

The Manufacturing Engineering Society International Conference

(MESIC 2013)

Procedia Engineering Volume 63

**Zaragoza, Spain
26-28 June 2013**

Editors:

**Juan J. Aguilar-Martín
José A. Yagüe-Fabra**

ISBN: 978-1-63266-329-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by Elsevier B.V.
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact Elsevier B.V.
at the address below.

Elsevier B.V.
Radarweg 29
Amsterdam 1043 NX
The Netherlands

Phone: +31 20 485 3911
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Preface	1
Feasibility Study of Manufacturing Using Rapid Prototyping: FDM Approach	4
<i>Pranjal Jain, A. M. Kuthe</i>	
The Standardization of Supporting Tools: Advantage Competitive for Collaborative Networks	12
<i>M. Otero, A. Pastor, J. M. Portela, J. L. Viguera, M. M. Huerta</i>	
The Influence of Cutting Conditions on Surface Integrity of a Wrought Magnesium Alloy	20
<i>N. Wojtowicz, I. Danis, F. Monies, P. Lamesle, R. Chieragati</i>	
Methodology for Implementing Document Management Systems to Support ISO 9001:2008 Quality Management Systems	29
<i>José Manuel Conde Hernad, Cristina González Gaya</i>	
Cutting Conditions and Surface Integrity During Dry Plunge-Milling of a Wrought Magnesium Alloy	36
<i>I. Danis, N. Wojtowicz, F. Monies, P. Lamesle, P. Lagarrigue</i>	
Optimal Parameters for 5-axis Laser Cladding	45
<i>I. Tabernero, A. Calleja, A. Lamikiz, L. N. López De Lacalle</i>	
Laser Polishing of GGG70L Cast Iron with 2D Scan-head	53
<i>Eneko Ukar, Aitzol Lamikiz, Silvia Martínez, Fernando Estalayo, Iván Tabernero</i>	
Reliable Manufacturing Process in Turbine Blisks and Compressors	60
<i>A. Calleja, A. Fernández, F. J. Campa, A. Lamikiz, L. N. López De Lacalle</i>	
Use of Extremophiles Microorganisms for Metal Removal	67
<i>E. Díaz-Tena, A. Rodríguez-Ezquerro, L. N. López De Lacalle Marcaide, L. Gurtubay Bustinduy, A. Elías Sáenz</i>	
Adjustment of Numerical Simulation Model to the Investment Casting Process	75
<i>E. Anglada, A. Meléndez, L. Maestro, I. Domiguez</i>	
Design of a Hydraulic Front Brake Handle for Large Displacement Motorcycles	84
<i>J. L. Santolaya, J. Sevil, R. Miralbés</i>	
Improving the Development of Projects in Industrial Engineering Using Multimedia	92
<i>J. L. Santolaya, C. García, B. Callejero, P. Ubieto</i>	
Influence of the Response Delay on the Assembling Technique Based on the Statistical Feed-Forward Control Model	98
<i>C. Hernández, R. Tutsch</i>	
System for Controlling the Accuracy and Reliability of Machining Operations on Machining Centres	108
<i>Dimitar Dimitrov, Viktoria Karachorova, Tamas Szecsi</i>	
Defining a Methodology to Design and Implement Business Process Models in BPMN According to the Standard ANSI/ISA-95 in a Manufacturing Enterprise	115
<i>L. Prades, F. Romero, A. Estruch, A. García-Domínguez, J. Serrano</i>	
Towards an Integrated SOA-based Architecture for Interoperable and Responsive Manufacturing Systems	123
<i>A. García-Domínguez, M. Marcos-Bárcena, I. Medina-Bulo, L. Prades-Martell</i>	
Behaviour of PVD Coatings in the Turning of Austenitic Stainless Steels	133
<i>A. I. Fernández-Abia, J. Barreiro, J. Fernández-Larrinoa, L. N. López De Lacalle, A. Fernández-Valdivielso, O. M. Pereira</i>	
Verification Methods for Micro Gears. Analysis of Double Flank Roll Testing Applied to Micro Gears	142
<i>R. Acero Cacho, J. Santolaria Mazo, M. Pueo Arteta</i>	
Influence of the Position of a UHF-RFID Tag Relative to the Antenna in the Information Reading	151
<i>Jesús Royo, Pilar Lambán, Javier Valencia</i>	
New Redundant Architectures in Machining: Serial and Parallel Robots	158
<i>Kévin Subrin, Laurent Sabourin, Richard Cousturier, Grigore Gogu, Youcef Mezouar</i>	
Education Software for the Modelling and Calibration of Kinematic Mechanisms	167
<i>A. C. Majarena, J. Santolaria, D. Samper, J. J. Aguilar</i>	
Evolution of Surface Roughness in Grinding and its Relationship with the Dressing Parameters and the Radial Wear	174
<i>P. Puerto, R. Fernández, J. Madariaga, J. Arana, I. Gallego</i>	
Analysis and Design of a Homing Sensor System for a 2D Moving Platform with Nanometer Resolution	183
<i>R. Acero, J. A. Albajez, J. A. Yagüe-Fabra, M. Torralba, M. Valenzuela, J. J. Aguilar</i>	
Standardized Models for Project Management Processes to Product Design	193
<i>Prado Díaz De Mera Sánchez, Cristina González Gaya, Miguel Ángel Sebastián Pérez</i>	

