

Record 1 of 13

Title: Comparison of ultrasonically enhanced pulsating water jet erosion efficiency on mechanical surface treatment on the surface of aluminum alloy and stainless steel

Author(s): Lehocka, D (Lehocka, Dominika); Klich, J (Klich, Jiri); Botko, F (Botko, Frantisek); Simkulet, V (Simkulet, Vladimir); Foldyna, J (Foldyna, Josef); Krejci, L (Krejci, Lucie); Storkan, Z (Storkan, Zdenek); Kepic, J (Kepic, Jan); Hatala, M (Hatala, Michal)

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Abstract: Presented article is focused on the comparison of erosion efficiency on the surface treatment of ultrasonically enhanced PWJ (pulsating water jet) on different metal materials surfaces. Surfaces of EN X5CrNi18-10 stainless steel and EN-AW 6060 aluminum alloy were evaluated. Pulsating water jet technological factors were set to the following values: pressure was 70MPa, circular nozzle diameter was 1.19mm, traverse speed of cutting head was

100mms(-1) (which is 200 impact for millimeter) for stainless steel and 660mms(-1) (which is 30 impact per millimeter) for aluminum alloy. The evaluation was made based on the surface topography evaluation, evaluation of microstructure, and microhardness in the transverse cut. The results of the stainless steel surface evaluation show slight erosion of material, with creating microscopic craters. Subsurface deformation was found to a depth of a maximum of 200 μ m. Hardness measurement shows 11% higher value of hardness under the affected area compared with a measurement in the center of the sample. From the findings, subsurface deformation strengthening of stainless steel with minimal influence of material surface can be assumed. Surface deformation of aluminum alloy is characterized by the formation of more pronounced depressions and less pronounced protrusions. Depressions were created by a combination of compression and tearing off material parts. A decrease in hardness value of 18% compared with a measurement in the center of the sample. In places of the first indent just below the disintegrated area (up to 600 μ m deep), it is possible to assume the material plastic deformation, but the value of aluminum alloy tensile strength R-m is not exceeded. The experimental results from an aluminum alloy evaluation do not confirm the subsurface mechanical strengthening of the material.

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Author(s): Lehocka, D (Lehocka, Dominika); Simkulet, V (Simkulet, Vladimir); Klich, J (Klich, Jiri); Storkan, Z (Storkan, Zdenek); Krejci, L (Krejci, Lucie); Kepic, J (Kepic, Jan); Bircak, J (Bircak, Jaroslav)

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 Zhang YN, 2017, ADV MECH ENG, V9, DOI 10.1177/1687814017698321

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Abstract: Experimental study described in this article is focused on evaluation of dynamic effect of PWJ on disintegration efficiency on AISI 304 stainless steel surface. AISI 304 stainless steel was disintegrated with circular nozzle diameter 1.19 mm, pressure 70 MPa, frequency 20.25 kHz and traverse speed 100 mm.s⁻¹ (202 impacts per millimeter). Disintegration efficiency was evaluated based on surface and subsurface characteristics. Surface characteristics were evaluated based on surface topography and roughness parameters Ra [μm], Rz [μm], Rp [μm] and Rv [μm] comparison of disintegrated and non-affected area. Subsurface changes in material structure were described based on metallographic analysis and hardness measurement HV0.2 under the eroded area. The results of the disintegration efficiency evaluation of AISI 304 stainless steel surface show that was no massive erosion of material. Surface quality was slightly changed. Small microscopic craters were predominantly created on surface. Craters were characterized with predominant pitting mechanism and prevails fracture mechanism of material removal.

