

11 October 2016

TC1 Meeting Minutes

63rd IEEE Holm Conference on Electrical Contacts, Clearwater, FL

Jerry Witter, TC1 Chairman, opens meeting. Motion to approve 2015 meeting minutes. Brett Rickett motioned to approve and Gunther Horn seconded. Minutes approved.

Z.K. Chen, conference chair, provided summary of conference – 38 papers and 117 attendees with 14 attending the course. Feedback on Clearwater location was very good as a future potential conference location.

Paul Slade (Contact course) provided summary on course with included new instructors in addition to Paul Slade and Roland Timsit include Dr. Rod Martens, Professor Ron Coutu, and Professor John McBride. Need to advertise course and conference discount better. Proposed student discount.

John Shea (Communications and Website) provided update on communications and website. He described the two different websites – Holm conference and TC1 websites with links for going between each page. He also requested any photos taken of the conference could be emailed for inclusion on the website.

John McBride (CPMT) covered information for both the recent international conference in Scotland and the CPMT transactions. The conference had 80 papers and about 120 attendees. Jim Greenwood gave a 1-hour presentation in honor of Brian Williamson. CPMT associate editors include John McBride, Thomas Schoepf, Ron Coutu, and John Shea. Arcing/contact papers are also submitted to Transactions on Plasma Science in addition to CPMT. Ron Coutu is editing special edition of CPMT from six Holm papers which the authors

agreed to change at least 50% of the content. He is planning on having another special edition 6 to 8 months from now.

Volker Behrens (RoHS) presented the most recent information on restricted substances. See additional file for more details [RoHS](#).

Henry Czajkowski (NEMA and Contactors) reported that NEMA contactors still have cadmium with some designs changing to alternative materials. He also discussed power electronic devices (drives, hybrid contactors, power switching, and smart devices IoT).

Bob Malucci (High-Speed Connectors) reported that the conference is not getting papers on high-speed connectors rather they are going to packaging conferences. Not sure if this topic is a good fit for this conference since high-speed connectors are not considered an electrical contact and not concerned about fretting.

Ron Coutu (MEMS) reported there were 3 papers on MEMS and 2 related to MEMS research in this conference. Key workshop for MEMS community is the MEMS conference held in Hilton Head, SC. CMU and U of Pennsylvania are getting DARPA funding for MEMS research and Northeastern University is working on NEMS. Need links to MEMS conferences in Holm conference.

Xin Zhou (Circuit Breakers) DC voltages up to 1500Vdc with activity in China for PV solar farms. Electronic trip units with intelligence will continue to develop. Internet of things with challenge of how to collect information into the “cloud.”

John Shea (Circuit Breakers)

AFCI circuit breakers battle with wiring companies. Arc fault detection technology in outlet devices will take away business from circuit breaker manufacturers. Home run issue leaves an unprotected length of wire between the breaker load center and the first outlet.

SF₆ replacement gas – in MV breakers there is a lot of new research being performed on candidate replacement gases including fluoroketone CF₃C(O)CF(CF₃)₂ (lower GWP <1) (Novec 5110) and fluoronitrile (higher GWP 2100) gas called Novec4710 (Fluoronitrile (CF₃)₂CFCN) produced by 3M as well as mixtures of CO₂ and Novec gas. SF₆ GWP is 23500 relative to CO₂ GWP using 100-year time horizon. Tests show potential liquefaction issues and lower breakdown values under switching but very comparable numbers to SF₆ for insulation levels.

DC circuit breakers and disconnect switches are seeing some growth in PV applications and other potential applications.

Power electronics continues to make advances in power safety and will continue to displace many traditional contactors and circuit breakers. Inverters, micro-inverters, fan and lighting controls continue to use more and more power electronics for not only power conversion but also for circuit protection.

Brett Rickett (Connectors) reported substance ban required modifying nickel sulfamate connector plating process, metal costs are creeping back up. Lubricants are becoming part of overall engineered connector structure. New trends include wearable electronics and automotive electronic continues to grow with operating temperature going from 175°C to 200°C. Connector laboratory reliability testing versus actual field application is not realistic.

Rod Martens (open) added testing of new lower cost alternative plating materials are expected to pass the same standard tests as existing materials.

Jerry Witter (open) Proposed next Antler lecture to be on Tesla battery connector issues and related engineering challenges.

Jerry Witter thanked the presenters and closes the meeting.

Respectfully submitted by John J. Shea 25 October 2016