IWCS 2015

64th Program and Schedule

IWCS

THE
International
Cable • Connectivity
Symposium

Industry Leadership, Innovation
and Professional Development

Monday **October 5**–Thursday **October 8**, 2015

Hyatt Regency Atlanta Hotel
265 Peachtree Street NE
Atlanta, GA, 30303, USA

www.iwcs.org #IWCS15

WELCOME TO ATLANTA!

Your IWCS 2015 International Cable & Connectivity Symposium has a number of exciting enhancements this year that will provide you an excellent learning and networking experience! After 10 years of rotating between Providence, Rhode Island and Charlotte, North Carolina, we had feedback from our attendees to try different locations every so often. We selected Atlanta for its convenient international and domestic logistics and trust you had a smooth travel experience. We certainly hope that you enjoy the "southern hospitality" of the Hyatt Regency Atlanta, which is both the venue of IWCS 2015 and our host hotel. In addition, 2015 will be the first year that our Conference will be held in October, one month earlier than our traditional date in mid-November. We hope that this change will be beneficial for our attendees and allow for fewer conflicts with the hectic end-of-year work demands and holiday schedules.

This is the 64th annual IWCS conference, which is a testament to the value that we continue to bring to you and your international cable and connectivity industry colleagues. The vitality of the IWCS is demonstrated through the strong support coming from industry, both in terms of sponsorship and attendance, but also in the rich content for the Technical Symposium portion of the program. Our 2015 program contains over 130 papers and presentations in 18 compelling sessions right through Thursday afternoon. The Suppliers Exhibition continues its two-day program, providing plenty of opportunity and incentive for all attendees to visit the exhibits.

The Executive Track presents important information you need in managing your business. Views of the marketplace and the economy are keys to the planning process. Together with vital industry data, this year's Executive Track program will feature speakers from the critical supply chains serving our industry. We will hear from experts in the fiber, copper and materials markets, provide vital economic outlooks, along with guidance on strategic planning and business analysis. We will also have industry experts brief you on the implications of bandwidth growth and power over emerging network infrastructure.

Valuable door prizes will once again be provided during the Conference. Win a GoPro Hero 4 or an iPad Air! All symposium registrants attending the Wednesday Poster Paper Session / Exhibit Hall and the Thursday afternoon Technical Sessions are eligible to win. Must be present to win!

We recognize that networking is a critical element of any industry gathering, and we plan for plenty of opportunities at IWCS 2015. On Tuesday, IWCS will host a hospitality hour in the exhibit hall with your Suppliers and Customers. After the exhibits close, the Wire & Cable Industry Suppliers Association® (WCISA) will join us to host a reception to honor our industry's young professionals, new visitors to IWCS and students who are showing interest to join our industry upon graduation. Plan to join us for cocktails and hors d'oeuvres prior to your evening dinner plans.

Thank you, for joining us at IWCS 2015. Our most important goal is to meet all of your expectations for a valuable learning and networking experience. We look forward to meeting you and hearing of any suggestions you have to further improve your IWCS Conference in the years to come!

Interact with us on Twitter throughout the event. **#IWCS15**

PROFESSIONAL DEVELOPMENT PROGRAM:

This year, a variety of strong Professional Development Courses will be offered on Monday, providing a great learning opportunity from renowned industry experts. For the eleventh year, IWCS will present the core courses of Copper 101, Fiber 101 and Materials 101. The three core courses will provide those new to our wire and cable industry with basic technology information. The elective courses will deliver current, leading edge topics geared at providing information on new areas of interest to engineers, scientists, and other W&C professionals. Over time, students completing those courses, along with two electives, will be presented with an IWCS Professional Development plaque. The Courses will commence on Monday, October 5, 2015 at 8.00am with four concurrent sessions. Five more concurrent sessions will continue at 1:00pm. Scheduling of these courses allows for participants to take up to two courses.

TECHNICAL SYMPOSIUM:

The cornerstone of our Conference, the IWCS Technical Symposium is recognized around the world as the premier technical symposium for wire & cable. In our 64th year, we will present well over 100 new and previously unpublished papers on research and development for W&C and connector/interconnect technologies, designs, components, materials, fabrication, performance, testing and applications. Compelling sessions this year also include topics such as Global Codes & Standards, Power over Communications Cable, Data Centers and Micro-Cables. Sessions will begin on Tuesday morning and end late afternoon on Thursday.

PLENARY SESSION TO SHOWCASE THE RAPID PACE OF TECHNOLOGY:

The Plenary Session will feature the keynote address, Optical Solutions to Meet the Future Demands of 'The Internet of Things', presented by Michael A. Bell, PE, Sr. Vice President & General Manager, Optical Connectivity Solutions, Corning Optical Communications. Mr. Bell will address his unique perspectives and vision on the topic, which promises to be a highlight of the 2015 Conference.

The plenary session will also feature recognition for the best papers and presenters of 2014. The session is open to all Technical Symposium registered attendees.

SUPPLIERS' EXHIBITION™ AND NEW PRODUCT PRESENTATIONS:

The IWCS Suppliers' Exhibition™ will include over 100 exhibits providing interaction among various levels of the W&C Supply Chain, to learn about the wide variety of product technologies and user applications. Also, New Product Presentations provide an opportunity for suppliers to report on new commercial product developments. The schedule for these presentations will be included in the registration package at the Conference. The two day program on Tuesday and Wednesday will provide plenty of opportunity and incentive for everyone to visit the exhibits and maximize your networking opportunities.

CONFERENCE REGISTRATION:

Registration for all aspects of the IWCS International Cable · Connectivity Conference and Technical Symposium can be accomplished through our web site (www.iwcs.org), by facsimile or mail, or in person at the Conference. Specific information on both registration and hotel reservations is included on the IWCS website.

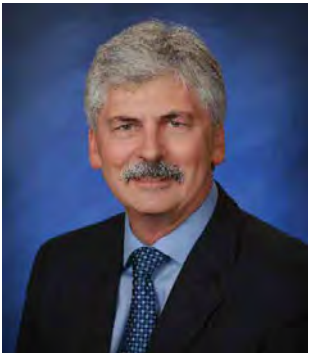
TUESDAY NIGHT HOSPITALITY:

All Conference attendees are invited as our guests to a cocktail reception on Tuesday, October 6th, from 6pm – 7:30pm, immediately following the Suppliers' Exhibition. This reception is co-sponsored by Wire & Cable Industry Suppliers Association® (WCISA®) to honor scholarship recipients and students aspiring to join our industry. We hope you will join us to enjoy drinks and light hors d'oeuvres with your colleagues to wind down from a full day, prior to your dinner plans.

CEO & CHAIRMEN

David B. Kiddoo
CEO/Director
IWCS, Inc.
Shrewsbury, PA, USA

Robert A. Wessels, Jr.
Chairman of the Board, IWCS, Inc.
CommScope, Inc.
Claremont, NC, USA



Guy Castonguay
Chairman, IWCS 2015 Symposium Committee
Corning Optical Communications, LLC
Glendale, AZ, USA

KEYNOTE SPEAKER

Optical Solutions to Meet the Future Demands of "The Internet of Things"

Michael A. Bell, PE
Senior Vice President & General Manager
Optical Connectivity Solutions, Corning Optical Communications
Hickory, NC, USA

Michael A. Bell was appointed senior vice president and general manager, Optical Connectivity Solutions for Corning Optical Communications in October 2012. Michael is responsible for leveraging capabilities to create integrated solutions, improve reach, and penetrate emerging markets. As the Keynote Speaker in this year's Plenary Session, Michael will provide an intriguing perspective on Optical Solutions to Meet the Future Demands of 'The Internet of Things'.

In 2011, Michael established CCS Global Product Line Management, creating differentiated optical solutions through "next practice" processes.

Michael joined Corning in 1991 as a process engineer for the Telecommunications Cable Plant in Hickory, N.C. Subsequently, he held a variety of positions in manufacturing and engineering. Since 2001, Michael provided leadership as program manager to establish a new Japanese equity company, Advanced Cable Systems. He consolidated two plants into the current Hickory Cable Facility as plant manager, and led the CCS SAP implementation. Michael was appointed CCS Americas Cable Manufacturing Manager in 2004, which was expanded to include Hardware manufacturing in 2009.

Prior to joining Corning, Michael served as a Submarine Warfare Officer in the United States Navy.

He holds a Master of Business Administration from the University of North Carolina at Chapel Hill and a Bachelor of Science in electrical engineering from West Virginia University.

MONDAY, OCTOBER 5, 2015 | 8:00 AM to 12:00 PM

Within the program of the IWCS Conference an opportunity is presented to advance the knowledge and education of industry participants through Professional Development Courses, led by industry experts. The offerings include basic concepts in core courses related to copper, fiber and materials. Additionally, courses are offered in the latest technology issues facing the industry, allowing participants to be fully briefed on current issues. For the eleventh year, IWCS will present the core courses of Copper 101, Fiber 101 and Materials 101. Over time, students completing those courses, along with two electives, will be presented with an IWCS Professional Development plaque. The first students to successfully complete the program were awarded such plaques at IWCS in November, 2008. Please check the IWCS website for further or changed offerings in the curriculum, www.iwcs.org.