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Yang H, 2017, MAT SCI ENG A-STRUCT, V680, P324, DOI 10.1016/j.msea.2016.10.078

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Abstract: Residual stress detection and evaluation has been of crucial importance, and also problematic for many years. There are many methods of residual stresses determination based on destructive and non-destructive way of approach. Nowadays there are still undiscovered possibilities to determine these internal stresses. Opportunity to detect residual stress on line directly, without using big and expensive devices is motivation for presented work. Presented article is focused on possibility to determine the residual stresses induced in conductive materials using eddy currents phasor angle. Using eddy currents method gives opportunity for quick on line measurement of residual stresses. Induced stress causes in base material slight deviation in permeability and conductivity, which can be detected using standard eddy currents flaw detector. Experimental procedure included annealing for stress relief, manufacturing by face milling and measurement of residual stresses using x-ray diffraction and eddy currents. Results of experimental research lead to extension of knowledge in the field of residual stresses. Presented method is applicable for assessment of residual stresses in many components.

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Zelenak M, 2015, MEASUREMENT, V72, P1, DOI 10.1016/j.measurement.2015.04.022

Cited Reference Count: 23

Abstract: The article deals with the measurement of micro-hardness of the track by the action of ultrasonic excitation of pulsating water jet. The cumulative effect of liquid matter in the form of droplets concentrated in waveform measurements was provided in horizontal and vertical direction to material core (AISI 304). The material was subjected to pressures of $p = 40, 50$ and 60 MPa with the actuator working at a frequency of $20,14$ kHz and traverse speed $v = 1,1$ mm/s, $v = 0,80$ mm/s and $v = 0,30$ mm/s respectively. The micro hardness measurement was carried out after machining it by pulsating water jet. The values were recorded in the zone located transversally under the trace to the depth of $1,5$ mm with $0,1$ mm distance between successive points. It was found that the deformation of material was ascertained from the boundary to the outer environment created by pulsating water jet to the inner core of the material. The results indicate that the pressure was the most influential parameter, which was responsible for the deformation strengthening of the material.

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Document Type: Article

Author Keywords: deformation; microhardness; pulsating water jet

KeyWords Plus: BONE; CONCRETE; REMOVAL; EROSION

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Krolczyk, Jolanta	J-8956-2015	0000-0002-7404-0377
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Publisher Address: TRG IVANE BRILIC-MAZURANIC 2, SLAVONSKI BROD, HR-35000, CROATIA

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Record 5 of 13

Title: Assessment of Deformation Characteristics on CW004A Copper Influenced by Acoustically Enhanced Water Jet

Author(s): Lehocka, D (Lehocka, Dominika); Simkulet, V (Simkulet, Vladimir); Legutko, S (Legutko, Stanislaw)

Edited by: Hamrol A; Cizak O; Legutko S; Jurczyk M

Source: ADVANCES IN MANUFACTURING (MANUFACTURING 2017) **Book Series:** Lecture Notes in Mechanical Engineering **Pages:** 717-724 **DOI:** 10.1007/978-3-319-68619-6_69 **Published:** 2018

Times Cited in Web of Science Core Collection: 3

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Usage Count (Last 180 days): 0

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Zhong ZW, 2002, MATER MANUF PROCESS, V17, P339, DOI 10.1081/AMP-120005380

Cited Reference Count: 22

Abstract: Paper deals with copper CW004A deformation characteristics evaluation after pulsating water jet disintegration. Experimental samples were prepared from copper CW004A with marking A, B, and C. As variable factors were selected combinations of pressure of pump pressure and nozzle diameter: A (p = 65 MPa; d = 1.067 mm), B (p = 49 MPa; d = 1.321 mm), C (p = 38 MPa; d = 1.600 mm). Surface topography was evaluated using optical profilometry. Microhardness measurement was measured using Vickers indenter. Hardness measurement was performed on seventeen points under disintegrated area in distance from 0.1 to 3 mm. Measured values indicate slight increase of strain hardening undercutting area.

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Author Keywords: Pulsating water jet; Strain hardening; Microhardness; Copper

KeyWords Plus: ABRASIVE WATERJET; MACHINING PARAMETERS; SURFACE; DISINTEGRATION; TECHNOLOGY

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Record 6 of 13

Title: DETERMINATION OF THE EOS MARAGINGSTEEL MS1 MATERIAL RESISTANCE AT LOW TEMPERATURES

Author(s): Dobransky, J (Dobransky, J.); Behalek, L (Behalek, L.); Baron, P (Baron, P.); Kocisko, M (Kocisko, M.); Simkulet, V (Simkulet, V.); Vojnova, E (Vojnova, E.); Briancin, J (Briancin, J.)

