

# Central Indiana

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The Central Indiana Section 1133 fall meeting was held on October 15, 2015 at Endress+Hauser in Greenwood Indiana. A total of 41 participants were in attendance.

The meeting started with a welcome from our host Jerry Spindler, Training Manager, Customer and Field Service Training, Endress+Hauser. Jerry explained that the building we were meeting in was called the Customer Center and was inaugurated in 2014. The building contains a large flow training rig, offices for field service, meeting rooms and a cafeteria.

Endress+Hauser were founded in 1953 and employ 400+ in Greenwood. They are a leading supplier of products, solutions and services for industrial process measurement and automation. They offer comprehensive process solutions for flow, level, pressure, analysis, temperature, recording and digital communications across a wide range of industries, optimizing processes with regards to economic efficiency, safety and environmental protection.

E+H calibration labs and mobile calibration rigs are accredited to *ISO/IEC 17025* by A2LA.

Special thanks to Endress+Hauser for providing lunch for the group.

The meeting was organized into two tracks, one technical and the other was quality.

The first technical track speaker was Mike Dillon, Product Group Manager for Calibration Products, The Modal Shop, Inc. The title of his presentation was "Vibration Sensor Technology and Applications." Mike presented on accelerometer theory, vibration applications and calibration techniques. His presentation was well received and the audience felt the information was very useful.

The first quality track speaker was Julie Kluzinski, Senior Quality Manager, CoorsTek Medical. Julie explained that Coors is actually a world class leader in ceramics. CoorsTek manufactures medical implants such as joint implants. Beer is not their main business.



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Her presentation was about quality auditing and accreditation. She explained details about the foundations of good quality management including 14 steps identified by Crosby, 14 obligations of top management by Deming and the Juran Trilogy by Juran. She discussed components of a quality system, benefits of auditing and accreditation, good documentation, lean manufacturing and the five Ss' of quality. Julie presented a tremendous amount of information and the audience was well engaged.

Lloyd Baker, NCSL International Regional Coordinator provided an update from the Board of Directors. He discussed the mission of the NCSLI and functions of the board and committees. He also promoted the Conference and Technical Exchange. Lloyd also strongly encouraged everyone present to get involved with committees and industry groups working on practices and standards within the NCSLI organization, and contributing their knowledge to the metrology world. Feedback from the audience indicated the listeners learned many new things about the organization.

The second technical track speaker was Leon Chao, Mechanical Engineer, NIST. The title of his presentation was "Towards the Definition and Dissemination of a New International Mass Standard: Watt Balance." Leon demonstrated his watt balance made from LEGO parts.

The abstract for his presentation was: A global effort to redefine our International System of Units (SI) is underway and the change to the new system is expected to occur in 2018. Within the newly redefined SI, the present base units will still exist but be derived from fixed numerical values of seven reference constants. More specifically, the unit of mass, the kilogram, will be realized through a fixed value of the Planck constant  $h$ . For instance, a watt balance can be used to realize the kilogram unit of mass within a few parts in  $10^8$ . Such a balance has been designed and constructed at the National Institute of Standards and Technology. For educational outreach and to demonstrate the principle, we have constructed a LEGO tabletop watt balance capable of measuring a gram size mass to 1 % relative uncertainty. This article presents the design, construction, and performance of the LEGO watt balance and its ability to determine  $h$ .

The audience really enjoyed the video and demonstration of the LEGO watt balance.

The second quality track speaker was Elizabeth Robinette, QA, Eli Lilly and Company and past chair of Indianapolis ASQ. Her topic was introduction to ASQ. This topic was chosen because of the close relationship between NCSLI and ASQ.

Elizabeth briefly spoke on ASQ and NCSLI timelines and noted the following:

- ASQ created a Measurement Quality Division in 1991; the first chair was a former director of NCSLI.
- ASQ Measurement Quality Division has a professional association to NCSLI since then.
- ASQ and NCSLI have had a number of joint efforts and publications together—such as the *Metrology Human Resource Handbook*.
  - The [www.metrologycareers.com](http://www.metrologycareers.com) website for metrology outreach
  - The Joe D. Simmons Scholarship
  - Education Liaison and Outreach efforts for Engineering Education (ASEE).

The third Technical track speaker was Kyle Shipps, Calibration Manager, Endress+Hauser, Inc. The title of his presentation was "Coriolis Flow Meters Linearity / Flow Calibration."

The aim of this presentation was first to address the factors affecting a Coriolis Flow Meter (CFM) linearity, what is done by manufacturers to ensure the linearity of these meters, and finally to present experimental data confirming this linearity. The presentation began with the CFM basic principle of operation. Next, the factors affecting the meter's linearity were discussed. Key techniques to improve CFM linearity were also presented. Finally, the experimental evidence of the CFM performance at full scale was presented confirming the meter's linearity. In conclusion, the following points were made:

- A single calibration factor is valid across the full range of the CFM as long as the point is taken at a flow velocity, where the effect of ZP is minimal and cavitation is avoided. In practice, this is at a velocity between 1 to 2 m/s with water.
- From the linearity perspective, additional calibration points do not add significant benefit to the CFM measuring performance.
- The Maximum Permissible Error band (MPE) depicted on calibration certificates encloses the extreme value of the measurement error attributed in part to the CFM's repeatability, reproducibility, hysteresis, to some extent the meter's drift, and importantly the linearity.

This presentation was well attended and there was considerable discussion about the key points.

The third quality track speaker was Steve Goebel, Dimensional Metrologist, Eli Lilly and Company. His topic was "Auditing by an Organization." Steve has extensive experience auditing calibration service providers. He also trains QA Auditors how calibration services operate and what they need to look for.

Whether a calibration service provider is accredited or not, *ISO/IEC 17025* is a great standard for ensuring all requirements are met. Free checklists are available on the internet. Simply decide which requirements need to be met and share the list with the vendor in advance of your visit.

Many industries have their own Quality Standards and these should be followed if possible but calibration is best judged with *ISO/IEC 17025* or *ANSI/NCSL Z540*.

Our final session was a discussion panel with a topic of "Auditing and Accreditation." Panel members were Julie, Elizabeth and Steve.

The Central Indiana Section steering committee members are John Bush, Eli Lilly and Company, Elizabeth Robinette, Eli Lilly and Company, Kevin Pata of Roche Diagnostics, Kevin Broderick of Tangent Labs and Kyle Shipps of Endress+Hauser.

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