Fostering In-Process Inspection During Process Planning Using Tolerance Charting	200
<i>G. M. Bruscas, F. Romero, P. Rosado, J. Serrano</i>	
On Line Diagnosis Strategy of Thread Quality in Tapping	208
<i>A. Gil Del Val, J. Fernández, M. Arizmendi, F. Veiga, J. L. Urtzar, A. Berriozábal, A. Axpe, P. M. Diéguez</i>	
Advanced Manufacturing of Ceramics for Biomedical Applications: Subjection Methods for Biocompatible Materials	218
<i>J. Minguella, D. Cuiñas, J. V. Rodríguez, J. Vivancos</i>	
Development of a Calibration Model for Optical Measuring Machines	225
<i>J. Caja, E. Gómez, P. Maresca, M. Berzal</i>	
Virtual Environment for the Simulation of a Horizontal Coordinate Measuring Machine in the Teaching of Dimensional Metrology	234
<i>P. Maresca, E. Gómez, J. Caja, C. Barajas</i>	
Evaluation of AACMM Using the Virtual Circles Method	243
<i>D. González-Madruga, E. Cuesta, H. Patiño, J. Barreiro, S. Martínez-Pellitero</i>	
Design and Implementation of a Monitoring and Control System for Setting and Balancing a Tile Grinding Line	252
<i>L. Prades-Martell, J. Serrano-Mira, R. Sanchis Llopis</i>	
An Investigation into Alternative Conceptions and Knowledge Retention of Manufacturing Concepts in Undergraduate/Graduate Engineering Students	261
<i>J. Serrano, L. Prades, G. M. Bruscas, J. V. Abellán-Nebot</i>	
Comparing Planar Pocketing Tool Paths Via Acceleration Measurement	270
<i>R. Dorado-Vicente, P. Romero-Carrillo, R. Lopez-Garcia, F. A. Diaz-Garrido</i>	
Terrestrial Laser Scanner (TLS) Equipment Calibration	278
<i>T. Fernández Pareja, A. García Pablos, J. De Vicente Y Oliva</i>	
Degradation of Adhesive Joints for Joining Composite Material with Aluminum under Immersion in Water and Motor Oil	287
<i>J. M. Arenas, C. Alía, R. Ocaña, J. J. Narbón</i>	
Evaluation of Harmonic Variability in Electrical Power Systems through Statistical Control of Quality and Functional Data Analysis	295
<i>J. Sancho, J. J. Pastor, J. Martínez, M. A. García</i>	
Heat Treatment Process Energy Efficient Design and Optimisation	303
<i>I. Mendikoa, M. Sorli, A. Armijo, L. García, L. Erausquin, M. Insunza, J. Bilbao, H. Friden, A. Björk, L. Bergfors, R. Skema, R. Alzbutas, T. Iesmantas</i>	
EPES: Engineering System for Optimization of Product Life-cycle through Adapted Eco-services	310
<i>M. Sorli, A. Armijo</i>	
A Knowledge based Application for Industrialization Design	318
<i>A. Gómez, F. Mas, J. L. Menéndez, J. Ríos</i>	
Implementation of the iDMU for an Aerostructure Industrialization in AIRBUS	327
<i>J. L. Menéndez, F. Mas, J. Servan, R. Arista, J. Ríos</i>	
Collaborative Engineering: An Airbus Case Study	336
<i>F. Mas, J. L. Menéndez, M. Oliva, J. Ríos</i>	
The Effect of Process Parameters on the Energy Consumption in Single Point Incremental Forming	346
<i>I. Bagudanch, M. L. Garcia-Romeu, I. Ferrer, J. Lupiáñez</i>	
Forming Force in Single Point Incremental Forming under Different Bending Conditions	354
<i>I. Bagudanch, G. Centeno, C. Vallengano, M. L. Garcia-Romeu</i>	
Study of the Pore Formation on CoCrMo Alloys by Selective Laser Melting Manufacturing Process	361
<i>K. Monroy, J. Delgado, J. Ciurana</i>	
Scanning Space Analysis in Selective Laser Melting for CoCrMo Powder	370
<i>Y. Pupo, J. Delgado, L. Serenó, J. Ciurana</i>	
Identification and Kinematic Calculation of Laser Tracker Errors	379
<i>J. Conte, J. Santolaria, A. C. Majarena, A. Brau, J. J. Aguilar</i>	
Analysis and Selection of the Modular Block Distribution in Indentation Process by the Upper Bound Theorem	388
<i>C. Bermudo, F. Martín, L. Sevilla</i>	
Comparison of Ti-5Al-5V-5Mo-3Cr Welds Performed by Laser Beam, Electron Beam and Gas Tungsten Arc Welding	397
<i>T. Pasang, J. M. Sánchez Amaya, Y. Tao, M. R. Amaya-Vazquez, F. J. Botana, J. C. Sabol, W. Z. Misiolek, O. Kamiya</i>	
Influence of the Axial Machining Length on Microgeometrical Deviations of Horizontally Dry-turned UNS A97075 Al-Zn Alloy	405
<i>F. J. Trujillo, L. Sevilla, M. Marcos</i>	