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Cited References: Anton P, 2014, APPL MECH MATER, V616, P183, DOI 10.4028/www.scientific.net/AMM.616.183

Behalek L., 2013, APPL MECH MAT, V308, P127

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Greskovic Frantisek, 2013, Advanced Materials Research, V739, P171, DOI 10.4028/www.scientific.net/AMR.739.171

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Cited Reference Count: 11

Abstract: This article deals with determination of the EOS MaragingSteel MS1 material resistance at different low temperatures. Material resistance was evaluated in two types of standardized specimens. The impact energy at the specimens tested at 10 degrees C, values for the specimens with no notch were compared to the V - notch specimens, higher by approximately one - third. When the temperature dropped to 0 degrees C, the values of the impact energy slightly decreased as well. It therefore follows that lower temperatures result in decrease in the values of the impact strength. This experiment provided us with the opportunity to find out whether the decrease in temperature impacts the resistance of the tested material.

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Author Keywords: alloy steel; mechanical properties; impact energy; fracture; surface

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Output Date: 2019-09-17

Record 7 of 13

Title: EVALUATION OF THE IMPACT ENERGY OF THE SAMPLES PRODUCED BY THE ADDITIVE MANUFACTURING TECHNOLOGY

Author(s): Dobransky, J (Dobransky, J.); Kocisko, M (Kocisko, M.); Baron, P (Baron, P.); Simkulet, V (Simkulet, V.); Behalek, L (Behalek, L.); Vojnova, E (Vojnova, E.); Marcincinova, LN (Marcincinova, L. Novakova)

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Cited References: Anton P, 2014, APPL MECH MATER, V616, P183, DOI 10.4028/www.scientific.net/AMM.616.183

Behalek L., 2013, APPL MECH MAT, V308, P127

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Stejskal T, 2013, APPL MECH MATER, V282, P257, DOI [10.4028/www.scientific.net/AMM.1000.257, 10.4028/www.scientific.net/AMM.282.257]

Cited Reference Count: 10

Abstract: The article covered the evaluation of the impact energy, notch toughness and morphology of the fracture surfaces of the specimens manufactured by the Direct Metal Laser Sintering Technology. Specimens without heat treatment with no notch were not broken through in course of testing, therefore there was no fracture surface present. The heat treatment resulted in the increase in hardness values. The values of impact energy after the heat treatment was approximately 60 % lower. Ductile intergranular fracture with more or less segmented dimple morphology appeared in every specimen. At places where the internal plastic bond was resisting the test, cracks remaining after particles broke away from the surface can be seen as craters.

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Language: English

Document Type: Article

Author Keywords: metal powder; mechanical properties; impact energy; fracture; surface

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Simkulet, Vladimir		0000-0003-0249-8183

Publisher: CROATIAN METALLURGICAL SOC

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Record 8 of 13

Title: EXAMINATION OF MATERIAL MANUFACTURED BY DIRECT METAL LASER SINTERING (DMLS)

Author(s): Dobransky, J (Dobransky, J.); Baron, P (Baron, P.); Simkulet, V (Simkulet, V.); Kocisko, M (Kocisko, M.); Ruzbarsky, J (Ruzbarsky, J.); Vojnova, E (Vojnova, E.)

