SIMULATION OF LINE SCALE CONTAMINATION IN CALIBRATION UNCERTAINTY MODEL

Druzovec, M.; Acko, B.; Godina, A. & Welzer, T.
University of Maribor, Faculty of Electrical Engineering and Computer Science, Maribor, Slovenia
E-Mail: marjan.druzovec@uni-mb.si

Abstract
Precise calibration of quartz line scales is very important for assuring traceability of microscopic measurements. Very significant influence in calibration uncertainty budget is represented by uncertainty of line centre detection. Line centre is usually detected through video signal processing using different types of algorithms. This paper is presenting calibration procedure that was developed in the Laboratory for Production Measurement at the Faculty of Mechanical Engineering in Maribor. It is focused in uncertainty analysis and especially in the influence of line scale contamination on determination of line centre position. Different types of line scale contamination like dirt spots, scratches, line edge incorrectness, and line intensity were simulated in order to test the ability of the line centre detection algorithm to eliminate such influences from the measurement results. 12 refs.
(Received in June 2007, accepted in May 2008. This paper was with the authors 5 months for 2 revisions.)

A DISCRETE EVENT MODELLING APPROACH FOR SUPPLY CHAIN SIMULATION

Wang, Q. & Ingham, N.
School of Engineering, Durham University, Durham, United Kingdom
E-Mail: qing.wang@durham.ac.uk

Abstract
In today's competitive environment, companies face increasingly diverse challenges. To survive in the next millennium, they need to improve their profit margins by cutting capital costs and creating more responsive and adaptable supply chains to meet the ever changing market demand. This paper aims to investigate how dynamic simulation tools can be used to improve and optimise supply chain performance. The general overview of the supply chain is first introduced, the importance of order release mechanisms is examined and its use as a performance measure to monitor the supply chain is proposed. Simulations were developed to investigate the customer/manufacturer relationship of the supply chain. After the running of the trials a diagnostic evaluation was formed. With the simulation results analysed, significant improvements in lowering inventory costs, increasing output and fulfilling orders on time were achieved. 41 ref.
(Received in August 2007, accepted in June 2008. This paper was with the authors 6 months for 2 revisions.)

A GENERATION OF MORE EFFICIENT CNC TOOL PATHS USING SIMULATION MODELLING

Dotcheva, M. & Millward, H.
The National Centre for Product Design and Development Research (PDR), University of Wales Institute Cardiff, Cardiff, UK
E-Mail: mdotcheva-pdr@uwic.ac.uk

Abstract
This paper presents two-phase optimisation strategy for efficient planning of finishing end-milling operations when machining pocket-type features. The optimisation mechanism controls dimensional tolerances through knowledge of cutting forces and the associated cutting tool deflections. The developed model of the end milling process describes the main parameters, such as chip thickness, engagement angles, cutting forces, cutting tool deviation, and simulates the relationship between them during the cutting operation. The created strategy is feed-forward and it is focused on cutting process geometry identification and specifics of machining pocket type features. The model-based simulation covers the general case of end-milling when the chip thickness is variable along the tool path. The developed off-line optimisation methodology creates more efficient milling process with variable feed rate, compared to the same tool path cut with constant feed rate derived from the worst-case condition. Up- and down-milling were modelled and optimised, and the predicted data was evaluated experimentally. 14 refs.
(Received in January 2008, accepted in June 2008. This paper was with the authors 1 month for 1 revision.)

RESOURCE OPTIMIZATION OF CONSTRUCTION OPERATIONS USING AOA-BASED SIMULATION

Zaneldin, E. K.
Construction Engineering and Management Department of Civil and Environmental Engineering,
United Arab Emirates University, Al-Ain, United Arab Emirates
E-Mail: essamz@uaeu.ac.ae

Abstract
In an effort to improve productivity and optimize resource use, the activity-on-arrow (AOA) approach is used in this paper to model and simulate real-world complex construction operations. First, simulation models for two construction operations of a large-size real-world international project were developed. Several experiments on these models were then conducted using different resource combinations to arrive at the best combination that improves productivity and reduces the operational cost. The developed models were used to experiment with different resource alternatives and overtime options for a single project and repetitive projects in order to arrive at the best alternatives that provide the least total direct cost or the shortest completion time for the two operations. The potential of using this approach for resource optimization of large infrastructure networks was then investigated and, finally, possible future extensions to the present study were discussed. 14 refs.
(Received in January 2008, accepted in June 2008. This paper was with the author 2 months for 1 revision.)