Smart GD&T™ Training

Presented by Bill Tandler of

MULTI METRICS, INC.
Machine Part Geometry Management

The Smart GD&T Refresher for Design, Manufacturing & Inspection

A Public Training Seminar

January 19-20, 2006
Why Smart GD&T™?

Geometric Dimensioning and Tolerancing (GD&T) is a much maligned black art because it has never been adequately reliable to be classified as a science. Smart GD&T is the ASME Y14.5 standard refined into a highly organized set of concepts, tools, rules and processes, which convert GD&T from an uncertain art, into a precise symbolic language.

Smart GD&T provides the means to rigorously “encode” and “decode” the function of each part, resulting in:

- **Accelerated new product ramp-up** through accurate forecasting of the risks in Design, Manufacturing and inspection so they can be dealt with prior to drawing release
- **Reduced manufacturing costs** through the loosening of tolerances to better reflect true part function
- **Guaranteed assemblability** of mating parts
- **Unambiguous communication of design intent** to Manufacturing and Inspection

Multi Metrics’ Training Approach

Multi Metrics’ Public Seminars are presented to groups of up to 40 students. Each student receives a proprietary course manual with extensive text and graphic material, and classroom exercises. The trainer uses overhead slides to introduce concepts, proprietary 3D models to demonstrate them, and a white board to amplify explanations. Finally, hands-on involvement is provided through group exercises using the Geo-Fact I and Gage-It I 3D training models. Active participation and cross-training are encouraged throughout, in keeping with the concept that “the best way to learn anything is to teach it to someone else”.

Who Should Attend?

**Mechanical Designers** will learn how to “encode” the function of parts using GD&T, rather than the all too common art of “decorating” drawings with GD&T symbols.

**Manufacturing Engineers** will learn how to “decode” GD&T drawings and convert them into reliable manufacturing processes.

**Mechanical Inspectors** will learn how to “decode” GD&T drawings and convert them into reliable inspection processes.

Fees:

The Smart GD&T Refresher (2 days) = $795.00 (student discounts are available upon request)

Fee Includes: continental breakfast, lunch, and refreshments

Signing-up

Please sign-up by completing the “Smart GD&T Registration Form” available from SJSU or Multi Metrics and faxing it to (650) 328-3586.

For questions about the course or how to sign-up: Call 1 (650) 328-0200 OR email julian@multimetrics.com

Location

San Jose State University College of Engineering
Department of Mechanical and Aerospace Engineering
One Washington Square, San José, CA, 95192-0087

Instructor Profile - Bill Tandler

Education

After two years of undergraduate engineering study at Columbia College in New York City, Mr. Tandler completed his Masters degree in Applied Physics and Numerical Mathematics at the Swiss Federal Institute of Technology (ETH) in Zürich, Switzerland, in 1965.

Career

Mr. Tandler’s professional experience includes three years at the Hewlett Packard R&D laboratory in Palo Alto, CA, where he helped develop a quadruple mass spectrometer, five years with the laser manufacturer Coherent, Inc. as International Marketing Manager, followed in 1975, by the founding of his company, Multi Metrics, Inc. Mr. Tandler’s activities at Multi Metrics included marketing metrology equipment for Carl Zeiss and other companies, pioneering the contract inspection business, and managing the design and development of several dimensional metrology software systems. These included “Inspector S”, the world’s first programmable, SPC based software system for automating mechanical inspection with digital electronic calipers, micrometers, height gages and indicators, and “GEOMET”; a 3D geometry processing software system for coordinate measuring machine retrofit. Since 1992, Mr. Tandler has focused on corporate GD&T research and development, training and consulting. Mr. Tandler is currently a member of the ASME Y14.5.1 Mathematization Committee, and has been a contributor to ISO TC213 in the realm of Datum Reference Frame construction. Mr. Tandler is the author of seven GD&T specialty training manuals and the Little Encyclopedia of GD&T, and is a frequent speaker at international meetings on computer aided tolerancing and coordinate metrology.