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Cited References: Behalek L., 2013, APPL MECH MAT, V308, P127

Gaspar S, 2014, ADV MATER RES-SWITZ, V909, P3, DOI 10.4028/www.scientific.net/AMR.909.3

Greskovic Frantisek, 2013, Advanced Materials Research, V739, P171, DOI 10.4028/www.scientific.net/AMR.739.171

Manas D., 2014, International Journal of Mechanics, V8, P150

Monkova Katarina, 2014, Advanced Materials Research, V1016, P239, DOI 10.4028/www.scientific.net/AMR.1016.239

Panda A, 2013, APPL MECH MATER, V415, P610, DOI 10.4028/www.scientific.net/AMM.415.610

Radoslav Krehel, 2013, Applied Mechanics and Materials, V308, P121, DOI 10.4028/www.scientific.net/AMM.308.121

Sebo J, 2013, METALURGIJA, V52, P119

Stanislav F, 2014, APPL MECH MATER, V616, P85, DOI 10.4028/www.scientific.net/AMM.616.85

Stejskal T, 2013, APPL MECH MATER, V282, P257, DOI [10.4028/www.scientific.net/AMM.1000.257, 10.4028/www.scientific.net/AMM.282.257]

Cited Reference Count: 10

Abstract: This article is concerned with assessing microstructural properties of metal component manufactured by additive DMLS technology. Two series of samples were assessed. The first one was manufactured without heat treatment. Samples in the second series were treated with heat in order to assess increase in hardness and influence on modification of microstructure. Subsequently, values of hardness were measured by Vickers Hardness Test and modification of microstructure was observed by optical microscope. Evaluations were carried out in three planes in order to assess the differences in layering of material during its processing. Differences in values of hardness and microstructural components were discovered by examination of changes in three planes.

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Author Keywords: direct metal laser sintering; heat treatment; hardness; microstructure

Addresses: [Dobransky, J.; Baron, P.; Simkulet, V.; Kocisko, M.; Ruzbarsky, J.] Tech Univ Kosice, Fac Mfg Technol Seat Pregov, Kosice, Slovakia. [Vojnova, E.] IPN Moulds & Tools, Presov, Slovakia.

Reprint Address: Dobransky, J (reprint author), Tech Univ Kosice, Fac Mfg Technol Seat Pregov, Kosice, Slovakia.

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Author	Web of Science ResearcherID	ORCID Number
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Simkulet, Vladimir		0000-0003-0249-8183

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Record 9 of 13

Title: Microstructural Characteristics Investigation of the Chip-Making Process after Machining

Author(s): Vojtko, I (Vojtko, Imrich); Simkulet, V (Simkulet, Vladimir); Baron, P (Baron, Petr); Orlovsky, I (Orlovsky, Imrich)

Edited by: Fabian S; Krenicky T

Source: OPERATION AND DIAGNOSTICS OF MACHINES AND PRODUCTION SYSTEMS OPERATIONAL STATES II **Book Series:** Applied Mechanics and Materials **Volume:** 616 **Pages:** 344-350 **DOI:** 10.4028/www.scientific.net/AMM.616.344 **Published:** 2014

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Usage Count (Last 180 days): 0

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Cited References: Beno J., 1996, P INT 96 STAR LESN 1

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Krenicky T., 2011, SCI PAPERS OPERATION, V4, P5

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Vasilko K., 2001, MANUFACTURING TECHNO

Vojtko I., 2011, J CA SYSTEMS PRODUCT, V12, P127

Cited Reference Count: 21

Abstract: Machining as a base technology for the manufacture of precision engineering components has a dominant position. Interaction of machine - tool - work piece has a significant impact on the quality of surface, next to under surface changes of worked material and finally to the total production process. In presented work microstructures characteristics of the arising chip are evaluated depending on the defined conditions used for machining. Further basic patterns of the manufacturing process as well as the accompanying effects on the cutting process are clarified. Theory of formation of chip is not nearly closed part of the analytical theory of cutting indicates a possibility of further investigation boundaries of these zones of deformation, the application of mathematical, physical and other methods of examination, verification of modern experimental methods. Thickness of chip was achieved to 50 μm . This micro hardness value was selected to the plastic zones. In area of primary plastic deformation was in range from 256.7 to 264.0 HV 0.1. Area of secondary plastic deformation was higher as primary plastic deformation; it was in range of 289.4 to 357.4 HV 0.1. In plastic deformation area was in range from 261.5 to 278.2 HV 0.1 which is consequence of the action of the outgoing temperature [1].

