

CETOL 2011 U2U PRESENTER BIOGRAPHIES & ABSTRACTS

Abstract Title: *“CETOL 6 Sigma Technology Vision”*
Presenter: Tim Bogard
Presenter Title: President & CEO
Company: Sigmatrix LLC
Presenter Bio: Tim is the leading expert on the development and integration of tolerance and variation analysis technologies driving unique engineering solutions into the CAE/CAD/CAM market. Over the past 25 years, he has worked with engineering management in over 1000 global companies improving lean engineering processes toward more robust products. Prior to forming Sigmatrix, Tim was Director of Engineering at Texas Instruments and Raytheon, where he helped develop the Design for 6 Sigma strategies and design technology centers supporting multi-disciplined engineering processes for advanced development programs.

Presentation Abstract: CETOL 6 Sigma Technology Vision - This presentation will focus on the overall product strategy including a discussion of the FIRM technology foundation.

Abstract Title: *“Tolerance Analysis Model Management Using StackManager”*
Presenter: Praveen Gomer
Presenter Title: Technical Manager of Dimensional Variation Simulation and Control Powertrain and Engine Systems
Company: Chrysler Group LLC
Presenter Bio: Praveen is responsible for developing and establishing Quality tools and processes for tolerance planning at Chrysler. This includes the group wide effort to develop proactive tolerance design and optimization for all Powertrain and engine system component and assemblies.

Previously, Praveen held various positions within Chrysler in Quality Planning and Dimensional control area of Powertrain, BIW that include the Jeep line of products. He was also instrumental in establishing Global engineering Centers to aid in Virtual analysis. He holds a BS in mechanical Engineering and a MS in Manufacturing Engineering and is currently pursuing Masters in Advanced propulsion and Hybrid technology.

Presentation Abstract: This presentation will discuss the application of the Tolerance simulation model management techniques at Chrysler LLC. Throughout the development cycle of engines and transmission, we create 500+ CETOL 6 σ models per program. The challenge is to update and maintain the validity of these models from each phase as changes are being made. Through the development of a database called StackManager to store “Master CXM_GD&T” and search of multiple CXM files called “CXM search”, we have achieved major efficiency improvement to the design process by utilizing faster updates to tolerance analysis and maintaining updated results data in models. Topics will include:

- Advantages of Stack Master database that enables the CXM_GD&T file reusability in Tolerance Analysis model
- Usage of CXM Search to quickly identify feature usage as critical contributors across multiple models or query objective measurement results.

This systems based approach to manage tolerance analysis models has improved our GD&T update times by 50% and a high level of confidence with models using up to date data.

Abstract Title: *“Crank Cam Timing Error Calculation – A CETOL Assembly Variation Analysis”*

Presenter: Ajay Balachandran

Presenter Title: Dimensional Management Specialist

Company: Chrysler LLC PowerTrain Group

Presenter Bio: Ajay Balachandran is a Dimensional Management Specialist working in Engineering and Industrial Services (EIS) division of Tata Consultancy Services (TCS) assigned to Chrysler LLC PowerTrain Group. Ajay has 6 years of experience in Engine and Axle program dimensional management. He has supported various engine development programs from concept to production launch.

Presentation Abstract: Genichi Taguchi insists that poor quality products are cost to society. Customer satisfaction and product value are directly related to product quality. A product from a design terminology is an assembly built out of multiple parts; each part is designed individually but performs collectively as an assembly to deliver desired functions. Therefore, it is very important to analyze how the final product would function once all the parts come together.

Products when designed are always considered to be in nominal condition. Because parts can never be made perfectly, tolerances are defined in the print to accommodate variation due to the manufacturing process. Assembly Variation analysis (AVA) is the approach to simulate these imperfect parts virtually and see the impact on the final product quality. The primary importance in the product development process is typically ignored, and AVA is usually considered when field issues are observed. The presentation will highlight why CETOL AVA should be considered as a vital process in product development considering Engine Crank Cam Timing as an example.

A measurement in the CETOL model will allow the complete set of results and variables to be viewed graphically in the CETOL Analyzer.

Abstract Title: *“Shift and Squeeze - How Do We Get Engineers to Adopt Robust Design Practices”*

Presenter: Dr. Andreas Vlahinos

Presenter Title: Principal

Company: Advanced Engineering Solutions, LLC

Presenter Bio: Andreas has concentrated on rapid new product development. He has been instrumental in rapid product development through the implementation of Design For Six Sigma (DFSS) and Computer Aided Concurrent Engineering for several Government agencies such as NASA, NREL and DOE and industry partners such as IBM, Coors, Lockheed Martin, Alcoa, Allison Engine Comp., Solar Turbines, Ball, Futech, American Standard, Kohler, Varian, Stewart & Stevenson, Harris Corp., GENERAL DYNAMICS, TDM, PTC, MDI, Ford Motor Company, Rockwell Collins, BIC, BAE, XEROX, ULA and TOYOTA, as well as several others.

