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Cover story — continued

It is one of the great iconic buildings of the 20<sup>th</sup> century, an image of great beauty that has become known throughout the world – a symbol for not only a city, but a whole country and continent." It is one of the world's most famous performing arts centres in the world. Contrary to the implication of the name, it houses a multi-venue performing arts centre, rather than a single Opera theatre.

As well as hosting many touring productions in a variety of performance genres, the Sydney Opera House is a major presenting venue for Opera Australia, the Australian Ballet, the Sydney Theatre Company and the Sydney Symphony. The Sydney Opera House is an expressionist modern design, with a series of large precast concrete 'shells', each taken from a hemisphere of the same radius, forming the roofs of the structure. The roofs of the Sydney Opera House are covered in a subtle chevron pattern with 1,056,006 glossy white and matte cream Swedish-made tiles, though from a distance the tiles look only white. Despite their self-cleaning nature, they are still subject to periodic maintenance and replacement. Apart from the tile of the shells, and the glass curtain walls of the foyer spaces, the building's exterior is largely clad with aggregate panels composed of pink granite quarried in Tarana. Significant interior surface treatments also include off-form concrete, Australian white birch plywood supplied from Wauchope in northern New South Wales, and brush box glulam. The building covers 1.8 hectares of land, and is 183 metres long and about 120 metres wide at its widest point. The podium of the Sydney Opera House is supported on 588 concrete piers sunk up to 25 metres below sea level. Its power supply is equivalent for a town of 25,000 people. The power is distributed by 645 kilometres of electrical cable. The Sydney Opera House was conceived and largely built by a Danish architect Jørn Utzon, who in 2003 received the Pritzker Prize, architecture's highest honour, and was made a UNESCO World Heritage Site on 28<sup>th</sup> June 2007.

The Sydney Harbour Bridge (presented in the central small photo on the cover) is a steel arch bridge across Sydney Harbour that carries rail, vehicular and pedestrian traffic between the Sydney central business district and the North Shore. The dramatic view of the bridge, the harbour, and the nearby Sydney Opera House is an iconic image of both Sydney and Australia. The bridge is locally nicknamed the Coathanger because of its arch-based design. As a part of the fireworks displayed on the New Year's Eve each year since 1998, the Sydney Harbour Bridge has what is referred to colloquially as the "Bridge Effect", in which a light display on a framework is used to complement the fireworks. The bridge was designed and built by Dorman Long and Co Ltd, Middlesbrough, England and opened in 1932. It is the fourth-longest spanning-arch bridge in the world. The arch span is 503 metres and the weight of the steel arch is 39,000 tons. About 79% of the steel came from England. The rest was Australian-made. The total weight of the bridge is 52,800 tonnes, and six million hand-driven rivets hold the bridge together. The rivets were made at the Park Bridge Ironworks in Lancashire, England. According to Guinness World Records, the Sydney Harbour Bridge is the world's widest long-span bridge and is the tallest steel arch bridge, measuring 134 metres from the top to the water level, though it can increase by as much as 180 millimetres on hot days as the result of steel expanding in heat. Two large metal hinges at the base of the bridge accommodate these expansions and contractions and thereby prevent the arch from being damaged. At each end of the bridge stands a pair of 89 metres high concrete and granite pylons. The pylons were designed by Thomas Smith Tait, who was a prominent Scottish Modernist architect and designed a number of buildings around the world in Art Deco and Streamline Moderne styles, a partner in the architects' firm John Burnet & Partners. The granite was quarried at Moruya, New South Wales, 250 kilometres south of Sydney. The concrete used was also Australian-made.

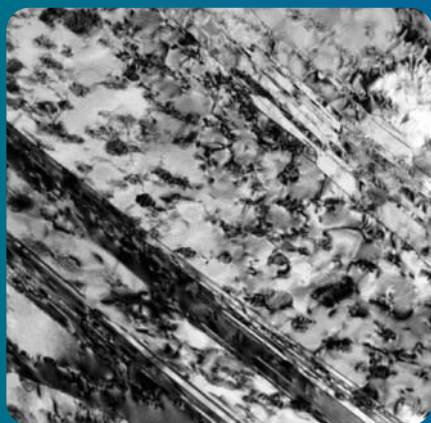
In the third small photo on the cover there is Surfers Paradise, Queensland. Surfers Paradise is a town on Australia's Gold Coast in Queensland. Colloquially known as 'Surfers', the suburb has many high-rise apartment buildings and a wide surf beach. The feature of the central business district is Cavill Mall, which runs through the shopping precinct. Cavill Avenue, named after Jim Cavill, an early hotel owner, is one of the busiest shopping strips in Queensland, and the centre of activity for night life. It is the best known feature of the Gold Coast's skyline. The 9<sup>th</sup> Global Congress on Manufacturing and Management, organised in the cooperation with the World Academy of Materials and Manufacturing Engineering WAMME took place on 12<sup>th</sup>–14<sup>th</sup> November 2008 just here in Holiday Inn Hotel in Gold Coast, Australia.