The Courses will commence on Monday, October 5, 2015 at 8.00am with four concurrent sessions. Five more concurrent sessions will continue at 1:00pm. The Professional Development Courses will conclude prior to the opening of the IWCS Technical Symposium, allowing attendees to participate both in the Courses and in the Symposium. Lunch will be provided to registrants of the courses on Monday. Scheduling of these courses allows for participants to take up to two courses.

1. **CU101**: FUNDAMENTALS OF COPPER CONDUCTORS & METALLIC CABLE DESIGN & APPLICATIONS | **Hanover C**

Instructors: Trent Hayes, Senior Engineering Manager, CommScope Incorporated, Claremont, NC, USA

Larry Bleich, Senior Engineering Manager, CommScope Incorporated, Claremont, NC, USA

Description: This course is an introduction to the design and application of copper conductor communications cables. Students will understand how coaxial, twisted pair and twinaxial cables are designed and how they operate upon completing the class. The instructors will provide background material on the history of copper cabling followed by sections on applications, design and construction of cables. Current standards and design examples are also reviewed by the instructors. Materials that are typically used in copper conductor communication cables will be incorporated at a fairly high level into the design exercises.

Industry professionals desiring a basic knowledge of copper cabling systems will find the course of value.

2. **FO101**: FUNDAMENTALS OF OPTICAL FIBERS & FO CABLE DESIGN & APPLICATION | **Hanover D**

Instructor: David A. Seddon, Senior Engineering Associate, Cable Technology, Corning Optical Communications, Hickory, NC, USA

Description: This course will explore several aspects of optical fiber and cable design technology with particular focus on products for communications. It will discuss application considerations to select a product appropriate for a given installation environment and the basic considerations necessary for successful design of optical fiber cables.

The first part of this course will outline the characteristics and fundamental operating principles of optical fibers and the designs of the three basic fiber families (Single-Mode, Multimode and Non-Zero Dispersion Shifted optical fibers). Included will be critical fiber parameters and their impact on system performance. Specific topics will include the Advantages of Optical Fiber, Optical Fiber Manufacturing, Total Internal Reflection, Attenuation, Dispersion, Polarization Mode Dispersion (PMD), Cutoff Wavelength and other optical parameters critical to optical communications.

The second part of this course will explore the functional requirements of optical fiber cables and some of the fundamental design equations which can be used to ensure a cable will meet a given installation or operational requirement. We will also discuss selection of a product appropriate for a given installation environment. Structural differences between cables for indoor, outdoor, and specialty applications will be explored including stranded loose tube cables, central and stranded tube ribbon cables, tight buffered cables and optical power ground wire cables.

The course provides a basic overview of optical fiber fundamentals and optical cable design principles to those new to the fiber optic cables.

3. **MA101**: SELECTION & USE OF MATERIALS IN WIRE & CABLE | **Hanover E**

Instructors: Chester J. Kmiec, Global Applications Technology Leader, The Dow Chemical Company, Collegeville, PA, USA

Dr. Scott H. Wasserman, Associate R&D Director, The Dow Chemical Company, Collegeville, PA, USA

Description: In this course, the selection and implementation of materials used in the construction of telecommunication wires and cables will be reviewed. The course will focus on materials utilized in Premises and Outside Plant cable applications for twisted pair, coaxial, and fiber optic cables. An overview of the materials science essential to the properties of the selected polymers and additives will be

covered to level-set all attendees. Further, the fundamental characteristics (advantages and disadvantages) of materials will be presented which can then be considered in selecting a material for use in a finished cable construction. In addition, the effect of additives on material performance will also be presented, particularly those that impart ultraviolet resistant and flame retardant properties on the materials. The course will touch upon all material components of the cable's construction such as, polymers for insulating and sheathing, water blocking materials, and materials for shielding and armoring.

The course is intended for all wire and cable practitioners including raw material suppliers, cable manufacturers, and end users interested in gaining a broad understanding of applied material selection as it relates to cable performance.

4. **MA201**: THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE—Part One | **Hanover F**

Instructor: Dr. Stéphan Puissant, Senior Engineer, BCIAG, Switzerland

Description: The complete extrusion process is complex and involves a lot of machines having each a different function. The heart of the process being extrusion, we focus in this course on the extrusion group (extruder and Cross head).

In a first approach, the single screw extruder seems to be a very simple machine; the extrusion process however is complex as it is governed by interacting laws from mechanical engineering, thermodynamics, flow mechanics, the properties of solid and molten polymers etc. Therefore, the physical characteristics (viscosity, conductivity, melting) of polymers used in extrusion are presented. These properties will be the keys to understand the functioning of the thermoplastics extrusion process.

The material basis being covered, the focus will shift on the functioning of the single screw extruder. Then the 3 functional zones of the extruder are introduced. For each zone, we will see its functioning in relation to material properties. This mechanism having been described, we will obtain some hints of the optimal screw designs (for some broader plastic families!), so as solutions which may be used to solve problematic issues.

After being plastified (molten), the polymer will be formed in its final shape by some extrusion head. We will see different head geometries, compare different tool designs, show how to calculate pressure- and tube-tools, and discuss the effects of mechanical adjustments and temperature settings on concentricity, adhesion and surface quality.

For each of the different items (extruder, X-head, even cooling) evoked in the course, practical hints are given in relation with the more theoretical approach.

This course is intended for people involved in extrusion and who want to get a basic understanding of this continuous process. This, in order to be able to handle most of the common issues of product quality which can be resolved by simple means so as temperature settings. But this course objective is also to help them, if these simple means are not sufficient, and in relation to the material characteristics, to understand the type of change in tooling or screw geometry, so as even of extruder type, size or motorization (torque issues) which may be necessary to insure the final product's quality.

MONDAY, OCTOBER 5, 2015 | 1:00 PM to 5:00 PM

5. **FO206:** BEND RESISTANT SINGLE-MODE AND MULTIMODE FIBERS | **Hanover C**

Instructor: Scott R. Bickham, Ph.D., Development Associate, Corning Optical Fiber, Corning, NY, USA

Description: This course starts with a brief refresher of optical waveguides that will lead into a discussion of the macrobending in optical fibers and how it can be mitigated through fiber design. The topics covered include a comparison of bend loss measurements with predictions from a modified Marcuse model that includes photoelastic contributions to the effective bend radius. Recent analytical results using a Beam Propagation Model will be discussed. Designs of bend-improved single mode fibers will be compared, along with their performance and applications. The remainder will be devoted to the design and applications of bend-improved multimode fiber.

This course should give the attendee the background to assess the capability of bend-improved fibers in FTTX, Data Centers and other applications.

6. **MA202:** THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE—Part Two | **Hanover D**

Instructor: Dr. Yimsan Gau, Cable Consulting Services, Princeton, NJ, USA

Description: One of the most critical steps in the fabrication of plastic parts and products and specifically wire & cable is the extrusion process. The process involves the extruder and screw as well as the properties of the materials being extruded. The course presents an overview of the extruder components, the three main functions of the extruder screws, the importance of mixing elements and their design, and the impact of material properties on the extrusion processes. This is followed by a detailed description of the different types of screws, their design concept, their advantages/disadvantages, and the fabrication lines of different type of cables and problems associated with them.

The course also covers two sections on extrusion stability and extrusion optimization. Stable extrusion is critical in

controlling the electrical properties, physical properties and the dimensions of the cables. The factors which can lead to unstable extrusion and the two parameters used to monitor extrusion stability, head pressure and melt temperature are reviewed. Optimizing the extrusion process requires a good understanding of the energy input to the extrudate from the motor through the screw, and the energy input from the heated barrel through heat conduction. The energy input from the two sources and the setting of temperature profile on the barrel and die to achieve an optimal flow out of the extruder and die are presented. Simple flow and pressure drop calculations are also made to illustrate the modeling flow process in the extruder and die. In addition, the important polymer properties affecting the extrusion process and performance are discussed along with the typical problems in cable extrusion and new trend in extrusion technology.

The course provides useful reference material to process engineers planning to pursue more advanced studies in wire & cable extrusion, and practical hints and tools to help optimize the extrusion processes.

7. **CU202:** COPPER CABLING TECHNOLOGY—ADVANCED TRANSMISSION LINE THEORY AND MEASUREMENTS I **Hanover E**

Instructors: Alistair Duffy, Ph.D., Professor of Electromagnetics, De Montfort University, Leicester, United Kingdom

Kenneth Cornelison, Cable Technology Resources, Cincinnati, OH, USA

Description: This course reviews the fundamental transmission line theory inherent in all cables, relating the electrical property fundamentals to the transmission in high performance cables. Basic building blocks of electrically long transmission lines are described, and how they relate to modern cable design.