He has been Professor of structural engineering at the University of Colorado teaching courses in Structural Mechanics and Computer Aided Structural Engineering. Several times he received the Professor of the Year Award, and he has published over 100 publications in areas of structural dynamics, design optimization and DFSS. He has

received the R&D 100 award and several patents. He received his Ph.D. in Engineering Science and Mechanics from Georgia Institute of Technology. Finally, he is regularly invited as a keynote speaker on a variety of subjects (Innovation, Rapid new product development, DFSS) in international conferences.

Presentation Abstract: Although great advances have been made over the last decades in the product development process, tradition and experience still govern many design decisions. Designs are rarely designed considering the variability of design variables and noise parameters to the performance requirements. Several organizational and technical inhibitors restrict the implementation of robust design practices. In this presentation, a list of these organizational and technical inhibitors and solution strategies to overcome them will be presented. Examples of Design for Six Sigma from automotive, battery and defense industries will be presented.

Abstract Title: *“Use of CETOL 6 σ for Adjustments Addressing Assembly Float Issues”*

Presenter: Dipl.-Ing. Michael Kellers

Presenter Title: Principal

Company: TTC3 GmbH

Presenter Bio: Dipl.-Ing. Michael Kellers studied mechanical engineering design at the University of Applied Science in Krefeld.

Since 1997, he has been employed at Variation Systems Analysis GmbH, a daughter company to TTC3 GmbH, as a technical director. His responsibilities include planning and implementation of comprehensive dimensional management studies in the areas of automotive (BIW, interior, suspensions, powertrain), aerospace, defense, white goods and medical. In addition, he is in charge of all activities related to CAA CETOL 6 σ in Germany. This includes presales activities, pilot projects, training activities and first level support.

Presentation Abstract: When considering basic CETOL 6 σ , there are two options for a centered pin/hole contact. The first will use the standard coaxial or least concentric at point option. The second will apply automatic float, which will bring additional variation into the model.

Neither of these two options addresses the effect of the looseness of an assembly and calculation of it. Instead, the simulation model should show that the actual variation, (e.g. for an angular measurement) could be reduced due to the adjustments that will occur in the real product.

The application where this question was raised is the waste gate actuator system of a turbocharger. The objective is to determine the angular variation between the link and the lever axis which is an important criterion for the fatigue resistance of the system. This presentation shows a method how the adjustments could be taken into account.

Abstract Title: *“How to Model a Pattern of Features as a Datum Using CETOL Version 8.2”*
Presenter: Tyler Burgener
Presenter Title: Senior Mechanical Engineer – Tolerance Management
Company: Raytheon
Presenter Bio: Tyler is a Senior Mechanical Engineer at Raytheon Missile Systems in Tucson, Arizona. He is a tolerance analyst and geometric dimensioning and tolerancing (GD&T) subject matter expert for Missile Systems’ Tolerance Management Team. His primary focus is the development of producible and cost effective solutions through the proper use of tolerance analysis and GD&T. Tyler has 11 years experience as a mechanical designer and analyst, and two years experience using CETOL. Tyler is an ASME Senior Certified Geometric Dimensioning and Tolerancing Professional (GDTP S-0612). He is also an active member and leader of several ASME committees that create national policy with regards to engineering data.

Presentation Abstract: This presentation reviews the results of a case study created to validate a method for modeling a pattern of features as a datum using CETOL version 8.2. The methodology is consistent with the rules established by ASME Y14.5-1994 for defining a pattern of features as a datum and referencing another feature to that datum. It incorporates the GD&T principles of virtual condition, resultant condition, inner boundary, and outer boundary. The methodology was validated by comparing the results obtained from a Monte Carlo simulation to the results obtained from CETOL. The minimum gap, maximum gap, mean gap, and standard deviation matched exactly for both the Monte Carlo simulation and CETOL results. Convergence of the solutions indicates that the methodology developed is valid and can be used in other applications. The presentation will cover in detail the steps necessary to model a pattern within CETOL. With the knowledge obtained from this presentation, CETOL users will be able to model a pattern of features as a datum and use that datum to define other features.