**Award**

In 2008 the outstanding academic contribution award for excellence in manufacturing engineering education was granted to Prof. Leszek A. Dobrzański



**Selected materialographical photo**



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The Materials section represented by A. Nowotnik, J. Sieniawski and G. Mrówka-Nowotnik on "Identification of dynamically precipitated phases in hot-working Inconel 718 alloy" on a **page 275** presents the analysis how to localise flow/structural inhomogeneties

that may develop during hot deformation and can affect a precipitated phases and to determine what kind of particles are presented in the microstructure of hot-worked Inconel 718 superalloy. Microstructural observations of deformed at high temperatures, previously solution treated Inconel superalloy revealed non uniform deformation effects. The distribution of molybdenum- and niobium-rich carbides affected by localised flow was found. Microstructural examination of the alloy also shows shear banding penetrating through the whole grains. The experiments on hot deformation of age hardenable Inconel 718 superalloy and the analysis of dynamic precipitation process have a practical aspect. This interaction could become an important feature of high temperature performance and may also influence the production of specific structures of this material. Even though the number of research has focused on the hot deformation behaviour of Inconel 718, there is still scarcity of data referring to the analysis of dynamic structural processes which operate during hot deformation of this precipitation hardenable alloy: in particular dynamic precipitation and dynamic particles coarsening.

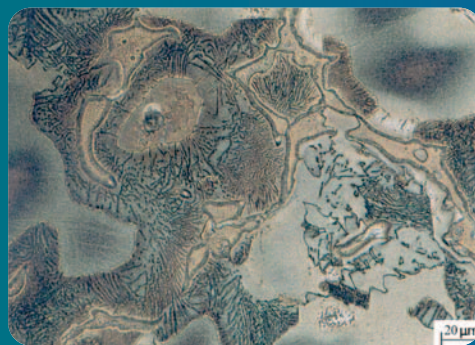
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**Properties**

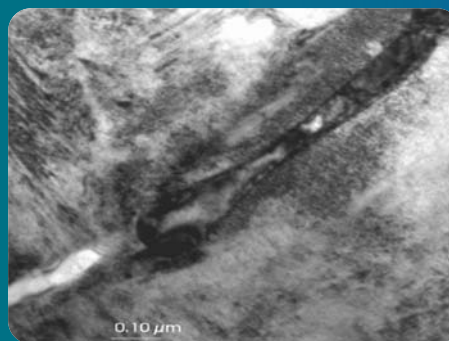
- 290.** Microstructural characterisation of EN AW6061 alloy matrix composites with Ti<sub>3</sub>Al intermetallics reinforcement  
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- 294.** Manufacturing and damage mechanisms in metal matrix composites  
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- 301.** The effect of design on adhesive joints of thick composite sandwich structures  
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- 312.** Characterisation of properties and microstructural changes of 12% Cr-W steels after long-term service  
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- 348.** Physical properties and haemocompatibility of passive-carbon layer  
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- 356.** Fatigue failure of micro-alloyed 23MnB4 steel  
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- 364.** Oxidation and exhaust gas corrosion resistance of the cobalt base clad layers  
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- 378.** Cavitation erosion of laser processed Fe-Cr-Mn and Fe-Cr-Co alloys  
M. Szkodo (Poland)
- 385.** Transient thermography in the assessment of local fibre content in CFRP laminates  
G. Wróbel, Z. Rdzawski, G. Muzia, S. Pawlak (Poland)



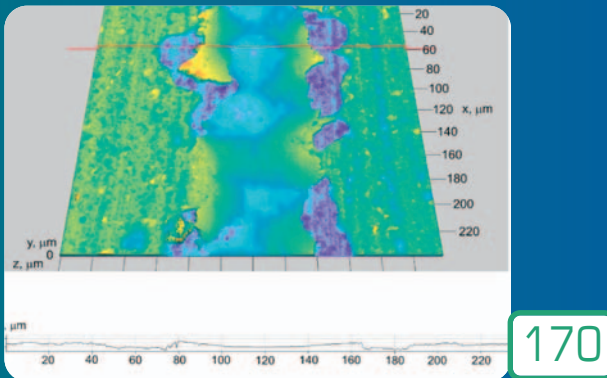
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The research paper entitled "Structure and properties of the Mg alloys in as-cast state and after heat and laser treatment" by L.A. Dobrzański, T. Tański, J. Domagała, M. Król, Sz. Malara, A. Klimpel on a **page 123** discusses the structure and properties of the magnesium cast alloys in as-cast state and after heat treatment. Moreover, a purpose of this paper is to extend a complex evaluation of magnesium alloys after laser surface treatment and the new methodology to determine the thermal characteristics of magnesium alloy using the novel Universal Metallurgical Simulator and Analyser Platform (UMSA). The structure of the alloyed zone is dendritic. Microhardness of laser alloyed surface layer with ceramic powders was significantly improved while comparing to alloy without laser treatment. The research of the thermal analysis shows that UMSA Technology Platform is an efficient tool for collection and calculate of thermal parametres. Totally, there are some restriction for the use of ceramic powders for alloying, some powders as oxides and nitrides are not favourable for alloying because of their dissolution during the alloying process. Further tests should be carried out in order to examine different cooling rates and parametres of solution treatment process and aging process.