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Language: English

Document Type: Article; Book Chapter

Author Keywords: chip-making process; microstructure; micro hardness

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Record 10 of 13

Title: MICROSTRUCTURE CHARACTERISTICS OF Fe-0.85Mo-3Mn-0.5C SINTERED STEEL IN DEPENDENCE ON SINTERING CONDITIONS

Author(s): Simkulet, V (Simkulet, Vladimir); Parilak, L (Parilak, L'udovit)

Source: CHEMICKÉ LISTY **Volume:** 106 **Special Issue:** SI **Pages:** S529-S530 **Supplement:** 3 **Published:** 2012

Times Cited in Web of Science Core Collection: 0

Total Times Cited: 0

Usage Count (Last 180 days): 0

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Cited References: Bidulsky R., 2008, CHEM LISTY, V105, ps14

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Duszova A, 2011, CHEM LISTY, V105, ps17

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Novak-Marcincin J, 2011, TEH VJESN, V184, P4
Salak A., 2005, P DFPM
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Zubko P., 2010, CHEM LISTY, V105, ps17

Cited Reference Count: 9

Abstract: V. Simkulet, and L. Parilak (Faculty of Manufacturing Technologies of the Technical University of Kosice with a seat in Presov, Slovakia): Microstructures Characteristics of Fe-0.85Mo-3Mn-0.5C Sintered Steel in Dependence on Sintering Conditions Manganese in combination with Molybdenum atomized prealloyed powder forms a new group of sintered high strength steels. The final properties of these steels depend on microstructure homogeneity. The aim was to investigate the alloying of molybdenum prealloyed powder with manganese in comparison with plain iron powder. The circular cross section samples were prepared for the investigation from basis water atomized and plain iron powders. The microstructure characteristics of sintered samples were characterized by micro hardness measurement.

Accession Number: WOS:000314237900055

Language: English

Document Type: Article

Author Keywords: powder metallurgy; alloying; microhardness measurement

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E-mail Addresses: vladimir.simkulet@tuke.sk

Publisher: CHEMICKE LISTY

Publisher Address: NOVOTNEHO LAVKA 5, PRAGUE 6 116 68, CZECH REPUBLIC

Web of Science Categories: Chemistry, Multidisciplinary

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Record 11 of 13

Title: THE EFFECT OF SURFACE ROUGHNESS ON NANOINDENTATION

Author(s): Fuchsova, G (Fuchsova, Gabika); Lofaj, F (Lofaj, Frantisek); Simkulet, V (Simkulet, Vladimir)

Source: CHEMICKE LISTY **Volume:** 105 **Pages:** S796-S797 **Supplement:** S **Published:** 2011

Times Cited in Web of Science Core Collection: 5

Total Times Cited: 5

Usage Count (Last 180 days): 0

Usage Count (Since 2013): 9

Cited References: Fischer-Cripps A. C., 2004, NANOINDENTATION

ISO 14577-4:2007:E, 2007, 1457742007E ISO

ISO 14577-1:2002:E, 2002, 1457712002E ISO

Cited Reference Count: 3

Abstract: Current study revealed that surface roughness of WC-C coating increases with steel substrate roughness reduction and nanohardness (and indentation modulus) of substrates and coatings does not depend on R, it only substantially increases the scatter of the measurements.

Accession Number: WOS:000297278200043

Language: English

Document Type: Article; Proceedings Paper

Conference Title: 7th International Conference Local Mechanical Properties (LMV)

Conference Date: NOV 10-12, 2010

Conference Location: Smolenice Castle, SLOVAKIA

Author Keywords: nanoindentation; surface roughness; WC-C coating; nanohardness; indentation modulus

Addresses: [Fuchsova, Gabika; Simkulet, Vladimir] Tech Univ Kosice Seat Presov, Fac Mfg Technol, Presov 08001, Slovakia.