Abstract Title: *“TAE Product Update”*
Presenter: Karthik Laxminarayana
Presenter Title: Software Development Engineer
Company: Sigmetrix LLC
Presenter Bio: Karthik is the Lead Software Developer at Sigmetrix and has worked on several development life-cycles of TAE & CETOL products integrated with multiple CAD systems. He has been a part of the development team at Sigmetrix for 7 years. He earned his Master’s degree in Mechanical Engineering from Clemson University with a specialization in designing and developing object-oriented programming solutions for creating engineering analysis software.

Presentation Abstract: This presentation will explain the enhancements that were added in the releases of TAE for Wildfire 5.0 and Creo 1.0 and highlight the new features that will be coming in the Creo 2.0 release of TAE.

Abstract Title: *“ROI with CETOL - An Amazing ASSA Abloy Story”*
Presenter: Miraslaw Chamera
Presenter Title: Principal
Company: ARIADNE Engineering AB
Presenter Bio: Since 1996, Miraslaw has led ARIADNE Engineering AB, an engineering company focused on simulation- based product development. Miraslaw studied machine design at Technical University of Krakow in Poland. After moving to Sweden, he worked with FE analysis, mechanism analysis and innovation for Scandinavian companies. He has also worked with training and implementation. From 2001 to 200, he served as chairman for the Swedish PTC User group. Since 2006, he has worked closely with Sigmetrix within the field of variation analysis and dimensional management.

Presentation Abstract: This presentation will elaborate on the implementation and usage of CETOL for Solid Works at ASSA Abloy AB, the largest locking device manufacturer in Scandinavia.

During 2010, ASSA investigated the tools for tolerance analysis and optimization directly in the CAD environment. After a thorough evaluation process, CETOL for 6Sigma was chosen. The software was implemented, engineers were trained, and the initial pilot project was completed. A number of product families were analyzed and optimized both for function and manufacturing cost. The impact on quality and cost was significant and resulted in a very short ROI time.

This presentation will illustrate a the many considerations involved in making a successful ROI comparison including the many aspects of CETOL usage, ease of measurability, market reputation, customer quality perception, and many others.

Abstract Title: *“GD&T Advisor Product Introduction”*
Presenter: James Stoddard
Presenter Title: Director, Product Development
Company: Sigmetrix LLC
Presenter Bio: James has served as the chief technologist at Sigmetrix since its inception in 1999. Starting as a graduate student of Dr. Ken Chase, founder of ADCATS (Association for the Development of Computer-Aided Tolerancing Systems), James has spent over 15 years researching advanced constraint technologies. This research has led to many advancements in the CETOL product line, making it the benchmark for ease of modeling and variation visualization. In addition, James has been responsible for developing the architecture that allows Sigmetrix product to integrate deeply with a variety of CAD systems while minimizing unique CAD coding dependencies. As Director of Product Development, James has also been instrumental in implementing many development processes improvement initiatives within Sigmetrix.

Presentation Abstract: The GD&T Advisor is a new product that will be available next year. The product is designed to guide the user through the correct application of GD&T, by providing in process advice and recommendations as well as direct access to a wealth of GD&T educational content. This presentation will demonstrate some of the workflows that will exist in the new GD&T Advisor Product.

Abstract Title: *“GD&T Advisor Product Introduction”*
Presenter: Ted Anderson
Presenter Title: Product Manager
Company: Sigmetrix LLC
Presenter Bio: Ted is the product manager responsible for the content of Sigmetrix current product line, including CETOL, TAE, and the GD&T Advisor. He has over 25 years of CAE experience in FEA, mechanism, and tolerance analysis. Prior to his employment at Sigmetrix, he worked for a major defense contractor as part of a CAE support organization. Having worked with CETOL 6s for over 15 years, he is an a recognized expert in the field of tolerance analysis.

Presentation Abstract: This presentation will review the current plans for the next release of CETOL. We will outline how CETOL will fit into the overall product strategy focusing primarily on the integration with GD&T Advisor.

Abstract Title: **Using CETOL Analysis to Identify Optimization Parameters for a Finite Element Simulation**
Presenter: Wayne Tanner
Presenter Title: CEO
Company: Leading Edge Engineering
Presenter Bio: Wayne Tanner is the CEO of Leading Edge Engineering, a simulation driven product development consulting company. Wayne has a B.S. in Engineering from the University of Illinois (1996), and a M.B.A from Illinois State University (2000). Wayne started Leading Edge in 2001, and prior to that worked for Caterpillar. Wayne is a certified Black Belt, and holds several patents.