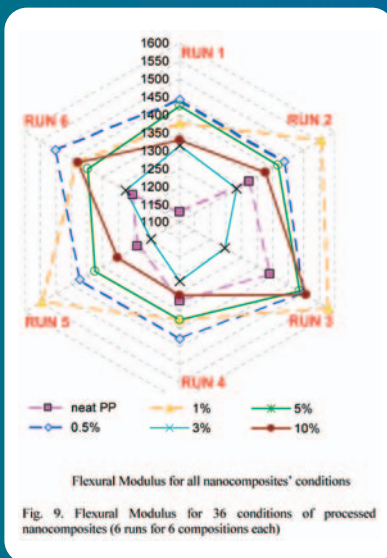
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The paper from Research monographs made by L.A. Dobrzański, M. Bonek, E. Hajduczek, K. Labisz, M. Piec, E. Jonda and A. Polok on "Structure and properties of laser alloyed gradient surface layers of the hot-work tool steels" on a **page 148** presents laser surface technologies, investigation of structure and properties of the hot work tool steels alloying with ceramic particles using high power diode laser HPDL. As the effect of laser alloying with powders of carbides NbC, TaC, TiC, WC and VC size reduction of microstructure as well as dispersion hardening through fused in but partially dissolved carbides and consolidation through enrichment of surface layer in alloying additions coming from dissolving carbides occurs. The increase of hardness of surface layer obtained throughout remelting and alloying with carbides by high power diode laser is accompanied by increase of tribological properties, when comparing to the steel processed with conventional heat treatment. The outcome of the research is an investigation and the proves of the structural mechanisms accompanying laser remelting and alloying. The artificial neural networks were used to determine the results of the technological effect of laser alloying on hardness and resistance wear abrasion of the hot work tool steels.



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The paper entitled "Multilayer and gradient PVD coatings on the sintered tool materials" by L.A. Dobrzański, K. Gołombek, J. Mikula and D. Pakula on a **page 170** demonstrates results of structure and properties of the multilayer and gradient TiN+(Ti,Al,Si)N+TiN nanocrystalline coatings deposited by the use of the PVD method (CAE -Cathodic Arc Evaporation process) and in the combination of Al<sub>2</sub>O<sub>3</sub> and TiN coatings in the CVD process on the substrate of cemented carbides, cermets, Al<sub>2</sub>O<sub>3</sub>+ZrO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>+TiC, Al<sub>2</sub>O<sub>3</sub>+SiC<sub>(w)</sub> oxide ceramics and Si<sub>3</sub>N<sub>4</sub> nitride ceramics. The structural investigation includes the metallographic analysis on the transmission and scanning electron microscope, confocal microscope. Examinations of the chemical compositions of the deposited coatings were carried out using the X-ray energy dispersive spectrograph EDS, glow-discharge optical emission spectroscopy GDOS, and using the X-ray diffractometer. The investigation includes also analysis of mechanical and functional properties of the material: substrate hardness tests and micro-hardness tests of the deposited coatings, surface roughness tests, evaluation of the adhesion of the deposited coatings, cutting properties of the investigated materials.



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In the research paper entitled "Non-conventionally obtained polymer nanocomposites at different nano-clay ratios" by L.A. Dobrzański, M. Bilewicz, J.C. Viana and A.M. Cunha on a **page 212** investigation of nanocomposites, as promising engineering materials, basing on polymers and organo-modified silicates as nano fillers

has been presented. The application of nano platelet together with developed injection moulding technique brought satisfying mechanical results and development of morphology in the shape of gradient composition. Conventional injection moulding process additionally equipped with external computer controlled manipulation system for inducing the shear rates. It is presented that wide application of polymer nanocomposites as materials with ameliorates properties render them high potential materials.