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Publisher: CHEMICKE LISTY

Publisher Address: NOVOTNEHO LAVKA 5, PRAGUE 6 116 68, CZECH REPUBLIC

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Record 12 of 13

Title: Analysis of compressive forces on rolls of a pipe conveyor

Author(s): Michalik, P (Michalik, Peter); Molnar, V (Molnar, Vierošlav); Fedorko, G (Fedorko, Gabriel); Zajac, J (Zajac, Jozef); Luscinski, S (Luscinski, Slawomir); Hatala, M (Hatala, Michal); Monka, P (Monka, Peter); Simkulet, V (Simkulet, Vladimir); Orlovsky, I (Orlovsky, Imrich)

Edited by: Navrat T; Fuis V; Houfek L; Vlk M

Source: EXPERIMENTALNI ANALYZA NAPETI - EXPERIMENTAL STRESS ANALYSIS **Pages:** 245-250 **Published:** 2011

Times Cited in Web of Science Core Collection: 1

Total Times Cited: 1

Usage Count (Last 180 days): 0

Usage Count (Since 2013): 0

Cited References: Fabian M., 2009, NAVRHOVANI VYROBA S, V1

Ivanco V, 2003, METAL STRUCTURES: DESIGN, FABRICATION, ECONOMY, P369

Janecki D, MEASURE QUALITY CONT, V1860, P113

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Marasova D., 2008, CURRENT SITUATION DE, P49

Mares A., 2008, AI MAG, V1, P3

Stanova E., 2008, TRANSPORT LOGISTICS, P40

Cited Reference Count: 7

Abstract: The paper deals with the analysis of compressive forces in the rolls of a pipe conveyor measured on a testing device

Accession Number: WOS:000394059400036

Language: English

Document Type: Proceedings Paper

Conference Title: 49th International Scientific on Experimental Stress Analysis

Conference Date: JUN 06-09, 2011

Conference Location: Znojmo, CZECH REPUBLIC

Conference Sponsors: Brno Univ Technol, Fac Mech Engn, Inst Solid Mech Mechatron & Biomechan, Czech Soc Mech

Author Keywords: Pipe conveyor; Testing device; Rolls of a pipe conveyor

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Michalik, Peter		0000-0001-8431-6050
Luscinski, Slawomir		0000-0001-7385-6668

Publisher: BRNO UNIV TECHNOL, FAC MECHANICAL ENGINEERING

Publisher Address: TECHNICKA 2, BRNO, 616 69, CZECH REPUBLIC

Web of Science Categories: Engineering, Mechanical; Mechanics; Materials Science, Characterization & Testing

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Record 13 of 13

Title: Estimation of the smooth zone maximal depth at surfaces created by Abrasive Waterjet

Author(s): Hloch, S (Hloch, Sergej); Valicek, J (Valicek, Jan); Simkulet, V (Simkulet, Vladimir)

Source: INTERNATIONAL JOURNAL OF SURFACE SCIENCE AND ENGINEERING **Volume:** 3 **Issue:** 4 **Pages:** 347-359 **DOI:** 10.1504/IJSURFSE.2009.027420 **Published:** 2009

Times Cited in Web of Science Core Collection: 17

Total Times Cited: 18

Usage Count (Last 180 days): 0

Usage Count (Since 2013): 5

Cited References: Arola D, 1997, WEAR, V210, P50, DOI 10.1016/S0043-1648(97)00087-2
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Valicek J, 2007, INT J MACH TOOL MANU, V47, P1786, DOI 10.1016/j.ijmactools.2007.01.004
ZENG J, 1996, WEAR, V193, P207

Cited Reference Count: 22

Abstract: The paper proposes a new method for the estimation of the maximal depth of the smooth zone at surfaces created by an Abrasive Waterjet (AWJ). The new estimation is based on experimental analysis and the experimental study of stainless Steel Surface irregularities created by an AWJ. Surface profile parameter Ra has been obtained by means of an optical commercial profilometer MicroProf (FRT). The main emphasis is on the analysis of results for defining the process of creation of a new surface generated by the stream of an AWJ.

Accession Number: WOS:000269890600006

Language: English

Document Type: Article

Author Keywords: AWJ; abrasive waterjet; shadow method; parameters; cutting mechanism

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