Mr. Tandler has a substantial, hands-on background in manufacturing and inspection technology, and is responsible for creating Smart GD&T™, a unique, rule based system for permitting GD&T to be encoded and decoded, rather than interpreted.
Course Description

The Smart GD&T Refresher
January 19th & 20th, 2006

Course Description:

GD&T has long been considered something of a blacksmith's art if not altogether a black art, because everyone seems to have his or her own way of "interpreting" the language. Isn't it normal to ask a colleague to help "interpret" a GD&T call-out? But if drawings can be interpreted, they surely will be, and then differently by different people. With a thorough introduction to the concepts, tools, rules (above all rules), and processes of GD&T, our two day seminar makes it possible for designers to "encode" GD&T and for machinists and inspectors to "decode," instead of interpret it.

The course includes many in-class exercises and encourages strong participant interaction.

Course Learning Objectives:

By the end of this course you will be able to:

1. Name the engineering objectives and financial contributions of GD&T.
2. Name the shortcomings of "CD&T" (Classical Dimensioning & Tolerancing).
3. Name the fundamental components of the perfect imaginary world of GD&T (Tolerance Zones, Tolerance Values, Datums, Datum Reference Frames, and Basic Dimensions).
4. Name the components of the imperfect real world of physical parts.
5. Name and begin to use the most important Geometry Control Tools (Size, Flatness, Parallelism, Perpendicularity, Position, and Surface Profile).
6. Recognize the fifteen fundamental rules of GD&T and appreciate their use.

Course Materials:

Course manual and sundry hand-outs will be provided. Participants should bring scratch paper and pencils (not pens).
# Smart GD&T™ Registration Form

**Course:** The Smart GD&T™ Refresher (2 days)

**Dates:** January 19th & 20th, 2006 – 8AM - 5PM

**Location:** San Jose State University (SJSU) – San Jose, CA

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## Registration and Payment Instructions

Please register by filling out the form on the right and forwarding it via fax to (650) 328-3586.

If paying by check, please send completed registration form and check to the following address:

**Multi Metrics, Inc.**
865 Lemon St.
Menlo Park, CA
94025

Registration is not complete until payment has been received.

NOTE: To receive Student Pricing, valid Student ID is required

## Registration Information

| Name: | ____________________________ |
| Title: | ____________________________ |
| Company: | ____________________________ |
| Street: | ____________________________ |
| City: | ____________________________ |
| State: | ____________________________ |
| Zip: | ____________________________ |
| Email: | ____________________________ |
| Telephone: | ____________________________ |
| Fax: | ____________________________ |

## Payment Information

My check is [ ] enclosed and is [ ] and sent via mail
My Visa [ ] , MasterCard [ ] , Amex [ ] number is:

#: ____________________________
Expr: ____________________________

Signature: ____________________________

## Additional Information

[ ] I can’t take the course(s), but please put me on your permanent mail/email list.
[ ] My company is interested in in-house courses please send more information.

## Space Limitations

Space is limited to 40 participants per course to guarantee thorough coverage. We therefore suggest registering as soon as possible.

**Questions**

Technical Questions: Contact Bill Tandler @ (650) 328-0200 OR bill@multimetrics.com

Course Logistics Questions: Contact Julian Tandler @ (650) 328-0200 OR julian@multimetrics.com

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## Number of Participants

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CA Residents add 8.25% TAX for books:

Total: ____________________________

## Cancellation Terms

1) A full refund will be made for cancellations received 21 calendar days in advance of class inception.
2) A 50% refund will be made for cancellations received between 21 and 7 days in advance of class inception.
3) No refund will be made for cancellations received less than 7 calendar days in advance of class inception.

All course materials will be shipped to those forced to cancel 21 or fewer days prior to inception. Your signature confirms acceptance of these terms.