Presentation Abstract: When trying to analyze the effects of variation on a highly non-linear system that involves material and contact non-linearity, one technique is to use a Response Surface Model to calculate the effects of each variable and their interactions. However, these fully non-linear solutions may be very computationally expensive and include a large number of variables, which makes the solution very time consuming as well. To reduce the number of variable we will us a CETOL model to identify the major contributors which will allow us to focus on a reduced set of inputs for the non-linear Finite Element Response Surface Model. Once we calculate the transfer function from the RSM, we will use these results to populate a measurement in the CETOL model to allow the complete set of results and variables to be view graphically in the CETOL Analyzer.

Abstract Title: *“The DM Revolution”*
Presenter: Dr. Denis Sleath
Presenter Title: DM Specialist
Company: i-DMsolutions Ltd
Presenter Bio: Over 20 years of DM experience working with companies such as Ford, Bentley, Hyundai, BAe Systems, Arvin Meritor, Unilever and GlaxoSmithKline. His qualifications include a BSc - Mechanical Engineering from Imperial College London, an MSc - Advanced Manufacturing Technology from Loughborough University and a PhD in Competitive Product Development from Loughborough University.

Presentation Abstract: The last two decades have seen revolutionary changes in the methods that engineers are using to predict, understand and manipulate how minor variations in component geometry affect the overall assembly, operation and performance of mechanical products.

Minor variations in the size, shape and location of the components occur due to the inherent limitations of the manufacturing and assembly processes. The risk is that weaknesses in the design, inadequate control measures or low process capability allow these minor component variations to combine and propagate, producing substantially higher overall variation that can adversely comprise the end product. Basic stack calculations and the routine assignment of standard component tolerances, common practices of the past, have been surpassed by full 3D analysis of overall variation behavior and the evolution of comprehensive Dimensional Management (DM) systems to protect a product’s geometric integrity from concept, through development and on into production.

CETOL has delivered a quantum leap in the analytical capability, enabling engineers to go well beyond basic stack calculations by providing the means to reliably predict and manipulate how a complete assembly responds to component variation in far greater detail. In parallel, forward thinking manufacturing companies have grown internal DM systems, operating within the established engineering activity, that give the structure, support and organization to extract the maximum benefit from the advances in analytical capability.

This presentation draws on several real life examples from the aerospace, automotive, pharmaceutical and other industries to show the impact of the DM revolution in terms of the techniques and strategies that manufacturing companies have adopted to initiate and implement a DM system that meets each company’s own unique requirements.

Abstract Title: **Process Integration and Design Optimization with Optimus**
Presenter: Bram Van Der Heggen
Presenter Title: Senior Application Engineer
Company: Noesis Solutions
Presenter Bio: Bram is a mechanical engineer with Msc degrees in Electromechanical and Automotive Engineering from Leuven University, Belgium. He serves as a Senior Application Engineer at Noesis Solutions, with 4 years of experience in working on research and industrial projects related to Simulation Process Automation, Design of Experiments, Numerical Optimization and Design for Six Sigma.
Presentation Abstract: This presentation will provide an overview of the Noeis’ Optimus software and its function in design optimization.

Abstract Title: **New Tolerance Optimization – Balancing Optical Performances & Costs**
Presenter: Azumi Okada
Presenter Title: Application Engineer
Company: Cybernet Systems Co., Ltd.
Presenter Bio: With more than a decade of engineering expertise, Azumi has made many contributions to the automotive industry. She currently serves as an Application Engineer of CETOL 6 σ at Cybernet Systems. Prior to this, she was a successful production engineer for Hitachi Automotive Systems.
Presentation Abstract: Product performances can fluctuate by dimensional variation, presenting the challenges of adjusting tolerances with balancing performances as well as balancing costs and tolerances.

This presentation will discuss a new approach to optimizing tolerances with balancing performance and costs. It will illustrate this approach with two examples, integrating CETOL 6 σ and CAE tools:

- 1) To avoid strict tolerancing for mechanical parts without clear relation with optical performances (MTF, RMS wavefront error, etc), integrating CETOL 6 σ and CODE V by Optimus to work effectively. This example will illustrate how to utilize this system by explaining common input / output data between CETOL 6 σ and CODE V and to generate optimum tolerances. This case is expected to be diverted to the product which assembly quality leads performance variation.
- 2) Tolerance and cost are contradictive parameters. These balances are kept by high-experience designers in Japan. Integrating CETOL 6 σ and cost table in Excel by Optimus provides balanced tolerances by the optimization method. This presentation will discuss possibilities and benefits for real design tolerancing.