

# JEMNÁ MECHANIKA A OPTIKA

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**The Effect of Cooling Process on Residual Stresses in a Surface Layer of Ground Components**

(J. Jersák, Z. Pala, N. Ganey)..... 232  
Production processes and working conditions in the course of machining affect, the properties of a surface layer of machine components. This layer, in turn, has an effect on machine components quality, especially regarding their resistance to dynamic load. Consequently, this layer directly affects durability and reliability of those components. There are a large number of components, e.g., motors, power plants, means of transport, machine tools, and so on which may be exposed to cyclic stress, whether mechanical or thermal. Conditions for the creation of functional surface layer are reflected in the so called surface integrity. The surface integrity shows the effect of production methods on the quality of machined surface related to functional requirements for the product as a whole. An important parameter of surface integrity is the state of stress level. This paper presents results of residual stress measurements of the surface layer of components which were ground either without using a cooling agent, or cooled by means of Cimtech A31F cooling liquid, or cooled by means of cold air flow. The other grinding conditions were kept constant.

**Experience with REM and EDX analyse at study materials**

(V. Reicheltová) ..... 237  
In 2007 was caused by Technical University of Liberec and Škoda Auto a.s. company cooperation separate workplace „Scanning electron microscopy laboratory“ (REM). REM laboratory inhere in modern premises of the newly constructed Educational Centre Na Karmeli in Mladá Boleslav. Workplace serve not only for quality of part classification, but head for research requirements of new generation materials structure and constitution. Without question are this materials nanomaterials, geopolymers and geocomposites.

**Objective off-line method for evaluation of flat glass corrugation** (V. Hotař)..... 240

In practise a corrugation tests are widely used for evaluation a flat-glass quality during its mass production. Recently, these tests have been based on a subjective standards comparison with the ripple of the zebra-plate image reflected by the glass-sheet sample. Tests in a continuous production process are performed even several times per hour under usual conditions. Our research aim consists in an objectification of corrugation quantity replacing the subjective observer by digital camera and processing unit, all verified routinely in the production process. For a corrugation analysis the unique software was proposed and developed using the Matlab environment, including the data acquisition in service. The code is compiled as an independently executable module. The principle of the method rests in the detection of boundary lines between light and dark areas of the sample image and their evaluation employing statistical approach, curve rectification and determination of its fractal dimension. The quality parameter obtained in such a way and recalculated by means of weighted coefficients is in the accord with the results previously achieved using the subjective methodology.

**USING ENDOSCOPIC VISUALIZATION EQUIPMENT AT THE COMBUSTION ENGINES RESEARCH**

(J. Blažek) ..... 242  
The paper describes the use of visualization method in combustion engines. The development of engines with its complexity of in-

cylinder process requires modern development tools. Visualization tools are possible for using of monitoring of fuel mixtures creation, start reaction of ignition and subsequent of combustion process at combustion engine (SI engines and diesel engines). The special protection of optical endoscope lens was developed to observe actions in the catalyst at very high-temperatures.

**Grinding of Friction Discs Front Faces - Transmitted Torque** (R. Vrzala, I. Petříková) ..... 245

Special grinding machine based on relative motion between the two front faces of friction discs with the vertical parallel axes are applied in technological process of manufacture of high-quality flat surfaces. Paper deals with kinematic and dynamic motion transfer from driving disc to driven disc for in the cases of fixed and variable eccentricity between two discs ; influence of distance between axes, influence of function generating change of this distance on non-uniform driving disc revolving and influence of instantaneous speed rotation.

**Geometrical aspects of surface roughness in classical and unconventional technology** (J. Valíček, J. Rusnák, M. Müller, P. Hrabě, M. Kadnár, S. Hloch, M. Kušnerová)..... 249

**Damascus steel – medieval composite from the view of nowadays** (M. Polák) ..... 253

Golden age of damascus steel has passed away, however his value still remains. It could be even said that this material passes through his renaissance in the last years. Besides aesthetic properties it has doubtless very interesting mechanical properties. For example, strength of final material is higher than strength of his particular components, whereas hardness is relatively low - as is apparent from done experiment.

**From technical library** (I. Brezina) ..... 255

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## ANOTACE

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**Analýza destrukce diamantových brusných kotoučů**

(A. Popov)..... 247  
Uvádí se klasifikace možných modelů destrukce diamantových brusných kotoučů v podobě lokálního odlomení, posunu a rotace diamantových zrn, které se uplatňují nezávisle, postupně nebo současně. Je konstatováno, že destrukce diamantových kotoučů s organickou nebo kovovou vazbou se obecně vyskytuje jakožto výsledek lokálních rotačních diamantových zrn ve vazbě, jejichž počet dosahuje 50 % celkového množství zrn neúčastnících se procesu řezání.