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EM&CW Expo Shares Motor And Magnetics Knowledge—Including Last Chance to Take Colonel McLyman's Course

For almost 40 years, the Electrical Manufacturing & Coil Winding (EM&CW) Expo, has provided the electrical industry forum for the technologies involving the materials and processes (including assembly, coil winding, and testing) for manufacturing electrical products. The 2015 edition of this conference and trade show will be held next month, May 13 and 14, at the Milwaukee Center in Milwaukee, Wisconsin. The conference program features presentations from industry leaders on a range of topics related to the design and manufacturing technologies of coil assemblies, transformers, ac-dc motors, insulation materials and more.

The EM&CW Expo is co-located with the Electrical Wire Processing Expo and Critical Power 2015. The Electrical Wire Processing Expo is a showcase for the electrical wire and cable processing industries, offering visitors access to all the equipment, instruments, tools, materials and supplies used in wire & cable harness assembly, inspection and repair. Critical Power is a conference and exhibition on the latest advancements in UPS/standby power supply and power quality solutions for data centers, industrial, facilities, telecommunications, infra-structure and emergency applications. According to Chuck Thurman, executive director of the EMCWA, the three events draw a total of approximately 3000 attendees.

In addition to the conference program, the EM&CW Expo hosts a series of short courses. These include several of interest to power electronics engineers. One of the regular instructors at EM&CW, Colonel Wm. T. McLyman of KG Magnetics, is well known throughout the power electronics industry and many engineers have his textbook on Transformer and Inductor Design. As in past years, McLyman will teach his two-day course on "Practical Power Magnetics Design Techniques." But McLyman will be retiring after this class, so this year's EM&CW Expo will be the last opportunity to take his course. A course description appears below.

There will also be classes on:

- "Practical Inductor Design," taught by consultant Keith Williams;
- An "EMI Fitler Design Seminar" taught by Richard Ozenbaugh;
- "An Introduction to Coil Winding," taught by Robert Sanchez, Hi-Rel Solutions;
- "Training Course and Design Workshop: Electromagnetic and Thermal Design of Synchronous Brushless PM and AC Induction Machines" presented by Mircea Popescu and David Staton of Motor Design and Dan M. Ionel of Regal Beloit and Marquette University;
- "Vibration Control & High Speed Balancing," taught by Atul Nath and Reed Grant of Abro Balancing.

For more on these courses, see Short Courses.

Meanwhile, the expo offers visitors the opportunity to meet with companies offering products or services related to coil manufacturing and winding, motor design and manufacturing, insulation materials, product quality and test equipment, automation for coil production, armature and stator manufacturing, and magnetic components —laminations and ferrites. The list of vendors exhibiting at the EM&CW Expo appears below along with lists of the exhibitors at the co-located events.

For more information on the Electrical Manufacturing & Coil Winding (EM&CW) Expo, see the conference website or email Jo Thurman.

Conference Schedule

Conference, Milwaukee, WI, Wednesday, May 13, 2015

9:00 am – Electromagnetic and Thermal Design Considerations for High Performance Servo Permanent Magnet Synchronous Motors, *Gennadi Sizov, Rockwell Automation*

9:30 am – Simulation of Efficiency Maps for Synchronous Permanent Magnet and Induction Machines, *Mark Solveson and Emad Dlala, ANSYS*

10:00 am – Rotational Cutting as an Alternative in the Processing of Electrical Steel Strip, *Markus Hubert and Jörg Franke, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)*

10:30 am – Alternative Manufacturing Method for Concentrated Wound Machines, *Jason Kreidler, Regal Beloit Corp.*

11:00 am – Unbalanced Magnetic Force and Vibration Characteristics of Flux Switching Permanent Magnet Machines with and without Eccentricity, *Silong Li and Bulent Sarlioglu, University of Wisconsin - Madison*

11:30 am – Rapid Estimation of Induction Machine Stator Core Losses, *Sreekanth Narayana Pillai and Ian P. Brown, Illinois Institute of Technology*

12:00 – Lunch Break

1:00 pm – High-Frequency "Airgap" Windings for High-Power Density Electrical Machines, *Jonathan Martin and Kiruba Haran, University of Illinois - Urbana Champaign*

1:30 pm – Linear actuators: A Very Diverse Landscape, *Bruno Lequesne, EMotors Consulting, LLC*

2:00 pm – Modern Heat Extraction Systems for Electrical Machines – A Review, *Mircea Popescu, Motor Design, Ltd.*

2:30 pm – Synchronous Reluctance and PM Assisted Motors, *Steven J. Stretz, Regal Beloit Corp.*

3:00 pm – Permanent Magnets for Electric Machines: Current Performance and Research Trends, *Melania Jasinski, Heeju Choi, and Jinfang Liu, Electron Energy Corp.*

3:30 pm – Common-Mode Voltage Mitigation in Multilevel-Inverter-based Adjustable Speed Motor Drives, *Chad Somogyi and Nabeel A.O. Demerdash, Marquette University*

Short Courses

SC1: Practical Power Magnetics Design Techniques

Instructor: Colonel Wm. T. McLyman, KG Magnetics, Inc.