- 391.** Torsional fatigue behaviour in gigacycle regime and damage mechanism of the perlitic steel  
H.Q. Xue (China, France), E. Bayraktar (France), I. Marines-Garcia (Mexico, France), C. Bathias (France)
- 398.** Investigation on mechanical behaviour of AM60 magnesium alloys  
C. Yan, (Australia) R.X. Bai (China), Y.T. Gu, W.J. Ma (Australia)



## Methodology of research

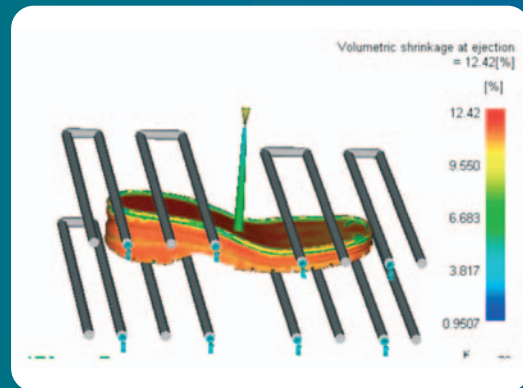
- 402.** Optical plasma spectroscopy as a tool for monitoring laser welding processes  
A. Ancona, T. Sibillano, P. M. Lugarà (Italy)
- 408.** X-ray and SEM studies on zirconia powders  
G. Dercz, K. Prusik, L. Pająk (Poland)
- 415.** Measurement of surface roughness and flank wear on hard martensitic stainless steel by CBN and PCBN cutting tools  
S. Thamizhmanii, S. Hasan (Malaysia)



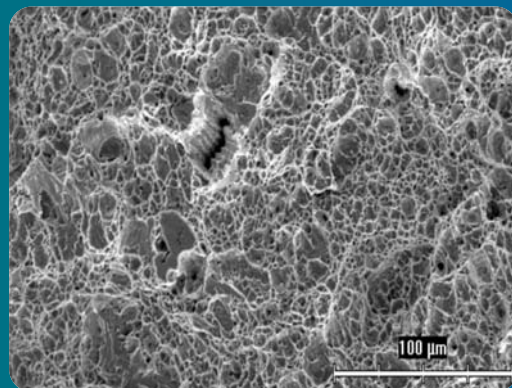
## Analysis and modelling

- 422.** An investigation on thermoelastic behaviour of functionally graded thick spherical vessels under combined thermal and mechanical loads  
F. Alavi, D. Karimi, A. Bagri (Iran)
- 429.** The reverse engineering to optimise the dimensional conical spur gear by CAD  
F. Belarifi (Algeria), E. Bayraktar (France), A. Benamar (Algeria)
- 434.** Analysis of mechanical systems with transversal vibrations in transportation  
A. Buchacz, S. Żółkiewski (Poland)
- 442.** Control and path prediction of an Automate Guided Vehicle  
S. Butdee, A. Suebsomran (Thailand), F. Vignat (France), P.K.D.V. Yarlagadda (Australia)

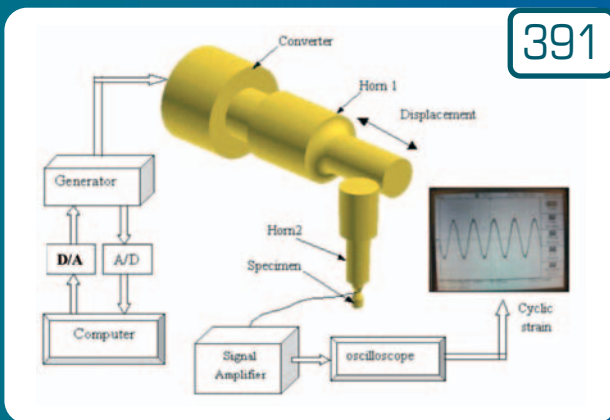
449. Formulation of 3 D shoe sizes using scanning camera and CAD modelling  
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456. TRIZ method for light weight bus body structure design  
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463. 3D finite element analysis of metal flow in hot aluminium extrusion of T-shaped profile with various offset pockets  
S.J.J. Carmai, S. Pitakthapanaphong, S. Sechjarern (Thailand)
469. Adaptive self-learning controller design for feedrate maximisation of machining process  
F. Cus, U. Zuper, E. Kiker, M. Milfelner (Slovenia)
477. An integrated model for the optimisation of a two-echelon supply network  
B. Fahimnia, L. Luong, R. Marian (Australia)
485. Experimental study to analyse the workpiece surface temperature in deep hole drilling of aluminium alloy engine blocks using MQL technology  
M.I. Hussain, K.S. Taraman, A.J. Filipovic (USA), I. Garrn (Germany)
491. Application of annotated paraconsistent logic to surveys conducted of self-administered questionnaires containing redundant questions  
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498. Process control using reliability based control charts  
J.K. Jacob, P.S. Sreejith (India)
505. Criteria of material selection for ballistic shields in the context of chosen degenerated models  
M. Kulisiewicz, M. Bocian, K. Jamroziak (Poland)
510. Toolpath generation method for four-axis NC machining of helical rotor  
J.N. Lee, C.B. Huang, T.C. Chen (Taiwan)
518. Research and development of Multi-Agent System based agile collaborative design system for machining centre  
F. Li, N. Chen, L. Zhou (China)