Upper Bound Solutions of Ring Compression Test	413
<i>F. Martín, L. Sevilla, A. Camacho, M. A. Sebastián</i>	
Composite Cutting with Abrasive Water Jet	421
<i>A. Alberdi, A. Suárez, T. Artaza, G. A. Escobar-Palafox, K. Ridgway</i>	
Analysis of the State of Stresses and Plastic Strains during the Necking Process in Ductile Steels	430
<i>B. Hortigón Fuentes, E. J. Nieto García, M. A. Herrera Garrido</i>	
Analysis of Documental Heritage of CETA in Standardization of the Spanish Manufacturing Automotive Industry	438
<i>M. González, M. J. Martín, L. Sevilla, M. A. Sebastián</i>	
Analysis of the Influence of Geometrical Parameters on the Mechanical Properties of Incremental Sheet Forming Parts	445
<i>J. León, D. Salcedo, C. Ciáurritz, C. J. Luis, J. P. Fuertes, I. Puertas, R. Luri</i>	
Double Flank Roll Testing Machines Intercomparison for Worm and Worm Gear	454
<i>M. Pueo Arteta, J. Santolaria Mazo, R. Acero Cacho, G. Aso Arjol</i>	
Conformity Analysis in the Measurement of Machined Metal Surfaces with Optoelectronic Profilometer	463
<i>E. Cuesta, B. J. Álvarez, M. García-Diéguez, D. González-Madruga, J. A. Rodríguez-Cortés</i>	
Influence of Roughness on Conoscopic Holography Digitizing of DIN34CrMo4 Surfaces	472
<i>D. Blanco, G. Valiño, P. Fernández, J. C. Rico, S. Palomo</i>	
Analysis of Variability in the Manufacture of Cr-Co Fixed Partial Dentures by Geometric Comparison	481
<i>S. C. Gutiérrez Rubert, M. D. Meseguer Calas, J. Bellera Sosa, F. Folguera Arbas</i>	
Grinding of Gamma TiAl Intermetallic Alloys	489
<i>A. Beranoagirre, L. N. López De Lacalle</i>	
Influence of the Process Parameters to Manufacture Micro-cavities by Electro Discharge Machining (EDM)	499
<i>D. Gurguí, E. Vázquez, I. Ferrer</i>	
Basis for the Classification and Study of Immovable Properties of the Spanish Industrial Heritage	506
<i>J. Claver, M. A. Sebastián</i>	
Stability Prediction Maps in Turning of Difficult-to-Cut Materials	514
<i>G. Urbicain, J. A. Palacios, A. Fernández, A. Rodríguez, L. N. López De Lacalle, A. Elías-Zúñiga</i>	
Influence of Pocket Geometry and Tool Path Strategy in Pocket Milling of UNS A96063 Alloy	523
<i>P. E. Romero, R. Dorado, F. A. Díaz, E. M. Rubio</i>	
Computer Aided Electroforming. Elecform3D™	532
<i>P. Hernández, A. Socas, A. Benítez, N. Díaz, M. Marrero, F. Ortega, M. Monzón</i>	
FEM Analysis of the Isothermal Forging of a Connecting Rod from Material Previously Deformed by ECAE	540
<i>R. Luri, C. J. Luis, D. Salcedo, J. León, J. P. Fuertes, I. Puertas</i>	
Precision Study of a Coordinate Measuring Machine Using Several Contact Probes	547
<i>I. Puertas, C. J. Luis Pérez, D. Salcedo, J. León, R. Luri, J. P. Fuertes</i>	
Characterizing of Meshes for Resistance Welding of High Temperature Reinforced Laminate Thermoplastic (RLT)	556
<i>I. González Requena, A. Sanz Lobera, Luis Miguel Vega Fernández</i>	
Investigations on Friction Factors in Metal Forming of Industrial Alloys	564
<i>A. M. Camacho, A. I. Torralvo, C. Bernal, L. Sevilla</i>	
Analysis of Machining Strategies for Peripheral Milling	573
<i>H. Perez, E. Diez, J. Perez, A. Vizan</i>	
Machine Tool Rotary Axis Compensation Trough Volumetric Verification Using Laser Tracker	582
<i>Sergio Aguado, David Samper, Jorge Santolaria, Juan José Aguilar</i>	
Performance Evaluation of Optical Scanner Based on Blue LED Structured Light	591
<i>C. Bernal, B. De Agustina, M. M. Marín, A. M. Camacho</i>	
Surface Finish Monitoring in Taper Turning CNC Using Artificial Neural Network and Multiple Regression Methods	599
<i>E. García-Plaza, P. J. Núñez, D. R. Salgado, I. Cambero, J. M. Herrera Olivenza, J. García Sanz-Calcedo</i>	
Tool Wear Estimation for Different Workpiece Materials Using the Same Monitoring System	608
<i>D. R. Salgado, I. Cambero, J. M. Herrera Olivenza, J. García Sanz-Calcedo, P. J. Núñez López, E. García Plaza</i>	
Study of the Indentation Process under Specific Technological Parameters	616
<i>M. M. Marín, A. M. Camacho, M. A. Sebastián</i>	
Experimental Methodology for Discretization and Characterization of the Rigidities for Large Components Manufacturing Machines	623
<i>M. Arsuaga, R. Lobato, A. Rodrigue, L. N. Lopez De Lacalle</i>	