2-day, 12-hour course

Monday, May 11, 2015 8:30 am - 4:30 pm

Tuesday, May 12, 2015 8:30 am - 4:30 pm

Course Description:

The course covers a variety of basic topics including magnetic fundamentals and materials; dynamic B-H loop; permeability and the air-gap; eddy currents and fringing flux; magnet wire, foil, and insulation; regulation; magnetic cores; design fundamentals; minimizing leakage inductance and winding capacitance; transformer

converter magnetics; flyback and forward converter magnetics and much more. The course also includes design exercises to help attendees get the greatest benefit from attending. For a complete breakdown of the 41 segments plus 4 complete design presentation outlines, view the web page at www.kgmagnetics.com and highlight "Presentation Outline".

Who Should Attend: This practical course has been designed by the author to benefit engineering professionals involved with the technical aspects of magnetic design. This course would provide managers, design engineers, project engineers, system engineers and even the novice the opportunity to explore in depth the state-of-the-art of practical magnetic design. Anyone involved in switch mode power conversion, power processing, and solid-state lighting would benefit from this course. Course attendees wil receive a free copy of the complete TITAN Magnetics Design Program. Go to www.kgmagnetics.com to see all of what the Titan disk contains.

About the Author: Mr. McLyman has fifty-six years of experience in the field of magnetics and holds fourteen U.S. patents on magnetics-related concepts. Through his thirty years at the Jet Propulsion Laboratory (JPL) he worked on power conversion and as the magnetic specialist. He has worked on projects for NASA including the Pathfinder Mission to Mars, Voyager I and II, Topex/Poseidon, Cassini, Galileo, Magellan, Viking, International Solar Polar, Hubbell Space Telescope, Seasat, SIR-C, Mars Global Surveyor, NSCAT, and the Deep Space Network.

He designed the Galileo signal rotary transformers used by the Command Data System (CDS), when the slip rings produced excessive noise on the 1-Mbit data bus. The performance of the signal rotary transformer exceeded all expectations. The rotary transformer on the Galileo Spacecraft lasted the life of the spacecraft, from 1989 to 2003 without a glitch. He has designed the Quiet Converter with its low noise environment into programs, such as WF/PC-II, Articulated Fold, Mirror Actuators, (Hubbell Space Telescope), MISR (Earth Orbiting System), Raman, and Mars 05 ONC, CCD Camera.

He is the author of four popular textbooks, Magnetic Core Selection for Transformers and Inductors, Designing Magnetic Components for High-Frequency DC-DC Converters, High Reliability Magnetic Devices: Design and Fabrication, and the Fourth Edition of Transformer and Inductor Design Handbook. He has been on the lecture circuit for over twenty-five years speaking in the United States, Canada, Mexico, and Europe on the design and fabrication of magnetic components. He is known as a recognized authority in magnetic design throughout the world.

List of exhibitors for the Electrical Manufacturing & Coil Winding Expo 2015

- Abro Balancing
- Accurate Wire & Insulation
- Alpha Magnet
- Barks Publications
- Buckeye Bobbin
- Cosmo Corp.
- Del Finger
- Demak America
- Elantas PDG
- Elektrisola
- ESW
- Globe Products
- Gorman Machine
- Heattek
- Helwig Carbon Products
- How2Power.com
- IDI
- Infolytica
- Itasca
- Lamination Specialities
- LCS
- Micafil
- Orcxhid Monroe
- Permabond Engineering Adhesives
- Polaris Rare Earth Materials

- Precision Paper Tube
- SKF USA/Baker Instruments
- Sko-Die
- Temple Steel
- WGE Equipment
- Yun Sheng

List of sponsors and exhibitors for Critical Power 2015

- Active Power
- HITEC Power Protection
- ASCO
- C&C Power
- Power Sonic
- Toshiba Uninterruptible Power Systems
- Fairbanks Morse Engine
- PDU Cables
- Powervar
- Wingard Hydroblanking
- AEC
- Raritan
- Cyber Power
- Woodward
- GNB Industrial Power
- Total Energy Systems, LLC
- Inland Power Group
- Block
- Eagle Eye Power Solutions
- Crestchic
- Elcab Cable & Profile