The Properties section represented by S. Chartakom and S. Butdee on "Experiment on high speed machining parameters for sport shoe sole mould making" on a **page 306** presents how to obtain the fine surface roughness that is required to less final polishing process as well as to the shortest manufacturing lead time. The investigations proving that the aluminium graded Al 6163 and Al 7075 can be suitably used for the sport sole mould making in or to obtain the acceptable surface roughness without polishing. The method can be adapted for all global shapes of tools, even in the case of complex geometries. The aluminium alloy 5058, 6163 and 7075 are selected for the experiment on a high speed machine. The machine used for testing is namely Mould Maker 200&2500 which is the high precision machining centre.

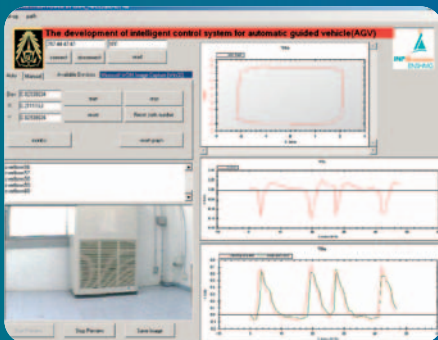


The paper entitled "Fatigue failure of micro-alloyed 23MnB4 steel" presented by S. Ruzs, L. Cizek, P. Filipec and M. Pastrnak on a **page 356** shows the structure and fatigue properties of micro-alloyed 23MnB4 steel evaluated in the initial state and after heat treatment. A fatigue test of micro-alloyed 23MnB4 steel was completed by metallographic and fracture analyses. The methods of the light microscopy and SEM were used for the scope. Microstructure of examined alloy in the initial state was characterised mostly by fine ferrite with pearlitic net and after heat treatment it was formed by martensite or partly by bainite and after tempering - by tempered martensite. The objective of this work consisted in determination of fatigue characteristics of micro-alloyed 23MnB4 steel, including fracture analysis. Results of fatigue testing at various stress levels for the samples in the initial state and after the heat treatment have confirmed that obtained values of cycles to rupture were at least 585 000 cycles. The results may be utilised for the application of the investigated material in process of manufacturing.



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In the research paper entitled "Torsional fatigue behaviour in gigacycle regime and damage mechanism of the perlitic" by H.Q. Xue, E. Bayraktar, I. Marines-Garcia and C. Bathias on a **page 391** the comprehensive study based on the damage mechanism under torsional fatigue behaviour of D38MSV5S steel in very high cycle regime (VHCF) is presented. Torsional fatigue tests have been carried out at 20 kHz ultrasonic fatigue testing device, and these results were compared with those of the conventional torsional fatigue test machine at 35 Hz as to whether the discrepancy due to the frequency effects between two test results. All of the fatigue tests were carried out up to 1010 cycles at the room temperature. The experimental results have shown that the S-N curves exhibited a considerable decrease in fatigue strength beyond 107 cycles. These results give a precise data for the safety design of the pieces.



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The paper from Analysis and modelling area made by S. Butdee, A. Suebsomran, F. Vignat and P. Yarlagadda on "Control and path prediction of an Automate Guided Vehicle" on a **page 442** shows a new architecture and control strategy of an AGV. The developed algorithm is based on a memorised path and kinematics determination of the movement. The vehicle position and deviation are calculated from rear wheels rotation measurement. The steering and driving command are determined from this deviation. The localisation of AGV by Kaman filtering algorithm is presented. Control of AGV motion is implemented by using PID control scheme. Displacement axis and steering axis are separated to implement the motion control. The localisation system for estimation of AGV is proposed. Position and orientation are estimated by Kalman filtering in a state-space model. The position and orientation of AGV are measured and used for simulation for the localisation system. It can be concluded that the vehicle can reach from the initial position moved along with the generated path with accurate location. A Schneider PLC is used to implement this control. The tests reveal a smooth movement and convenient deviation. Future work is planned to increase the accuracy of the system equipping more sensors for observation technique. Treatment of a dynamic model and machine vision application of automated vehicle are also planned to the next step.

