OUTLINE OF IEEE-IAS SEATTLE CHAPTER TUTORIALS

The Seattle Chapter of Industry Applications Society of IEEE will offer two tutorials in 2012. Both are open to all IEEE members and to all other interested persons.

The first tutorial, ***Switching / Tripping: Safety and Analysis Using Software,*** will cover power switching for operational procedures and maintenance, with strong emphasis on safety. The tutorial covers application of software programs for power system analysis. This tutorial is an up-dated version of *Operational & Switching Procedures; A Tutorial for Maintenance, Operations & Safety* that was presented at the Industrial & Commercial Power Systems Technical Conference in May, 2011. Presenters will again be Shawn Worthington of ESA (Easy Power) and Erling Hesla, Chair of IAS Seattle Chapter. This tutorial will be presented on **Tuesday, January 17, 2012**.
Who should attend: Engineers, electricians and supervisors responsible for planning or performing power switching operations safely and reliably; engineers responsible for design of industrial and commercial power systems that can be operated safely and reliably.
For further information, contact Erling Hesla at e.hesla@ieee.org.

The second tutorial, ***Motors – Their Applications, Design and Specification,*** will discuss underlying theory of motor design followed by in-depth discussion of real-world challenges facing engineers who specify and select motors for the many applications in industry. The presenter will be Dennis Bogh of GE. Currently Dennis is a Senior Application Engineer for Motors covering the Western United States. He is responsible for specification review and application review for user customers and consultants. Dennis is the Past Chair of the IEEE PCIC Chemical Committee, and is an active member of the API 547 committee, and is the Secretary of the IEEE 841 working group. Dennis is co-author of 7 Motors papers published at PCIC, the IAS magazine, and transactions. This tutorial will be presented on **Tuesday, February 21, 2012.**
Who should attend: Engineers, electricians and purchasing agents who are responsible for specifying, selecting, or purchasing motors; who are responsible for proper consideration of energy conservation through improved efficiency and for life cycle costs.
For further information, contact Tutorial Organizer, Bruce Colony, at bcolony@aeieng.com.

The venue for both tutorials is the *Sixth Avenue Inn* at 2000 Sixth Avenue, Seattle. Tutorials start at 1:30 pm and continue until 8:00pm, with a break for dinner from 5:30 to 7:00 pm.

Both tutorials have the clear purpose and objective of expanding knowledge relative to the practice of professional engineering; each provides five hours of professional development (5 – PDH). In addition, both provide practical training of immediate value to electricians and others in the fields of safety, reliability, and energy conservation.

The fee for each tutorial is $95 including dinner. Students qualify for a reduced fee.

SWITCHING TUTORIAL – IAS SEATTLE CHAPTER – 1/17/2012

I. Introduction

- **a. Scope of tutorial**
  - **i.** The "what and why" of switching
  - ii. The "what and why" of calculations
  - iii. Safety, reliability, continuity of service
  - iv. Constraints of time, resources, costs, and equipment
- b. **Power System Design – highlights**
  - i. Safety, reliability, continuity of service
  - ii. Maintenance and operations
  - iii. Grounding
  - iv. Constraints of time, resources, costs, and equipment
- c. **Historical Practices**
  - i. Smoke test
  - ii. Judgment, experience, hope, luck
  - iii. Prolonged calculations
  - iv. Over-compensation
- **d. Modern Software Support**
  - i. "Switching" Working Group
  - ii. Specialized software program
  - iii. General software programs in current use

II. **Switching/Tripping: Safety and Analysis Using Software**

- a. Overall
  - i. Accurate one-line
  - ii. Scenarios
- b. Procedures
  - i. Examples
- c. Arc-flash hazards
- d. Coordination
  - i. System study
  - ii. Temporary changes
  - iii. Solid state vs. induction disc relays
- e. Specialty equipment
  - i. ZSI
  - ii. Maintenance mode
  - iii. Differentials
  - iv. Current limiting fuses
- f. Short circuit
  - i. Equipment duty; impact of scenarios
- g. Power flow
  - i. Voltage drop / overloads
  - ii. Capacitors

III. **Summary**

- a. Review
- b. Questions, answers, comments

MOTOR TUTORIAL – IAS SEATTLE CHAPTER – 2/21/2012

I. **Introduction – scope of tutorial**
   a. Standards and information available to everyone, briefly
   b. Contents of this seminar

II. **Motor physics – the equations and general arithmetic**
   a. Construction (general pics to get us grounded)
   b. Voltage, flux, current, pf (so you don't have to ask what the motor current should be)
   c. Speed, torque, inertia
   d. Efficiency

III. **Low Voltage specifications – TEFC**
   a. Reference standards, and IEEE 841
   b. Efficiency – value of efficiency
   c. Service factor, temperature rise
   d. Insulation, thermal limits & protection
   e. Vibration
   f. Bearings, lubrication, temperature, protectors
   g. ASD issues / opportunities
   h. Testing

IV. **Enclosures & where to apply them**
   a. TEFC, WPII, TEAAC, TEWAC, TEFV

V. **Medium Voltage specifications – differences from LV (yes, you need a different spec)**
   a. Reference standards, and API 541, 547
   b. Efficiency, service factor, temperature rise
   c. Formed windings, insulation, thermal limits
   d. Protection
   e. Sleeve bearings, probes
   f. Vibration, lateral critical, thermal vector
   g. ASD issues
   h. Testing – acceptance and qualification

VI. **Vertical Motors**
   a. Bearings, lubrication, heat loss
   b. Reed Critical frequency

VII. **Maintenance**
   a. Acceptance on site
   b. Daily
   c. Weekly
   d. Monthly
   e. On an annual basis
   f. Storage, long and short term (spares)

VIII. **Starting**
   a. Reduced Voltage Solid State
   b. Reactor
   c. Drive
   d. Autotransformer

IX. **Summary and other topics of interest to the audience**