The course also covers the testing technology for high frequency cables. Measurement procedures, principles and techniques are covered, highlighting areas important for the latest cable types. Operation of test equipment such as vector network analyzers is reviewed, and the different methods of operation for laboratory and field test equipment. The course will briefly touch on some of the trends in cable applications and design that are influencing measurement technology and techniques

8. **CU205:** ADVANCED BALUNLESS MEASUREMENTS **Hanover F**

Instructor: Sterling Vaden, VP Advanced Technology, Surtec Industries Inc.Keelung City, Taiwan TPE, North Carolina, USA

Description: The course will describe the principles and use of network analyzer based balunless measurement systems to measure and characterize passive devices that utilize balanced pair transmission paths. These measurement systems are particularly useful for broadband frequency measurements above 1 GHz, where the use of baluns becomes impractical. They are also useful for obtaining measurement results of all device parameters, including "cross-modal" response. The course will begin with an overview of principles and techniques and progress to practical implementations using available equipment. The course will include test fixture construction principles, calibration using custom reference artifacts, fixture de-embedding and methods of connecting devices under test to the test fixtures. This course is intended for connector and cable designers in networking applications with bandwidths of application up to 3 GHz, and applicable to higher frequencies with careful fixture design.

9. **CN203:** CONNECTORS AND CONNECTORIZATION: FIBER **Hanover G**

Instructor: Douglas Parker, Custom Projects Manager, ODU-USA, Camarillo, CA, USA

Description: Fiber optic connectors are available in a variety of designs for providing excellent service in many environments. Selecting the best one for your application is an important decision. However, to insure that the connector was terminated properly and continues to keep the fiber data flowing with minimal loss, standardized installation and in-service testing must be done correctly.

We will review connector choices, pro's and con's, termination issues that can impact the reliability and performance of your connectorized fiber and cable and appropriate testing for the fiber and cable line configuration. Arguably the most critical issue in fiber optic connectorization is establishing and maintaining cleanliness in the connection once a high-quality termination is executed. We will review connector types, interface types (butt joint and expanded beam lens), splices (permanent connections), cleaning issues, the tools used to examine ends, the standards that exist and are developing to assist in properly testing for losses and assessing cleanliness.

The course includes limited hands-on use of test instruments to check fiber optic interconnections, making some subtle changes that demonstrate a dramatic effect on measured performance. There will be discussion on prevention of those conditions that result in poor performance. We will discuss today's fibers, coatings, cable strength members and jacketing that all are part of the termination process and influence the selection of the best connector, the best methods of termination and proper testing. Course notes will include references to standards and procedures which we will review to be aware of what is important in each step of the process of termination and the final inspection/testing procedure. The course will be helpful for designers, assemblers, quality people and managers who need to know what is important to control in fiber optic connectorization, maintenance and testing.

TUESDAY, OCTOBER 6, 2015 | 8:00 AM to 11:50 AM

SESSION 1: EXECUTIVE TRACK | Hanover CDE

Chairperson: Robert M. Canny, RSCC Wire & Cable LLC, Connecticut, USA

1-1 (8:00) The Global Fiber Optics Market: Running Faster than 40,000 km per Hour – R. Mack, CRU International, Rhode Island, USA

1-2 (8:25) A Review of the Metallic Cable Market with a Focus on China – R. Daniels, CRU, London, UK

1-3 (8:50) Global Supply Trends for Plastics – M. Taylor, SPI: The Plastics Industry Trade Association, Washington, DC, USA

1-4 (9:15) Optical Fiber Market Trends – W. Jordan, Corning Optical Fiber & Cable, New York, USA

BREAK (9:40-10:10)

1-5 (10:10) Implication of Bandwidth Growth on Network Deployment – D. Mazzarese, OFS, Georgia, USA

1-6 (10:35) HDBaseT: Solving the Power Game – A. Sobelman, HDBaseT Alliance, Oregon, USA

1-7 (11:00) Perspective on the Future of Power Over Ethernet – J. Lapak, Univ of NH / InterOperability Laboratory, New Hampshire, USA

1-8 (11:25) Economic Outlook – R. Fry, Robert Fry Economics LLC, Delaware, USA

SESSION 2: FTTX & ACTIVE COMPONENTS | Hanover AB

Chairperson: David Pheteplace, Bishop & Associates, Inc., Colorodo, USA

2-1 (8:00) Development of Aerial 8-Fiber Optical Fiber Cable for Rural Area - M. Tsukamoto and Y. Hoshino, Furukawa Electric Co., Ltd., Mie, Japan

2-2 (8:25) Development of Highly Functional Optical Indoor Cables - Y. Takahashi, S. Shiobara, M. Yamanaka and N. Okada, Fujikura Ltd., Chiba, Japan

2-3 (8:50) Micro Fiber Pathway and an Easy Access Fiber Drop Cable for Single Family Unit and Multi-Dwelling Unit Applications - R. Parikh and D. Larson, 3M Company, Texas, USA; and D. Collado, Prysmian Group, North Carolina, USA

2-4 (9:15) Review of Progress in Optical Ring Resonators with Crosstalk Modelling in OADMs - R. Mansoor and A. Duffy, De Montfort University, Leicester, United Kingdom

SESSION 3: COATINGS | Hanover FG

Chairperson: Ad Abel, DSM Functional Materials, Hoek van Holland, The Netherlands

3-1 (8:00) Investigation of Cure Behavior of UV Curable Coatings for Optical Fiber by UV-LED Lamps - K. Takase, H. Uchida and Z. Komiya, JSR Corp., Ibaraki, Japan

3-2 (8:25) Estimation of Long-Term Change in Physical Property of Optical Fiber Coating Considering Effect of Humidity - K. Sohma, N. Iwaguchi, T. Kawano, T. Fujii and Y. Koyano, Sumitomo Electric Industries, Ltd., Yokohama, Japan

3-3 (8:50) Research on the Optical Fiber Drawing-Coloring Integration Technology – X. Lin, S. Cao, Z. Liu, Z. Wang and H. Zhang, Zhongtian Technology Fibre Optics Co., Ltd., Jiangsu Province, P.R. China

TUESDAY, OCTOBER 6, 2015 | 12:00 PM – 7:30 PM

See following events for specific times

PLENARY SESSION LUNCHEON | REGENCY BALLROOM VI-VII (12:00 PM – 1:45 PM)
See Page 15 for Details

EXHIBITS | GRAND HALL (2:00 PM – 6:00 PM)

NEW PRODUCT INTRODUCTIONS | GRAND HALL (2:30 PM – 5:30 PM)
Chairperson: Mike Patel, Teknor Apex Co., Rhode Island, USA
(Titles Will Be Posted Onsite)

HOSPITALITY RECEPTION | REGENCY BALLROOM V (6:00 PM to 7:30 PM)

WEDNESDAY, OCTOBER 7, 2015, 8:00 AM – 11:50 AM

SESSION 4: SPECIAL APPLICATIONS | HANOVER C

Chairperson: Markus F. Kemmler, Kemmler Consulting GmbH, Denkendorf, Germany

4-1 (8:00) Bend Insensitive Optical Fibers for High Radiation Environments - B.G. Risch, Prysmian Group, North Carolina, USA; F. Achten, J. Jensma and M. Boon, Prysmian Group, Eindhoven, The Netherlands; A. Pastouret, M. Bigot and A. Amezcua, Prysmian Group, Champs-sur-Marne, France

4-2 (8:25) Installing Sensor Fibers or Cables for Power Cables - W. Griffioen and V. Chaves, Plumettaz SA, Bex, Switzerland

4-3 (8:50) Optical Fiber Cable Design for Distributed Pipeline Sensing and Data Transmission - B.G. Risch, R. Lovie and D. Roland, Prysmian Cables and Systems Telecommunications Americas, North Carolina, USA; E. Rochat, Omnisens, Morges, Switzerland; and D. DuToit, Omnisens, Minnesota, USA

4-4 (9:15) Accelerated Degradation of Balanced Twisted Pair Performance Due to the Use of Remote Powering (PoE+) - F. Akinnuoye, H. Sasse and A. Duffy, De Montfort University, Leicester, United Kingdom; and P. Cave, Excel Networking, Birmingham, United Kingdom

BREAK (9:40-10:10)

4-5 (10:10) Data Communication Cables with Functional Integrity During Fire Influence - U. Rudorf, M. Dettmer, R. Schmidt and J. Liebel, Leoni Special Cables GmbH, Friesoythe, Germany

4-6 (10:35) Optimal Position of Fiber in Power Cable for Sensing Application by Using Finite Element Analysis - S. Gaikwad, P. Vasani, P. Watekar and A. Aggrwal, Sterlite Technology Limited, Aurangabad, India