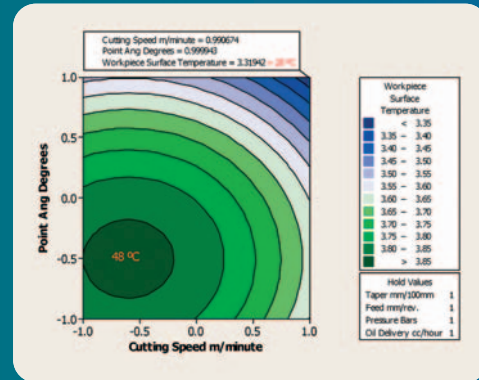
526. Modelling robotic palletising process with two robots using queuing theory  
J. Li, S.H. Masood (Australia)
531. Cutting stability investigation on a complicated free surface machining  
S.Y. Lin, R.W. Chang, C.T. Chung, C.K. Chan (Taiwan)
540. System integration of a multivariable process plant utilising an intelligent control technique  
P. Naidoo, D.T.P. Govender, T.I. van Niekerk (South Africa)
547. Technological processes optimisation according to MSTP procedure  
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553. A simulation study on optimal oil spraying mode for high-speed rolling bearing  
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558. Applicability valuation for evaluation of surface deflection in automotive outer panels  
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565. Investigations for reducing wall thickness of aluminium shell casting using three dimensional printing  
R. Singh, M. Verma (India)
570. An analytic model for tool trajectory error in 5-axis machining  
B.S. So, D.H. Park, Y. Cho, T.J. Kim, T.S. Song, T.J. Ko (Korea)
576. Finite element stress and strain analysis of a solid tyre  
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580. Intelligent identification of cutting states by utilising Power Spectrum Density  
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588. In-process monitoring and control of microassembly by utilising force sensor  
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595. The application of artificial intelligence in optimisation of automotive components for reuse  
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602. Molecular dynamics study of Cu-Pd ordered alloys  
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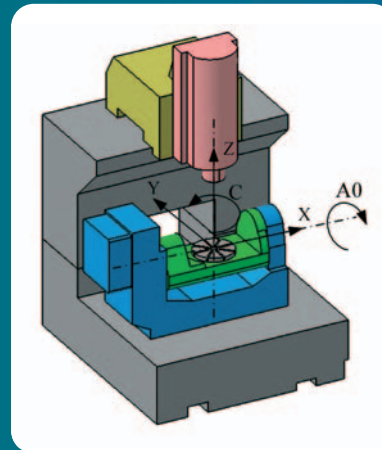
## Manufacturing and processing

610. Study of the milling strategy on the tool life and the surface quality for knee prostheses  
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616. An empirical study of performance measurement systems in manufacturing companies  
J.E. Carr, M. Hasan (Australia)
622. Assessing acceptance sampling application in manufacturing electrical and electronic products  
B.M. Deros, C.Y. Peng, M.N. Ab Rahman, A.R. Ismail, A.B. Sulong (Malaysia)
629. Characteristics of Ti(C,N) and (Ti,Zr)N gradient PVD coatings deposited onto sintered tool materials  
L.A. Dobrzański, M. Staszuk, M. Pawlyta, W. Kwaśny, M. Pancielejko (Poland)
635. Design of a wind tunnel for separating flower parts of saffron  
B. Emadi, P.K.D.V. Yarlagadda (Australia)
639. Remote programming of the Mitsubishi Movemaster robot by using the web-based interface  
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646. A study of microstructure and phase transformations of CMnAlSi TRIP steel  
B. Gajda, A.K. Lis (Poland)
654. Surface integrity on hardened steel parts produced by hybrid machining sequences  
W. Grzesik (Poland), J. Rech (France), T. Wanat (Poland)
662. A functional tolerance model: an approach to automate the inspection process  
R. Hunter, M. Guzman, J. Möller (Chile), J. Perez (Spain)



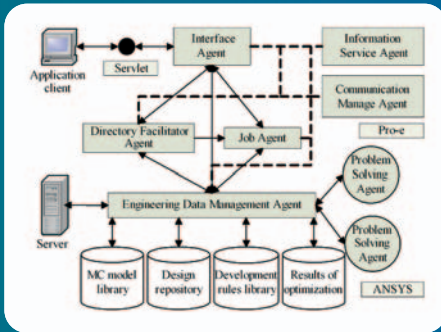
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Authors: M.I. Hussain, K.S. Taraman, A.J. Filipovic and I. Garmn in the paper entitled "Experimental study to analyse the workpiece surface temperature in deep hole drilling of aluminium alloy (B319) engine blocks using minimum quantity lubricant (MQL) technology" on a **page 485** present investigation of the MQL deep hole drilling method, in order to increase productivity and replace the current method of drilling main oil gallery holes in aluminium alloy cylinder blocks that uses MWFs. The experimentation was performed at the Guhring, Inc. (a tool manufacturing company) in Germany. The MQL drilling machine, machine operators, CNC programming, hole drilling, and tool layouts were provided by Guhring. The main components of this experiment were the MQL machine with dual channel system, machine tool fixture, special carbide drills, data acquisition system, a thermal optical camera to measure surface temperature, and computers. Based on this research it can be concluded that MQL is a viable production solution for DHD in automotive cast aluminium alloy. Good part quality characteristics were achieved using this method with production feeds and speeds. Good part quality characteristics were achieved using this method with production feeds and speeds.