Simulation and Modeling of Single Point Incremental Forming Processes within a Solidworks Environment	632
<i>L. M. Gómez-López, V. Miguel, A. Martínez, J. Coello, A. Calatayud</i>	
Volumetric Error Compensation Technique for 3D Printers	642
<i>C. Cajal, J. Santolaria, J. Velazquez, S. Aguado, J. Albajez</i>	
Experimental Study on the Evaluation of Necking and Fracture Strains in Sheet Metal Forming Processes	650
<i>G. Centeno, A. J. Martínez-Donaire, C. Vallellano, L. H. Martínez-Palmeth, D. Morales, C. Suntaxi, F. J. García-Lomas</i>	
Evaluation of the Performance of Coordinate Measuring Machines in the Industry, Using Calibrated Artefacts	659
<i>Fernando A. M. Ferreira, Jesus De Vicente Y Oliva, Angel M. Sanchez Perez</i>	
Formability of Automotive H240LA Steel Sheets in Stretch– Bending Processes	669
<i>L. H. Martínez-Palmeth, A. J. Martínez-Donaire, G. Centeno, F. J. García-Lomas, C. Vallellano</i>	
A First Approach to the Use of CO₂ Emissions as a Maintenance Indicator in Industrial Plants	678
<i>Luis Miguel Calvo, Rosario Domingo</i>	
Determination of Energy during the Dry Drilling of PEEK GF30 Considering the Effect of Torque	687
<i>Rosario Domingo, Manuel García, María Rosa Gómez</i>	
Experimental Analysis of the Cutting Forces Obtained in Dry Turning Processes of UNS A97075 Aluminium Alloys	694
<i>B. De Agustina, C. Bernal, A. M. Camacho, E. M. Rubio</i>	
Machine Tool Verification According to Machine Configuration	700
<i>D. Acosta, J. Velázquez, J. A. Albajez, J. A. Yagüe, M. A. Lope</i>	
Computer Tomography 3D Edge Detection Comparative for Metrology Applications	710
<i>S. Ontiveros, J. A. Yagüe, R. Jiménez, F. Brosed</i>	
Performance Calibration of Articulated Arm Coordinate Measuring Machine	720
<i>Unai Mutilba, Gorka Kortaberria, Aitor Olarra, Antonio Gutiérrez, Eneko Gomez-Acedo, Mikel Zubieta</i>	
Apply Lean and Taguchi in Different Level of Variability of Food Flow Processing System	728
<i>Ammar Noorwali</i>	
Cutting Forces Parametric Model for the Dry High Speed Contour Milling of Aerospace Aluminium Alloys	735
<i>J. Salguero, M. Batista, M. Calamaz, F. Girot, M. Marcos</i>	