SESSION 5: POWER OVER COMMUNICATIONS CABLE CONSIDERATIONS AND COPPER DESIGN/MODELING Hanover AB

Chairperson: Eric Lawrence, Berk-Tek, Pennsylvania, USA

5-1 (8:00) Initial Developments in the 2017 NEC® for Data/Comm Cables - S. Kaufman, CableSafe, Inc., Georgia, USA

5-2 (8:25) Methods of Evaluating Cable Heating for PoE Applications - W. Hopkinson and T. Hayes, CommScope Inc., North Carolina, USA

5-3 (8:50) Twisted-Pair Data Cabling Reach Considerations for Power Distribution - D.C. Hess, CORD DATA, Pennsylvania, USA

5-4 (9:15) Temperature Rise of Ethernet Cable Bundles from Power Delivery - B. Marchant, Berk-Tek LLC, Pennsylvania, USA

BREAK (9:40-10:10)

5-5 (10:10) Update on Industry Study of Powering Over Data Cables - A. Tassone, Underwriters Laboratories LLC, New York, USA

5-6 (10:35) Cable Measurement Assessment using the Feature Selective Validation Method - O. Ogundapo and C. Nche, American University of Nigeria, Yola, Nigeria; A. Duffy, F. Akinnuoye and V. Kang, De Montfort University, Leicester, United Kingdom; and Z. Gang, Harbin Institute of Technology, Harbin, China

5-7 (11:00) Impact of Quad Cable Manufacturing Tolerances on NEXT - J.Poltz, OptEM Engineering Inc., Alberta, Canada; and J. Domingue, Oceaneering Umbilical Solutions, Florida, USA

5-8 (11:25) OFDM Based Ethernet Transmission over Copper Cables - B. Li and A. Duffy, De Montfort University, Leicester, United Kingdom

SESSION 6: FIBER DESIGN, MEASUREMENTS & PREFORM PROPERTIES I Hanover DE

Chairperson: Dr. C. Bertil Arvidsson, Fiberson AB, Hudiksvall, Sweden

6-1 (8:00) Measurement of Bend-Insensitive Fibres with Low Index Coating - F. Achten and D. van Ras, Prysmian Group, Eindhoven, The Netherlands; and L-A. de Montmorillon, Prysmian Group, Haisnes, France

6-2 (8:25) Research on the Small-Size Ultra-Low Bending Loss Optical Fibers - S. Cao, Z. Liu and J. Hu, Zhongtian Technology Fibre Optics Co., Ltd., Nantong, China; C. Guo, Zhongtian Technology Submarine Cables Co., Ltd., Nantong, China; and H. Zhou, Zhongtian Technology Advanced Material Co., Ltd., Nantong, China

6-3 (8:50) A Single-Mode Fiber with Ultra-Low-Loss and Large-Effective-Area - L. Zhang, H. Zhou, J. Wu, S. Long, R. Wang and R. Matai, Yangtze Optical Fibre and Cable Joint Stock Limited Company, Wuhan, China

6-4 (9:15) Microbending Loss Characteristics of LP11 Mode in Two-Mode Fiber - T. Sakamoto, Y. Goto, T. Matsui, K. Nakajima, K. Tsujikawa, S. Aozasa and F. Yamamoto, NTT Corporation, Ibaraki, Japan

BREAK (9:40-10:10)

6-5 (10:10) Impact of Air-Hole on Core-to-Core Crosstalk Suppression - T. Sakamoto, Y. Goto, S. Aozasa, K. Tsujikawa, K. Nakajima, T. Matsui and Y. Fumihiko, NTT Corporation, Ibaraki, Japan; and M. Ohashi, Osaka Prefecture University, Sakai, Japan

6-6 (10:35) Improvement of Drawing Tension Induced Stress Corrosion Parameter - S. Aozasa, K. Tsujikawa, K. Nakajima, Y. Goto and F. Yamamoto, NTT Corporation, Ibaraki, Japan

6-7 (11:00) Study of the Effect of Preform Extending Condition on the Preform Geometric Performance - R.G. Yan, Y.C. Shen and Y.G. Qian, Zhongtian Technology Advanced Material Co., Ltd., Jiangsu, P.R. China

6-8 (11:25) Study on Influence of Fiber Preform Tapering Ways and the Equipment Technology on the Taper - R.G. Yan, Y.C. Shen and Y.G. Qian, Zhongtian Technology Advanced Material Co., Ltd., Jiangsu, P.R. China

SESSION 7: COMMERCIAL APPLICATIONS FOR MATERIALS & PROCESSES | Hanover FG

Chairperson: Mehdi Emad, Solvay Specialty Polymers, New Jersey, USA

7-1 (8:00) Genioplast® PELLETS - Performance Additive for Cable Compounds - D. Calimente, Wacker Chemical Corp., Michigan, USA; M. Geck and O. Fuhrmann, Wacker Chemie A.G., Burghausen, Germany

7-2 (8:25) New Applications Identified for ECA Resins - K.L. Campbell-Proszowska, J.L. Netta, J.M. McCall, K.R. Walck and J. Lahijani, Chemours FC, LLC, a wholly owned subsidiary of Dupont, Delaware, USA

7-3 (8:50) New Low Smoke Zero Halogen Tray Cable Jacket Materials with Enhanced Properties Product Design and Process Optimization - Z. Stryczek, A. Hoffman and D. Roberts, Saco Polymers, Wisconsin, USA

7-4 (9:15) Faster Processing FireCon™ CPE for Increased Profitability - K.R. Patel and G. Sharma, PolyOne Corporation, Ohio, USA

BREAK (9:40-10:10)

7-5 (10:10) Engineering Plastics - Influence to Processing for Wire and Cable Applications – C. Faustmann and G. Hofer, Rosendahl Nextrom GmbH, Pischelsdorf, Austria

7-6 (10:35) Online Monitoring of Loose Tube Production Process - C. Schönher and W. Hörschläger, Rosendahl Nextrom GmbH, Pischelsdorf, Austria

7-7 (11:00) New Aramid and HMPE Materials for OFC Reinforcement - O. Grabandt, Teijin Aramid BV, Arnhem, The Netherlands

WEDNESDAY, OCTOBER 7, 2015, 10:00 AM – 6:00 PM

EXHIBITS | GRAND HALL

WEDNESDAY, OCTOBER 7, 2015, 1:00 PM – 4:25 PM

SESSION 8: FIBER CONNECTIVITY & SPLICING | Hanover AB

Chairperson: Guy Castonguay, Corning Optical Communications, LLC, Arizona, USA

8-1 (1:00) Ultra-Compact MPO Connector for Data Center - Y. Aoshima, K. Ueda, T. Kamada, Y. Suzuki, K. Ohtsuka and Y. Yokomachi, SEI Optifrontier Co., Ltd., Kanagawa, Japan

8-2 (1:25) Ultra-Low Insertion Loss of Singlemode Ferrule-Less Connectors - M. Zitsch, M.A. Kadar-Kallen and M. Gurreri, TE Connectivity, Pennsylvania, USA

8-3 (1:50) High Density Optical Connector with Unibody Lensed Resin Ferrule - A. Nakama, T. Ota and K. Takizawa, Fujikura Ltd., Chiba-Ken, Japan

8-4 (2:15) Splice Loss Criteria for Outside Plant Cable - D. Mazzarese, OFS, Georgia, USA; K. Dunn, CommScope, North Carolina, USA; and R. Throckmorton, Corning Optical Communications, North Carolina, USA

SESSION 9: FTTX & NETWORK | Hanover DE

Chairperson: Helio J. Durigan, Furukawa Industrial S.A., Curitiba, Brazil

9-1 (1:00) Firetuf™ Central Loose Tube Fiber Optic Cables - Z. Şirin, B. Sönmez and C. Altingöz, Türk Prysmian Kablo ve Sistemleri A.Ş., Bursa, Turkey

9-2 (1:25) A New Fiber Optic Cable with Central Strength Element for FTTH Access - J.Q. Bi, Novobit AG, Winterthur, Switzerland

9-3 (1:50) Bend-Insensitive Low-Loss Cable - L. Provost, L.A. de Montmorillon, E. Aldea, P. Dhenry and P. Sillard, Prysmian Group, Haisnes, France; O. Tatat and S. Penet, Prysmian Group, Calais, France

9-4 (2:15) Optical Fiber Cable and Connectivity for High Capacity Single- and Multi-Mode Optical Home Network - L. Provost, P. Sansonetti, L. Gasca and D. Molin, Prysmian Group, Haisnes, France; O. Tatat, Prysmian Group, Calais, France; C. Populaire, G. Martin and L. Valencia, Radiall, Voreppe, France; N. Evanno and P. Guignard, Orange Labs, Lannion, France

BREAK (2:40 – 3:10)