List of exhibitors for Electrical Wire Processing Expo 2015

- 3M Electrical Markets Division
- AB Electrical Wires Inc
- Alpha Wire
- AMTI
- Anamet Electrical Inc
- Anixter
- Applitek Technologies Corp
- Ark-Les
- Artos Engineering Co
- Assembly Magazine
- Assembly Resources
- Brady Corp
- Branson Ultrasonics Corp
- C Davis Systems
- Cadonix Ltd
- Caetek Inc
- CAMI Research Inc
- Carpenter Manufacturing Co Inc
- Cembre
- Cetec ERP
- Cirris Systems Corp
- Cobra Braiding Machinery Ltd
- Commission Brokers Inc
- Composite & Wire Machinery Inc
- Connector Microtooling Systems Inc
- Control Micro Systems

- Crimping & Stamping Technologies
- Crimptools.com
- CrimpTronix Inc
- CURTI Costruzioni Meccaniche SpA
- Daniels Manufacturing Corp
- Dasco Label
- Delta Sigma Co
- Diamond Die & Mold Co
- Dinkle International
- DIT-MCO International
- Draco-K Enterprise LLC
- Drossbach/Reiku
- DSG Canusa
- Dunbar Products LLC
- DuPage Tying Solutions Inc
- Dynalab Test Systems Inc
- ECC
- Electric Motion Co Inc
- Entrada Group
- EPLAN Software & Services
- The Eraser Company Inc
- Essex Brownell
- ETCO Inc
- Eubanks/Cablescan
- Evolution Products
- Excel Connection
- Flat Cable Solutions
- Focused Solutions
- FreePoint Technologies
- FTZ Industries
- Gem Gravure Co Inc
- General Cable
- Glendo/Handworker
- GPC Electronics
- Grayline Inc
- HeatShrink Direct
- Heilind Electronics
- HellermannTyton
- Henkel Corp
- Hueson Wire
- IDEAL INDUSTRIES INC
- IDENTCO
- IEWC
- Illinois Precision Corp
- Imada Inc
- Industrial Wire & Cable Corp
- Janesville Tool & Mfg Inc
- Jokari USA
- Joyal, A Division of AWE
- JWB Manufacturing LLC
- Kalas
- Kingsley Div of ITW Marking & Coding
- KM USA LLC
- Komax Wire
- Lakes Precision Inc
- Lapp Tannehill
- Laselec Inc
- Laser Wire Solutions
- LORS Machinery
- LPMS-USA
- Machine Control Specialists Inc

- Mark-10 Corp
- Marsh Electronics Inc
- Master Appliance Corp
- Materials Technologies Corp
- Mecal by Starn
- Mecalbi-Engineering Solutions Lda
- Mechtrix Corp
- The Mello Company Inc
- Mentor Graphics
- MK Test Systems NA
- Mold-Man Systems
- Molex
- mta automation inc
- The Mueller Group Inc
- Multi/Cable
- National Standard Parts Associates Inc
- New England Wire Technologies
- Odyssey Tool LLC
- OES Inc
- Ondal Tape Processing GmbH
- Panduit
- Partex Marking Systems
- PATCO Inc
- Phoenix Contact
- PKC Group
- The Power & Signal Group
- Pressmaster
- Pro-Line
- Quick Cable
- Radix Wire
- Rennsteig Tools Inc
- Rowe Industries
- The Rubicon Group Ltd
- SAB North America
- Saylor Technical Products
- Schaefer Megomat USA Inc
- Schiffer Corp
- Schleuniger Inc
- Shimadzu Scientific Instruments Inc
- ShinMaywa (America) Ltd
- Sigma Corp
- SLE Electronics USA
- Sonics & Materials Inc
- Sonobond Ultrasonics
- Southwire Co LLC
- Spectrum Technologies
- SPI – Connects
- Spring Mills Manufacturing Inc
- Stapla Ultrasonics
- Steinel
- Stolberger Inc dba Wardwell Braiding
- Stranco Products
- STRUNK Connect Automated Solutions
- Sumitomo Electric
- SuperSeal Corp
- TA Wire & Harness Inc
- TE Connectivity
- Techflex Inc
- Telsonic Solutions
- Tenborg Technologies
- Thermosleeve-USA

- Toyojamco Ltd
- Tri-Star Technologies
- TTI Inc
- Union Polymer International
- US Tech
- USM Inc
- VTE Inc
- WAGO Corp
- Weidmuller
- Wenco Mfg Inc
- Western Industrial Tooling Inc
- Wezag Tools Inc
- Wire & Cable Technology International
- Wiring Harness Manufacturers Association
- Wiring Harness News
- Z+F USA Inc