Damaged Area Based Study of the Break-IN and Break-OUT Defects in the Dry Drilling of Carbon Fiber Reinforced Plastics (CFRP)	743
<i>P. Mayuet, A. Gallo, A. Portal, P. Arroyo, M. Alvarez, M. Marcos</i>	
Metrological Evaluation of the Tribological Behavior of Laser Surface Treated Ti6Al4 V Alloy	752
<i>J. M. Vázquez-Martínez, J. Salguero, F. J. Botana, J. P. Contreras, S. R. Fernández-Vidal, M. Marcos</i>	
Analysis of Non-linear Machine Tool Dynamic Behavior	761
<i>A. S. Delgado, E. Ozturk, N. Sims</i>	
Characterization of Surface Finish of Electropolished Stainless Steel AISI 316L with Varying Electrolyte Concentrations	771
<i>P. J. Núñez, E. García-Plaza, M. Hernando, R. Trujillo</i>	
Visualization Software for CT: Fan/Cone Beam and Metrology Applications	779
<i>L. Franco, P. G. Tahoces, J. A. Martínez-Mera</i>	
The Accreditation of Industrial Engineering in Spain: Teaching and Learning the Skills of Manufacturing Engineering	786
<i>M. A. Lope Domingo, J. A. Albajez, J. Santolaria</i>	
Study of the Influence of Cutting Parameters on the Ultimate Tensile Strength (UTS) of UNS A92024 Alloy Dry Turned Bars	796
<i>A. Gómez-Parra, F. J. Puerta, E. I. Rosales, J. M. González-Madrugal, M. Marcos</i>	
Metrological Evaluation of Secondary Adhesion Wear Effects in the Dry Turning of UNS-A92024-T3 Alloy through Focus-variation Microscopy (FVM)	804
<i>D. García-Jurado, J. M. Mainé, M. Batista, L. Shaw, T. Hausotte, M. Marcos</i>	
Automated Raw Part Alignment by a Novel Machine Vision Approach	812
<i>A. Mendikute, M. Zatarain</i>	
Application of Thermography to Analyse the Influence of the Deformation Speed in the Forming Process	821
<i>M. San Juan, O. Martín, F. J. Santos, P. De Tiedra, F. Daroca, R. López</i>	
Study to Determinate the Feasibility of RFID to Facilitate Traceability in a Logistics Operator	829
<i>Jesús Royo, Pilar Lambán, Javier Valencia, Melisa Olivera, Mario Monsreal</i>	
Use of Magnetorheological Fluids for Vibration Reduction on the Milling of Thin Floor Parts	835
<i>E. Díaz-Tena, L. N. López De Lacalle Marcaide, F. J. Campa Gómez, D. L. Chaires Bocanegra</i>	