9-5 (3:10) Cable Stiffness: Analysis and Optimization for Special Applications - M. Garcia, G. Hernandez and D. Galan, Prysmian Group Spain, Maliaño, Spain

9-6 (3:35) Network Monitoring: The Next Piece to the Intelligent Network Puzzle - W.J. Clatanoff, D.K. Larson, R.K. Selli and D.J. Treadwell, 3M Company, Texas, USA

SESSION 10: DATA CENTER & MULTIMODE FIBER Hanover FG

Chairperson: Peter Pilon, OFS, Massachusetts, USA

10-1 (1:00) Optical Interface Study of SI Type PCS Fiber for a Gigabits Network Application - K. Horiguchi, Y. Hyakutake, Y. Beppu and T. Iikubo, Adamant Co., Ltd., Tokyo, Japan; T. Hayashi, HAT Laboratory Inc., Kanagawa, Japan; S. Kobayashi, Tyco Electronics Japan G.K., Kanagawa, Japan; R. Nagase, Chiba Institute of Technology, Chiba, Japan; and M. Kagami, Toyota Central R&D Labs., Inc., Aichi, Japan

10-2 (1:25) Standard and Bend-Insensitive Multi-Mode Fiber Connection Modeling - A Vectorial Full-Wave Approach - S.J. Floris and T. Bolhaar, TE Connectivity, 's-Hertogenbosch, The Netherlands; B.P. de Hon and A.G. Tijhuis, Eindhoven University of Technology, Eindhoven, The Netherlands

10-3 (1:50) New Generation Wideband Multimode Fiber for Shortwave Wavelength Division Multiplexing in Datacom Links - R. Shubochkin and D. Braganza, OFS, Massachusetts, USA; Yi Sun, K. Balemarthy, J. Kim, R. Lingle, Jr., J. Kamino and D. Vaidya, OFS, Georgia, USA; and M. Yan, OFS, New Jersey, USA

10-4 (2:15) Extended Reach of 40G and 100G Transmission on OM4 MMF - Y. Sun, R. Lingle, Jr., J. Kamino, OFS, Georgia, USA; and D. Knight, OFS, Sturbridge, USA

BREAK (2:40 – 3:10)

10-5 (3:10) Characterization of Modal Dependence of MMF Chromatic Dispersion for Wideband MMF - J. Castro, B. Kose, R. Pimpinella, P. Huang, A. Berian, A. Novick and B. Lane, Panduit Corp., Illinois, USA

10-6 (3:35) Wide-Band OM4 Multimode Fibers for Future 400Gbps and 1.6Tbps WDM Systems - L. Provost, M. Bigot, D. Molin and P. Sillard, Prysmian Group, Haisnes, France; A. Amezcua-Correa, Prysmian Group, Champs sur Marne, France; and F. Achten, Prysmian Group, Eindhoven, The Netherlands

10-7 (4:00) Optimization of MMF Links to Increase Capacity × Distance using New Transceiver and Fiber Metrics - F. Achten, Prysmian Group, Eindhoven, The Netherlands; A. Amezcua-Correa, Prysmian Group, Champs-sur-Marne, France; D. Molin, M. Bigot-Astruc and P. Sillard, Prysmian Group, Haisnes, France

WEDNESDAY, OCTOBER 7, 2015, 4:00 PM – 6:00 PM

POSTER SESSION | GRAND HALL

Chairpersons: Eric Whitham, OFS, Georgia, USA

Professor Alistair Duffy, De Montfort University, Leicester, United Kingdom

P-1 Cables at Threat from Attack by Rodents and Termites - P.S. Dhamorikar, C Tech Corporation, Mumbai, India

P-2 The Mechanism of Fiber Breaking During Optical Fiber Cable Manufacture Processing and Method to Decrease - X. Su, H. Yan, J. Huang, Z. Zhou, F. Chen, Z. Xiong, and D. Xu, Yangtze Optical Fibre and Cable Joint Stock Co. Ltd., Wuhan, China

P-3 Application of Woven Continuous Basalt Fiber Tape in ADSS Cable - Z. Zhang, R. Xu, J. Yin, X. Shen and L. Shi, Hengtong Optic-Electric Co., Ltd., Jiangsu, P.R. China

P-4 Quality Variability in Commercial Polyethylene Cable Jackets as Determined by the Physical Properties and Aging Performance - A. Bringuier and B. Williamson, Corning Optical Communications, North Carolina, USA; T. Liu, Y. Liao and J. Lv, China Academy of Information and Communications Technology, Beijing, China; and S. Yong, Corning Optical Communications, Chengdu, China

P-5 A New Flat Indoor/Outdoor Drop Cable for FTTH Applications - Q. Yu, F. Qian, L. Chen, Q. Qi, S. Wang, H. Shi and C. Liu, FiberHome Telecommunication Technologies Co., Ltd., Hubei, P.R. China

P-6 Design and Develop of Sensor Optical Fiber Cable used in Oil/Gas Submarine Soft Pipe - Q. Qi, B. Chen, H. Shi and C. Lin, FiberHome Telecommunication Technologies Co., Ltd., Hubei, P.R. China

P-7 Measurement Study of Macrobending Test for ITU-T G.657 Fiber Under Small Bending Radius by Singlewavelength Light Source and Optical Power Meter - C. Li, Beijing University of Posts and Telecommunications, Beijing, China; L. Li, Quality Supervision and Test Center for Cables and Communication Equipments of Information Industry, Chengdu, China; and T. Wang, Beijing Blade Science & Tech Co., Ltd., Beijing, China

P-8 Design and Characterization of Optical Fiber For Next Generation Multi-Dimensional Multiplexing - Q. Mo, C. Du, H. Yu, Y. Ke, R. Chen and Z. Liu, Wuhan Research Institude of Posts and Telecommunications, Wuhan, P.R. China; J. Li and F. Ren, Peking University, Beijing, China; and J. Wang, Huazhong University of Science and Technology, Wuhan, China

P-9 The Application of Small Specification Radiating Mode Leaky Cable Indoor - L. Yanrui, X. Zongming, Z. Ruijing and H. Debing, Zhontian Hitachi Radio Frequency Cables Co., Ltd., Jiangsu Province, China

P-10 Shrinkability of the Non-Halogenated Flame Retarded Heat–Shrinkable Tubings from Elastomeric Polyolefin Blends: An Empirical Overview - D. Kang, Jiangsu Trigiant Technology Co., Ltd., Jiangsu Province, China

P-11 Novel Design and Analysis of Orbital Angular Momentum Transmission Optical Fiber - C. Du, Q. Mo, J. Zhang, W. Li, W. Luo, Z. Liu, Y. Ke, L. Yan and M. Kong, FiberHome Telecommunication Technologies Co., Ltd., Wuhan, China; and S. Li, Tsinghua University, Beijing, China

P-12 Development and Application of the Invisible Optical Cable in FTTx - M. Feng, Q. Jiang, L. Chang and F. Gao, Hengtong Optic-Electric Co., Ltd., Jiangsu, P.R. China

P-13 Introduction and Application of the Multicore and Flat Parallel Optical Cable - F. Gao, W. Lin, C. Shen, K. Lin and X. Shen, Hengtong Optic-Electric Co., Ltd., Jiangsu, P.R. China

P-14 Rayleigh Scattering Loss Reduction by Rapid Quenching in Glass Transition Region for Optical Fiber Drawing - N. Kwack, E. Hong, J. Park, J. Yun, C. Jung, C. Ouh and S. Oh, Taihan Fiberoptics Co., Ltd., Gyunggi-do, Korea

P-15 Investigation and Development on U-Tube Air Blowing Micro Cable & the Measuring Method of Binder Yarn Dynamic Payoff Tension - H. Song, R. Xu, P. Liu, J. Wu, L. Shi, Z. Zhang, D. Wei, C. Xuan and X. Shen, Hengtong Optic-Electric Co., Ltd, Jiangsu, P.R. China

P-16 Several Test Methods of the Performance of UV Color Ink in Cable - Z. Ju, S. Xu, J. Wu, L. Shi and S. Wu, Hengtong Optic-Electric Co., Ltd., Jiangsu, P.R. China

P-17 Development of 2000-Fiber Ultra-High Density Underground Optical Cable - T. Ishimura, M. Tsukamoto and Y. Hoshino, Furukawa Electric Co., Ltd., Mie, Japan

P-18 Analysis of Fiber Micro Bending Loss – H. Xu, S. Cao, Z. Liu, Z. Wang and H. Zhang, Zhongtian Technology Fibre Optics Co., Ltd., Jiangsu, China

P-19 Filler/Polymer Interface Studies for Optimization of Composition and Process for HFFR Tray Cable Jacket Materials with Enhanced Fire Resistance, Physical Properties and Flexibility - Z. Stryczek and A. Hoffman, Saco Polymers, Wisconsin, USA

