diamond **grinding wheel** bonded with a matrix of short cast iron fibres. When compared with high quality bronze bonded diamond **grinding wheels** the new type of **wheel** was found to be more suitable for the high efficiency **grinding** of hard and brittle materials such as ceramics. When Si3N4 was ground, a trebling of the **grinding** rate and a sixfold increase in **grinding** ratio was achieved.

Veröffentlichungsjahr

1995

Quelle

POWDER METALLURGY

Klassifikation

Metallurgy & Metallurgical Engineering

Schlagworte des Autors

nicht belegt

Thesaurusbegriffe

nicht belegt

Sprache

ENGLISH

Recherchedatum

12.03.2021

Dokument Nr. 197

Titel

Titel serbokroatisch. Einfluss der Profilierungsart der **Schleifscheibenschneidflaeche** auf die **Schleifkraefte** und die Rauheit der geschliffenen Oberflaeche. Influence of the **grinding wheel cutting** surface profiling on **grinding** forces and ground surface roughness.

Autor

CEBALO, R.

Institution

Jugoturbina, Karlovac, YU

Abstrakt

This work examines the influence of the way and conditions of profiling on the characteristics of the **grinding wheel cutting** surface, **grinding** forces and the roughness of the ground surface while creep-feed **grinding**. Profiling, i.e. sharpening of the **grinding wheel** surface was performed by a single-diamond, by a diamond roller and by a cementated carbides roller. The obtained results are, according to the experiment plan, valid for the testing of NIMONIC 80 A and for the open **grinding wheel**. The results can probably be applied to other materials and **wheels** also, which, however, has to be proved for each individual case.

Veröffentlichungsjahr

1987

Quelle

Strojarstvo * Band 29 (1987) Heft 5, Seite 237-246 (10 Seiten, 5 Bilder, 6 Tabellen, 20 Quellen)

Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen

Schlagworte des Autors

SCHLEIFEN
SCHLEIFSCHEIBE
PROFILIERUNG
EINFLUSSGROESSE
SCHLEIFKRAFT
RAUHEIT
DIAMANTSCHLEIFEN
NIMOCR STAHL
DIAMANTSCHLEIFSCHEIBE
ABRICHTEN
VERSUCHSMETHODE
TIEFSCHLEIFEN
SPANEN (OHNE KONTUR)
FLACHSCHLEIFEN

Thesaurusbegriffe

nicht belegt

Sprache

Serbokroatisch

Recherchedatum

12.03.2021

Dokument Nr. 198

Titel

Einsatz und Einsatzvorbereitung von CBN- und Diamant-Schleifscheiben. Application of CBN and diamond **grinding wheels**.

Autor

MEYER, H.R.

Institution

nicht belegt

Abstrakt

Einteilung der Abrichtverfahren in Form- und Schaerfverfahren. Unterteilung der Formverfahren in Verfahren mit stehenden und bewegten Abrichtwerkzeugen. Zu den stehenden Abrichtwerkzeugen gehoeren Einzeldiamant, Abrichtleiste, Vielkornabrichter und **Molybdaen-Stab**. Formverfahren mit bewegten Abrichtwerkzeugen werden unterschieden in Abrichten mit Diamant-Abrichtrolle, mit Diamant-Abrichtscheibe, mit Siliziumkarbidschleifscheibe, mit Roll-2-dress-Verfahren, **Schleifen** von langspanendem Stahl und Einrollverfahren. Schaerfen von CBN-Schleifscheiben mit Schaerfblock, Abrichten von CBN- und Diamant-Schleifscheiben mit **Molybdaen-Abrichtstab** und Abrichten von CBN-Schleifscheiben mit Kunstharzbindung mit Diamant-Abrichtrolle. **Schleifen** des Zahnprofils an HSS-Waelzfraesern mit gleichzeitiger Herstellung des Hinterschliffs mit profilierbaren Bornitridschleifscheiben. **Schleifen** von Zahnprofilen an Hartmetallfraesern mit crushierbaren Diamant-Schleifscheiben.

Veröffentlichungsjahr

1980

Quelle

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Klassifikation

3LKB Spanende Bearbeitung, Zerspanen, Zerteilen

Schlagworte des Autors

SILICIUMCARBID
SCHLEIFSCHEIBE
DIAMANT
BORNITRID
KUBISCHE STRUKTUR
SCHLEIFSCHEIBENABRICHTUNG
WERKZEUGWERKSTOFF
VERSUCHSDURCHFUEHRUNG
VERFAHRENSBEDINGUNG

Thesaurusbegriffe

ANWENDUNG

Sprache

Deutsch

Recherchedatum

12.03.2021

Dokument Nr. 199

Titel

SYNTHETIC **GRINDING TOOLS** FOR SMOOTH **LEAD** GLASS PRODUCTS

Autor

LESHCHINSKII DA
EVSTISHENKOV VS
KLEPIKOV SA
FEIGIN BZ

Institution

nicht belegt

Abstrakt

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Schlagworte des Autors

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