Self-Optimization in Large Scale Assembly	843
<i>R. Schmitt, P. Jatzkowski, M. Janssen, F. Bertelsmeier</i>	
Methodology for the Maintenance Centered on the Reliability on Facilities of Low Accessibility	852
<i>J. A. Sainz, M. A. Sebastián</i>	
Function-Oriented Measurements – The Path from Macro to Micro and Nano Range	861
<i>A. Weckenmann, W. Hartmann</i>	
Risk Management as an Element of Processes Continuity Assurance	873
<i>Tatiana Karkoszka</i>	
Comparative between FEM Models for FDM Parts and their Approach to a Real Mechanical Behaviour	878
<i>J. Martínez, J. L. Diéguez, E. Ares, A. Pereira, P. Hernández, J. A. Pérez</i>	
Replication of Micro Laser Textures by Injection Molding	885
<i>P. Hernández, A. Murawko, J. Martínez, G. Peláez, E. Ares</i>	
Holistic Methodological Model for Introducing Industrial Quality Management Methods to Manufacturing in Small and Medium Sized Enterprises	895
<i>Kerstin Schwab</i>	
Foundations for the Implementation of Automatic Control in a Hybrid Flexible Manufacturing System	903
<i>A. Sanz-Lobera, G. Angulo-Fernández, J. Ureña-Alcázar, I. González-Requena</i>	
Comparative Study about the Use of Two and Three-dimensional Methods in Surface Finishing Characterization	913
<i>A. Sanz, A. A. Negre, R. Fernández, F. Calvo</i>	
Temperature and Strain Measurement during Chip Formation in Orthogonal Cutting Conditions Applied to Ti-6Al-4 V	922
<i>M. Cotterell, E. Ares, J. Yanes, F. López, P. Hernandez, G. Peláez</i>	
An Investigation into CO₂ Laser Trimming of CFRP and GFRP Composites	931
<i>Islam Shyha</i>	
Automatic Grinding and Polishing Using Spherical Robot	938
<i>J. A. Dieste, A. Fernández, D. Roba, B. Gonzalvo, P. Lucas</i>	
Productivity in Construction and Industrial Maintenance	947
<i>I. Loera, G. Espinosa, C. Enríquez, J. Rodríguez</i>	
From JIT to Seru, for a Production as Lean as Possible	956
<i>Agostino Villa, Teresa Taurino</i>	
Cogeneration Process Modelling in a Paper Factory	966
<i>Marta Serrano Delgado, Esteban Calvo Bernad, J. Ignacio García Palacín</i>	
Author Index	