P-20 Investigating Effects of Freezing Condition on Micro-Duct Air-Blown Cables - Z. Xiong, Y. Ruan and W. Ye, Yangtze Optical Fibre and Cable Joint Stock Limited Company, Hubei, P.R. China; and X. Lu, Huawei Technologies Co., Ltd., Guangdong, P.R. China

P-21 Optical Wrap Defect Inspection for Cable - C. Girdwood and A. McCloskey, Taymer International Inc., Ontario, Canada

P-22 The Effect of Cable Construction on Flame Retardancy in Moisture Cure Compounds - P.C. Dreux, A. Ghosh-Dastidar and K. Bolz, The Dow Chemical Co., Pennsylvania, USA

P-23 Loose Tight Buffer, Time to Define What We Mean - W.M. Kachmar, Technical Horsepower Consulting LLC, Vermont, USA

P-24 Strong and Ultra-Strong Copper Conductors for Advanced Wire and Cable Applications - S. Burk, D. Zuckermann, P. Schmidt and J. Marien, Isabellenhuette Heusler GmbH & Co. KG, Dillenburg, Germany

THURSDAY, OCTOBER 8, 2015, 8:00 AM – 11:25 AM

SESSION 11: COPPER CABLE BALANCE, SHIELDING, MEASUREMENT & MODELING | Hanover C

Chairperson: Kenneth Cornelison, Wire & Cable Technology Resources, Ohio, USA

11-1 (8:00) Study on Relationship between Shielding Effectiveness and Unbalance Attenuation Performance - J. Martins, M. Beninca, P. Ito, S. Joly and H. Durigan, Furukawa Industrial S.A. Produtos Elétricos, Curitiba, Brazil

11-2 (8:25) EMC-Performance of Cabling Systems - Coupling Attenuation - S. Grüner, D. Wilhelm and B. Jung, GHMT AG, Bexbach, Germany

11-3 (8:50) Calculation of Common Mode Parameters of Cables for High Data Rate Digital Communications - C. Pfeiler, Prysmian Group, Nuremberg, Germany; and D. Molin, Prysmian Group, Douvrin, France

11-4 (9:15) Balunless Measurement of Coupling Attenuation of Screened Balanced Cables up to 2 GHz - C. Pfeiler, Prysmian Group, Nuremberg, Germany; and B. Mund, bedea Berkenhoff & Drebes GmbH, Asslar, Germany

BREAK (9:40-10:10)

11-5 (10:10) Reverberation Chamber Based Analysis of Environmental Noise Coupling to Ethernet Cables at High Frequencies – A. Duffy, E.C. Arihilam, F.S. Akinnuoye, V.K. Kang and P. Cave, De Montfort University, Leicester, United Kingdom

11-6 (10:35) The Extensive Research of the Radiation Characteristic of Leaky Cables – Y. Lan, R. Zhao, B. Wang and D. Huang, Zhongtian Hitachi Radio Frequency Cables Co., Ltd., Nantong, China

SESSION 12: CABLE INSULATION & JACKET MATERIALS **Hanover AB**

Chairperson: Dr. Mohamed Esseghir, The Dow Chemical Company, Pennsylvania, USA

12-1 (8:00) Polyolefin in Cu-based Data Communication Cables - T. Getzie, Berk-Tek LLC, Pennsylvania, USA

12-2 (8:25) Data Cable Insulation Resin System with Enhanced Foamability - A. Flory, M. Esseghir and C. Kmiec, The Dow Chemical Co., Pennsylvania, USA

12-3 (8:50) Regulation of Plasticizers Under EU REACH and RoHS - A. Voskian, Syska Voskian Consulting, Maine, USA; and J. Syska, Syska Voskian Consulting, Copenhagen, Denmark

12-4 (9:15) Lightweight Polyolefin Jackets - A. Flory, S. Pujari, M. Esseghir and C. Kmiec, The Dow Chemical Co., Pennsylvania, USA

BREAK (9:40-10:10)

12-5 (10:10) Low Modulus Polyvinylidene Fluoride-Hexafluoropylene Copolymers Having Improved Low Temperature Performance for Wire & Cable Applications - J.J. Henry, A. Freeman, D. Gaynor and D. Kreh, Arkema Inc., Pennsylvania, USA

12-6 (10:35) High Modulus Olefin Compounds for Fiber Optic Cable Buffer Tubes - K. Seven, M. Esseghir, C. Kmiec, B. Chaudhary and Y. Huang, The Dow Chemical Co., Pennsylvania, USA

12-7 (11:00) Dielectric Properties of Halogen Free Polymers with High Service Temperatures - M. Bühler, A.N. Gűbeli, Y.P. Köppel and S. Metz, Huber+Suhner AG, Herisau, Switzerland

SESSION 13: CABLE MANUFACTURING PROCESSES & MEASUREMENTS | Hanover DE

Chairperson: David Braun, Teknor Apex Company, Rhode Island, USA

13-1 (8:00) Process Control Parameters Evaluation Using Descrete Event Simulation for Business Process Optimization - P.S. Kang, A. Aboutaleb and A. Duffy, De Montfort University, Leicester, United Kingdom; C.U. Silva, M Wright and Sons Ltd., Loughborough, United Kingdom; A. Erhart and V. Todeschini, NEO Industrial Engineering, Porto Alegre, Brazil

13-2 (8:25) Detection of Surface Defects on Fine Metallic Wires by Stimulated Cathode Emission - M. Mestayer, S. Christo and M. Taylor, Jefferson Science Associates, LLC, Virginia, USA

13-3 (8:50) A Study on Optimization of Winding Cable Process Using DOE (Design of Experiments) – Taguchi Method – J. Martins, M. Souza, P. Ito, S. Joly and H. Durigan, Furukawa Industrial S.A. Produtos Elétricos, Curitiba, Brazil; E. Rigoni, Universidade Technógica Federal do Paraná, Curitiba, Brazil

13-4 (9:15) Subsea and EHV Cables Require a Challenging Purity Degree of XLpE-Material - J. Dognazzi, Sikora International Corp., Georgia, USA; and H. Prunk, Sikora AG, Bremen, Germany

SESSION 14: MICRO-CABLE DESIGN & INSTALLATION Hanover FG

Chairperson: Eric Whitham, OFS, Georgia, USA

14-1 (8:00) Micro Optical Cables System - A Solution to Brazilian Market - J.C.V. da Silva, E.L.A.S. de Souza, F.G. Corcini and A.R. Sampaio, Prysmian Draka Brazil S/A, Sorocaba, Brazil; J.G.D. de Aguiar and B.N. Aires, CPqD, Campinas, Brazil

14-2 (8:25) Installation and Access of a Novel Stranded Loose Tube Optical Fiber Outside Plant Micro Cable Design - J.L. Baucom, P. Tandon and L.A. Barrett, Corning Inc., North Carolina, USA

14-3 (8:50) 288 Fiber Ultra-High Fiber Density Micro-Duct Cable with Extreme Operating Performance - J. Quinn, AFL, South Carolina, USA; and O. Storaasli, Dura-Line, Tennessee, USA

14-4 (9:15) High Density Micro Cable Family with Next Generation 200 Micron Fibers - S. Olszewski, Corning Optical Communications Polska, Stryków, Poland; J. Toughlian, Corning Optical Communications, North Carolina, USA; M. Emmerich, Corning Optical Communications GmbH & Co., KG, Berlin, Germany; and K. Smith, Corning Optical Communications LLC, North Carolina, USA

THURSDAY, OCTOBER 8, 2015, 12:30 PM – 3:30 PM

SESSION 15: CODES AND STANDARDS | Hanover C

Chairperson: Steven A. Galan, Underwriters Laboratories, Inc., New York, USA

15-1 (12:30) Solutions for Navigating Product Sustainability and Transparency Demands to Maximize Market Opportunity - A. Mayer, P. Firth and A. Nicholson, UL Environment, Georgia, USA

15-2 (12:55) UL Standard Revisions and Proposals, Tri-National Standard Harmonization Activities - A.T. Tassone, Underwriters Laboratories LLC, New York, USA; and S. Stene, Underwriters Laboratories LLC, California, USA

15-3 (1:20) Europe Turns up the Heat on Construction Cables - J. Hodge and G. Stainthorpe, BASEC, Milton Keynes, United Kingdom

15-4 (1:45) Fiber Optic Cable Standards - What´s New in CENELEC? - W. Stöcklein, Corning Optical Communication, Berlin, Germany; L. Diakité, Sycabel, Paris, France

BREAK (2:10 – 2:40) – iPad drawing (must be present to win)

15-5 (2:40) Resistance to Fire of Communication Cables According to European Standards - M. Maritano, P. Marelli and A. Waßmuth, Prysmian SpA, Milano, Italy; J. Hennink and J. Jonker, Draka Comteq Telecom, Farmsum, The Netherlands; and N. Mabbott, Draka Comteq UK Ltd., Washington, United Kingdom