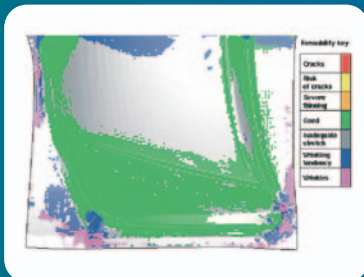
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Authors: J.N. Lee, C.B. Huang and T.C. Chen in the paper entitled "Toolpath generation method for four-axis NC machining of helical rotor" on a **page 510** inform about a method for generating the toolpaths for the machining of a helical rotor on five-axis machine tool. The geometry of the helical rotor is designed based on the ruled surfaces. Through the homogeneous coordinate transformation, the cutter location of the flank milling for four-axis machining can be generated. The postprocessor are developed for converting the cutter location file to the four-axis numerical control programme. As a result, modelling based on ruled surface is frequently used in constructing curved surfaces for aerospace industry and precision mechanical parts such as spatial cams, turbines, dies and moulds, rotors of pumps, and centrifugal impellers. This paper describes multi-axis tool-path generation using the flank milling method for the helical rotor, the cutter location file can be generated with cylindrical and mill.



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In the research paper entitled "Research and development of Multi-Agent System (MAS)-based agile collaborative design system for machining centre" by F. Li, N. Chen and L. Zhou on a **page 518** the MAS-based agile collaborative development system for MC (Machining Centre) set up using JADE (Java Agent DEvelopment framework) is presented. The development of machine tools is a typical work of a distributed cooperative process supported by CAX. MAS (Multi-Agent system) is now the mainstream of contemporary studies on distributed intelligent software system, and can provide a foundation for the establishment of such system. A development process supported by this system for a customer ordered MC is taken to execute the prototype case study. According to the customer order information, three feasible proposals that have the greatest similarity are presented by the intelligent reasoning of CAD Designer Agents. By performing the parametric design and intelligent optimisation, 3D dynamic MC model which satisfies the customer is proposed and shown. The platform supported with those intelligent abilities has shown that it is a powerful tool on the MC family design for shortening the development cycle and improving the design quality.



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The research paper entitled "Applicability valuation for evaluation of surface deflection in automotive outer panels" by D.H. Park, W. R. Bae<sup>1</sup>, H. J.

Jeong, B. S. So, T. J. Ko and Prasad K.D.V. Yarlagadda on a **page 558** shows the numerical simulation of process performed by the use of finite element method, paying attention particularly to the thickness distribution and surface deflection of the drawn outer panel and the outline flange during forming. Simulation procedures of automotive outer panel as large size shape are as follows; 1) Acquisition of drawing parts 2) Laser scanning for generating CAD model 3) CAD model generation 4) Simulation model operation 5) Simulation execution and analyses of simulation results. The use of high strength steel sheets in the manufacturing of automobile outer panels has increased in the automotive industry over the years because of its lightweight and fuel-efficient improvement. But one of the major concerns of stamping is surface deflection in the formed outer panels. Hence, to be cost effective, accurate prediction must be made of its formability. The automotive industry places rigid constraints on final shape and dimensional tolerances as well as external appearance quality of outer panels. The numerical simulation makes it possible to design and optimise the total process to a level, which cannot be reached by traditional theoretical and experimental methods. The development of automation in stamping and assembly processes of automobile manufacture will require an excellent surface quality of formed panels and also their accurate dimensions.