15-6 (3:05) IEC Standardization of Optical Fibres and Cables - B. Arvidsson, Fiberson AB, Hudiksvall, Sweden; G. Kuyt, Prysmian Group, Eindhoven, The Netherlands; and M. Kinard, OFS, Georgia, USA

SESSION 16: HIGH DENSITY OPTICAL FIBER CABLE & AERIAL CABLE | Hanover FG

Chairperson: Tomoyuki Hattori, Sumitomo Electric Ind., Ltd., Yokohama, Japan

16-1 (12:30) Development of Ultra High-Count and High-Density Optical Fiber Cable (2000 Coures) - N. Nakagawa, S. Hamaguchi, Y. Endo, K. Omoto, Y. Shibata and Y. Aoyagi, NTT Corp., Ibaraki, Japan

16-2 (12:55) Optical Design of Ultra-High-Density 2000-Optical Fiber Cable with Pliable 8-Fiber Ribbons for Underground Deployment - F. Sato, M. Takami, Y. Nagao, K. Takeda and H. Kato, Sumitomo Electric Industries, Ltd., Yokohama, Japan

16-3 (1:20) Development of 2000-Fiber Ultra-High Density Underground Cable - N. Itoh, M. Isaji, K. Osato, M. Yamanaka and N. Okada, Fujikura Ltd., Chiba, Japan

16-4 (1:45) Technique for Housing Optical Fibers in Underground Closure Applied Ultra High-Count and High-Density Optical Fiber Cable - M. Nogami, K. Nitta, R. Tanaka, K. Nishimura and Y. Aoyagi, NTT East and West Corporation, Ibaraki, Japan

BREAK (2:10 – 2:40) – iPad drawing
(must be present to win)

16-5 (2:40) New Ultra-Density Fiber Cable Technology for FTTx and Access Markets Using New Spider Web Ribbon - P. Dobbins and B. Villiger, AFL, South Carolina, USA

16-6 (3:05) Development of a Totally Dry Aerial Dielectric Self Support Cable Family - T. Goddard and R. Norris, OFS, Georgia, USA

SESSION 17: ENSURING A RELIABLE OPTICAL NETWORK I Hanover AB

Chairperson: Eric R. Logan, Corning Optical Communications LLC, North Carolina, USA

17-1 (12:30) Long Span Aerial Cable Installation Technology - K. Kawaguchi, R. Yasui, K. Shimokubo and K. Takamizawa, NTT Corporation, Ibaraki, Japan

17-2 (12:55) Revealing the Losses in Installed Fiber Cable Links Consisting of Cables of Different Age by OTDR Measurements at Several Wavelengths - S. Hopland, Telenor Norway, Fornebu, Norway

17-3 (1:20) Microscope Integrated with an Optical Connector Cleaner - Y. Higuchi, K. Hadama and J. Yamaguchi, NTT Corporation, Kanagawa Pref., Japan; and T. Miura, NTT Advanced Technology Corp, Tokyo, Japan

17-4 (1:45) New Optical Fiber Identifier - K. Matsuoka, S. Niimi, M. Miyamoto and H. Sugawara, Fujikura Ltd., Sakura, Japan

BREAK (2:10 – 2:40) – iPad drawing
(must be present to win)

17-5 (2:40) Temporary Optical Coupler and Dynamic Delay Adjustment Technologies for Optical Cable Re-Routing Operation Support Systems - T. Manabe, M. Inoue, H. Hirota, T. Kawano, T. Uematsu, K. Okamoto, T. Kiyokura, Y. Koshikiya and K. Katayama, NTT Corporation, Ibaraki, Japan

17-6 (3:05) Development of De-Icing OPGW - L. Ming, X. Yongjun, M. Chunyan and Z. Houpeng, Zhongtian Power Optical Cable Co., Ltd., Nantong, P.R. China; W. Daogen and M. Jingjing, Jiangdong Fittings Equipment Co., Ltd., Nantong, P.R. China

SESSION 18: FLAME RETARDANT TECHNOLOGY I Hanover DE

Chairperson: Daniel Winkler, Leoni Engineering Products & Services Inc., Michigan, USA

18-1 (12:30) Novel Strategies for Imparting Flame Retardancy to Polyolefins - B. Chaudhary, J. Cogen, M. Mundra and A. Batra, The Dow Chemical Co., Pennsylvania, USA

18-2 (12:55) Novel Polymeric, Non-Halogenated Flame Retardants for Use in Thermoplastic Elastomers - J-P. Lens and K. Trudel, FRX Polymers, Massachusetts, USA

18-3 (1:20) A New Technology Platform for Moisture Curable Non Halogen Flame Retardant Polyolefin - B. Sultan, S. Nilsson and O. Prieto, Borealis AB, Stenungsund, Sweden; S. Song, L. Westling and B. Fajardo, Borealis Compounds Inc., New Jersey, USA; and A. Watson, Borealis Polymers N.V., Mechelen, Belgium

18-4 (1:45) Not Your Grandfather's LSZH - E.W. Bates and M. Vassallo, General Cable, Indiana, USA

BREAK (2:10 – 2:40) – iPad drawing
(must be present to win)

18-5 (2:40) Quantification of the Flexibility of Flame Retardant Insulation and Jacket Materials When Designing Wire & Cable Products - P. Lorigan, T & T Marketing, Inc., Pennsylvania, USA

18-6 (3:05) Enhanced Solvent Resistance and Flammability Requirements for Harsh Environment and Industrial Optical Fiber Cables - B.G. Risch, R. Lovie and P. Baird, Prysmian Group, North Carolina, USA

PLENARY SESSION LUNCHEON

TUESDAY, OCTOBER 6, 2015: 12:00 PM – 1:45 PM

REGENCY BALLROOM VI-VII

Registered Technical Symposium attendees only (Seats are Limited)

ANNOUNCEMENTS/GREETINGS

Robert A. Wessels, Jr., Chairman, IWCS, Inc. Board of Directors, CommScope, Inc., Claremont, NC, USA

David Kiddoo, CEO/Director, IWCS, Inc, Shrewsbury, PA, USA

KEYNOTE SPEAKER

MICHAEL A. BELL, PE

Senior Vice President & General Manager, Optical Connectivity Solutions; Corning Optical Communications, NC, USA

Optical Solutions to Meet the Future Demands of "The Internet of Things"

AWARDS AND RECOGNITION

Presented By

Guy Castonguay, Chairman, IWCS Symposium Committee, Corning Optical Communications, LLC, Glendale, Arizona, USA

JACK SPERGEL MEMORIAL AWARD FOR OUTSTANDING TECHNICAL PAPER

William C. Hurley, Corning Optical Communications, Hickory, NC, USA

And

Dr. Lev L. Kuandykov, Corning Scientific Centre, St. Petersburg, Russia

"Statistical Model for Plenum Burn Testing"

OUTSTANDING POSTER PAPER

Zdenka B. Stryczek, Ph.D. and David G. Roberts, Saco Polymers Inc., Sheboygan, Wisconsin, USA

"New Low Smoke Zero Halogen Tray Cable Jacket Materials Designed for Balance of Cost, Performance and Enhanced Fire Resistance"

KITTS-KINGSLEY AWARD FOR BEST PRESENTATION

Ali Shehab, Cimteq Ltd., Cable Design and MES Software, Wrexham, United Kingdom

"Using a Manufacturing Execution System (MES) to Control Manufacturing Cost and Lead Time"

HONORING RETIRING IWCS MEMBER OF THE SYMPOSIUM COMMITTEE

Tomoyuki Hattori, Sumitomo Electric Ind., Ltd., Yokohama, Japan

And

SPECIAL RECOGNITION FOR OUTSTANDING CONTRIBUTIONS TO IWCS FOR OVER 38 YEARS

Michael A. DeLucia, Crofton, Maryland, USA

Presented By

Robert A. Wessels, Jr., Chairman, IWCS, Inc. Board of Directors, CommScope, Inc., Claremont, NC, USA