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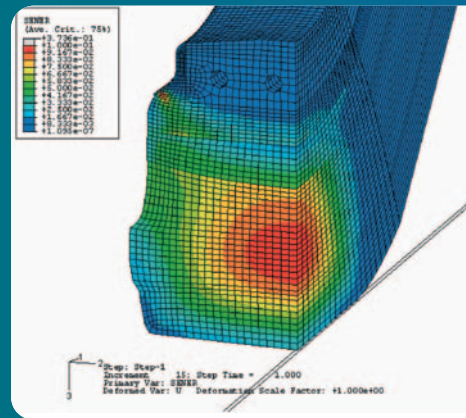
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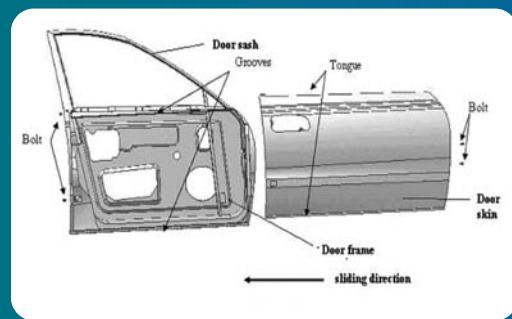
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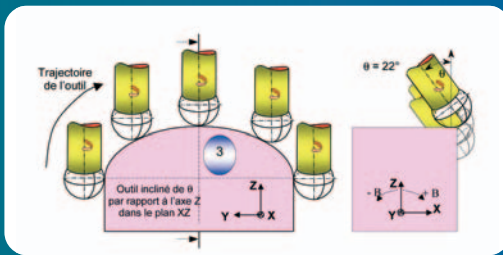
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The Analysis and modelling area is shown in the paper on "Finite element stress and strain analysis of a solid tyre" by U. Suripa and A. Chaikittiratana on a **page 576**. In this work, a finite element model of a solid tyre being modelled of three rubber layers with different properties and steel wires is taken into consideration. Only hyperelastic property is considered for the rubbers. The validation of FE prediction against experimental results was undertaken. An example of how arrangement of rubber layers in solid tyre can affect the distribution of strain energy density and deflection under loading was also carried out using FE analysis. Finite element analysis, as has been demonstrated, can be used to predict the performance of the solid tyre when such variations are made. The results from finite element analysis can be used to determine the optimum thickness of each layer for green tyre (unvulcanised tyre) building. In the solid tyre manufacturing point of view, improving the load bearing performance by changing thickness of each solid tyre layer or make a variation in layers arrangement is the least problematic and can be done effectively without changing the mould or rubber compounds.

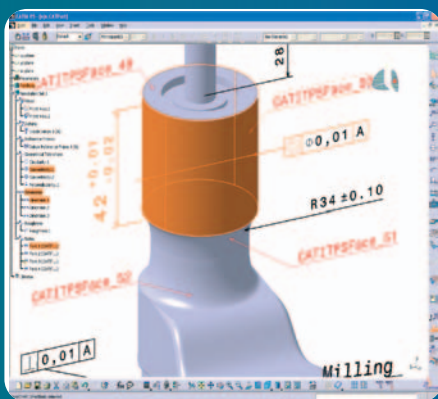


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The paper from Analysis and modelling area made by D.A.Wahab, L. Amelia, N.K. Hooi, C.H. Che Haron and C.H. Azhari on "The application of artificial intelligence in optimisation of automotive components for reuse" on a **page 595** describes the development work on an optimisation model for assessing potential automotive components for reuse using artificial intelligence approaches. Automotive component reuse as one of the product recovery strategy is now gaining importance in view of its impact on the environment. Research and development on components design and manufacturing as well as tools and methods to facilitate reuse are under way in many countries. To enable reuse, components have to be assessed and its reliability and life time predicted. Artificial intelligence methods, such as artificial neural networks (ANNs) and genetic algorithm (GA), can be applied to solve a problem as they can provide satisfactory and acceptable solutions for many complex problems. This study hopes to contribute to design for reuse by assessing high potential and reliable reuse components at the lowest costs.



The paper entitled "Study of the milling strategy on the tool life and the surface quality for knee prostheses" by M. Boujelbene, P. Abellard, E. Bayraktar and S. Torbaty on a **page 610** demonstrates the influence of the tool trajectory's generation on its tool life and the improvement of the surface quality in multi-axis milling at high speed machining of the knee prostheses. The material used for this study is the titanium alloy Ti-6Al-4V ELI (TAGV ELI) for an implant. The knee prostheses are constructed with important mechanical resistance materials with complex form, which require high performance cutting tools and high cost. The good generation's trajectory of the cutting tool in multi-axes milling permits to minimise flank wear. High speed machining offers a considerable profit in the capacity of surface quality, duration of the machining and polishing operations and consequently in improvement productivity. But the choice of the cutting speed must be recommended by the couple tool-materials. The relationship found between the milling strategy on the tool life and surface quality work piece has an important practical implication since it allows selecting the best cutting condition for knee prostheses. Results are of great importance in the quality of articulation surface so the cartilage in medicine industry. The paper is original since the bibliographical review has allowed testing that, although works about these themes exist, none approaches the problem made in this work. This paper could be an interesting source of information for engineers and researchers who work with machining knee prostheses.



The paper written by R. Hunter, M. Guzman, J. Möller and J. Perez on "A functional tolerance model: an approach to automate the inspection process" on a **page 662** shows the definition of a framework to describe the Technological Product Specifications (TPS) and the information associated with the geometric dimensioning and tolerancing to integrate the design concepts into a commercial inspection system. They are mainly focused on the definition of a framework that describes the relationship between the entities of dimensions and tolerances with the geometry of the part. The information imported to a CAI system allows to develop the inspection process without the additional information provided by a physical drawing of the part. The main value of this research is the development of a unique framework to extract the information related to the geometric dimensioning and tolerances and the geometry of the part in a common model. This model provides a complete definition and representation of the entities, attributes and relationship of design and inspection system.

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