CONFERENCE AT A GLANCE

	Monday 10/5	Tuesday 10/6	Wednesday 10/7	Thursday 10/8	
6:00 AM					6:00 AM
6:30 AM					6:30 AM
7:00 AM	**7:00a - 8:00a** **Instructor's Orientation Breakfast** **Hanover B**	**7:00a - 8:00a** **Speakers' Orientation Breakfast** **Chicago A-D**	**7:00a - 8:00a** **Speakers' Orientation Breakfast** **Chicago A-D**	**7:00a - 8:00a** **Speakers' Orientation Breakfast** **Chicago A-D**	7:00 AM
7:30 AM					7:30 AM
8:00 AM	**8:00p - 12N** **Professional** **Development Courses** **Rm #'s - see pages 5-6** **1** CU101: Fundamentals of Copper Conductors & Metallic Cable Design & Applications **2** FO101: Fundamentals of Optical Fibers & FO Cable Design & Application **3** MA101: Selection & Use of Materials in Wire & Cable **4** MA201: The Art & Science of Extrusion for Wire and Cable - Part I Coffee Break 9:45a	**6:00a - 1:30p** **Exhibit Setup** **Grand Hall** **SESSION 1** Hanover CDE **SESSION 2** Hanover AB **SESSION 3** Hanover FG	**SESSION 4** Hanover C **SESSION 5** Hanover AB **SESSION 6** Hanover DE **SESSION 7** Hanover FG	**SESSION 11** Hanover C **SESSION 12** Hanover AB **SESSION 13** Hanover DE **SESSION 14** Hanover FG	8:00 AM
8:30 AM					8:30 AM
9:00 AM					9:00 AM
9:30 AM		**Coffee Break - 9:40 - 10:10**	**Coffee Break - 9:40 - 10:10**	**Coffee Break - 9:40 - 10:10**	9:30 AM
10:00 AM		**Executive Track** **FTTX & Active Components** **Coatings**	**Special Applications** **Power Over Communications Cable Considerations & Copper Design/ Modeling** **Fiber Design, Measurements & Preform Properties** **Commercial Applications for Materials and Processes**	**Copper Cable Balance, Shielding, Measurement &** **Cable Insulation & Jacket Materials** **Cable Manfacturing Processes & Measurements** **Micro-Cable Design & Installation**	10:00 AM
10:30 AM					10:30 AM
11:00 AM					11:00 AM
11:30 AM				**11:30a - 12:30p** **Lunch on Own**	11:30 AM
12 Noon	**12N - 1:00p Lunch** **Instructors & Students Only** **Hanover B**	**Plenary Session with Awards (Lunch Included)** **Keynote Speaker** **Michael A. Bell** **Corning Optical Communications** **Regency Ballroom VI-VII** **12:00p - 1:45p**	**12:00p - 1:00p** **Lunch on Own**		12 Noon
12:30 PM					12:30 PM
1:00 PM	**1:00p -5:00p** **Professional** **Development Courses** **Rm #'s - see pages 6-7** **5** FO206: Bend Resistant Single-Mode and Multimode Fibers **6** MA202: The Art & Science of Extrusion for Wire and Cable - Part II **7** CU202: Copper Cabling Technology - Advanced Transmission Line Theory & Measurements **8** CU205: Advanced Balunless Measurements **9** CN203: Connectors & Connectorization: Fiber Coffee Break 2:45p		**SESSION 8** Hanover AB **SESSION 9** Hanover DE **SESSION 10** Hanover FG	**SESSION 15** Hanover C **SESSION 16** Hanover FG **SESSION 17** Hanover AB **SESSION 18** Hanover DE	1:00 PM
1:30 PM					1:30 PM
2:00 PM		**Exhibits 2:00p - 6:00p** **Refreshments 5:00p - 6:00p** **Grand Hall** **New Product Introductions** **2:30p - 5:30p** **Grand Hall**	**CoffeeBreak - 2:40 - 3:10**	**Coffee Break - 2:10 - 2:40** **Drawing for iPad - must be present to win**	2:00 PM
2:30 PM			**Fiber Connectivity & Splicing** **FTTX & Network** **Data Center & Multimode Fiber**	**Codes and Standards** **High Density Optical Fiber Cable & Aerial Cable** **Ensuring A Reliable Optical Network** **Flame Retardant Technology**	2:30 PM
3:00 PM					3:00 PM
3:30 PM					3:30 PM
4:00 PM			**POSTER PAPER SESSION** **Grand Hall** **4:00p - 6:00p** **Drawing for GoPro – must be present to win**		4:00 PM
4:30 PM					4:30 PM
5:00 PM					5:00 PM
5:30 PM					5:30 PM
6:00 PM		**Hospitality Reception** **Regency Ballroom V** **6:00p - 7:30p**			6:00 PM
6:30 PM					6:30 PM
7:00 PM					7:00 PM
7:30 PM					7:30 PM

Exhibits 10:00a - 6:00p
Grand Hall
Refreshments 5:00p - 6:00p

ON-SITE REGISTRATION SCHEDULE

Registration will be held at the Hyatt Regency Hotel, Atlanta, GA, on the Exhibit Level – LL2 Prefunction Area, during the following hours:

Monday, Oct 5, 2015……...7:00 am to 5:00 pm

Tuesday, Oct 6, 2015..…….…….. 6:00 am to 6:00 pm

Wednesday, Oct 7, 2015……..…….. 7:00 am to 6:00 pm

Thursday, Oct 8, 2015……..7:00 am to 3:00 pm

All conference attendees must register and obtain a badge.
Badges must be worn for access to all IWCS events.

DRESS CODE: BUSINESS CASUAL

EXHIBIT HALL SCHEDULE - New Days (Grand Hall - Exhibit Level LL2)

All Registered Attendees

Tuesday, Oct 6, 2015…… 2:00 pm to 6:00 pm

Wednesday, Oct 7, 2105……..10:00 am to 6:00 pm

HOSPITALITY RECEPTION TUESDAY

Co-Sponsored with Wire and Cable Industry Suppliers Association® (WCISA®) www.wcisaonline.org
Special Recognition to Scholarship Recipients and Colleagues New to our W&C Industry!
(Regency Ballroom V – Ballroom Level LL1) 6:00 to 7:30 pm

LUNCH

Monday, Oct 5, 2015, Exhibit Level LL2, Hanover B: 12:00pm-1:00pm
Professional Development Course Instructors & Students Only with Badge & Course Ticket

Tuesday, Oct 6, 2015, Regency Ballroom VI-VII, Level LL1: 12:00pm-1:45pm
Plenary Session – Registered Technical Symposium attendees only (seats are limited).

SPEAKER'S / INSTRUCTOR'S ORIENTATION BREAKFAST

On the day of your presentation, you are requested to attend a Speaker's Orientation Breakfast as follows:

Instructors Only: Monday (7:00 to 8:00 am) – Hanover B
Speakers: Tuesday through Thursday (7:00 to 8:00 am) – Chicago A-D
During breakfast, you will have the opportunity to review the procedures for your oral presentation. In addition, a group photo of the session presenters with the chairperson will be taken. Afterwards, you will be directed to the room where you can review your PowerPoint® presentation. Note: No presentations will be uploaded onsite without the permission of your Session Chairman.

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The Lapp Group first established in Stuttgart, Germany has been a manufacturer of Wire and Cable since the company's inception over 50 years ago. Since that time, the Lapp Group grown through their worldwide locations to accommodate customers on a global scale. As evidenced by their several testing laboratories the Lapp groups dedication to research and development has established them as the global innovator to the wire and cable industry.

Lapp products are used throughout the world in automotive plants, machine tools, instrumentation, medical electronics, telecommunications, robotics, industrial automation, transportation, general industrial control systems, and numerous other applications.
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OFS is a world-leading designer, manufacturer and provider of optical fiber, optical fiber cable, FTTX, optical connectivity and specialty photonics products. Our manufacturing and research divisions work together to provide innovative products and solutions that traverse many different applications as they link people and machines worldwide. Between continents, between cities, around neighborhoods, and into homes and businesses of digital consumers we provide the right optical fiber, optical cable and components for efficient, cost-effective transmission.

OFS's corporate lineage dates back to 1876 and includes technology powerhouses such as AT&T and Lucent Technologies (now Alcatel-Lucent). Today, OFS is owned by Furukawa Electric, a multi-billion dollar global leader in optical communications.

Headquartered in Norcross (near Atlanta) Georgia, U.S., OFS is a global provider with facilities in Denmark, Germany, Russia and the United States.
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WCISA®
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WCISA® (Wire and Cable Industry Suppliers Association®) is a nonprofit corporate membership association with 95 North American suppliers of machinery, materials and accessories used for making all types of wire and cable. Members are based in or have an established subsidiary in North America. WCISA's mission is to promote its member's products and services by providing its members with representation, networking/social opportunities and services at wire and cable trade events and conferences. WCISA also offers a scholarship program to high school graduates, employees and interns that are affiliated with WCISA member companies. WCISA is active as an exhibitor, supporter and/or outing organizer, at wire and cable trade events and conferences throughout the world, including the IWCS Conference. Details can be found at www.wcisaonline.org, including information on becoming a WCISA member.

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Underwriters Laboratories has the expertise, testing capability, brand recognition and global presence needed to provide a full portfolio of wire and cable testing services for Fire Safety, Performance Verification, Component Cabling and Compound Performance to the industry. Our investigation services are supported by one of the most comprehensive Follow-Up Programs in the third-party certification industry that helps users, specifiers, distributors and manufacturers identify cabling products that meet nationally recognized safety requirements as well as industry specifications for performance and quality.
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NOTES:

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