

PROFESSIONAL DEVELOPMENT COURSES

SUNDAY, NOVEMBER 7, 2010 – 8:00 am to 12:00 noon

1. CN203: CONNECTORS AND CONNECTORIZATION: FIBER

Instructor: Douglas Parker, *Project Manager, Interconnect Systems, Inc., California, USA*

Description

There are a plethora of fiber optic connectors available these days. Selecting the best one for your application is an important decision. 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. Arguably the most critical issue in fiber optic connectorization is establishing and maintaining cleanliness in the connection. We will review the cleaning issues, the tools used to examine ends, the standards that exist and are developing to assist in properly assessing cleanliness, the tools available to safely clean and the methods of checking for proper fiber connection cleanliness. The course includes hands-on use of test instruments to check fiber optic interconnections, making some subtle changes that dramatically affect performance and discussing how to prevent 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 and the best methods of termination. 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 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 and maintenance.

2. CU101: FUNDAMENTALS OF COPPER CONDUCTORS & METALLIC CABLE DESIGN & APPLICATIONS

Instructors:

Trent Hayes, *Senior Engineering Manager, CommScope Incorporated, Claremont, NC*

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

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.

3. FO 206: BEND RESISTANT SINGLE-MODE AND MULTIMODE FIBERS

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

Description

Starting with a review of optical waveguides, this short course will discuss bend losses in optical fibers and how they can be mitigated through profile design. In single mode fibers, the addition of features such as a depressed cladding and a trench help confine the light in the core and improve macrobend losses. Measured bend losses are compared with modified Marcuse model that includes photoelastic contributions to the effective bend radius. Next-generation bend-improved fibers will then be discussed, along with state-of-the-art performance, applications and a brief discussion of market opportunities. Finally, macrobend losses in multimode fibers will be discussed, along with designs that can reduce these effects while maintaining high bandwidth.

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

4. MA202: THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE – Part A

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

Description

One of the most critical steps in the fabrication of plastic parts and products and specifically in the production of 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 covers 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 for the different types of cables. Typical and not so typical problems associated with cable extrusion are also presented. In addition, the important polymer properties affecting the extrusion process and performance are discussed along with the new trend in extrusion technology

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

SUNDAY, NOVEMBER 7, 2010 – 1:00 pm to 5:00 pm

5. CN201: CONNECTORS AND CONNECTORIZATION: COPPER

Instructor: Dr. Robert Mroczkowski, *Principal, connNtext associates, Vero Beach, FL*

Description

This course has been presented to audiences ranging from sales people to experienced development engineers. The presentation is designed for a broad audience. The course is organized into four topics:

Session 1: Connector Overview and Structure of Contact Interfaces: Provides functional and structural definitions of connectors. Describes the microstructure of contact interfaces and how that structure determines the mechanical and electrical characteristics of connectors.

Session 2: Contact Finishes: Discusses design, structure and functional characteristics of the major contact finishes, both noble (gold) and non-noble (tin). Palladium and palladium alloy finishes are also discussed.

Session 3: Separable Interfaces: Reviews materials and design considerations for separable interfaces. The role of contact normal force is emphasized. Mating mechanics and wiping effectiveness are also discussed.

Session 4: Permanent Connections: Discusses materials and design considerations for permanent connections. Crimped, Insulation Displacement and Press-in connections are emphasized.

6. FO101: FUNDAMENTALS OF OPTICAL FIBERS & FO CABLE DESIGN & APPLICATION

Instructor: David A. Seddon, *Senior Scientist, Design and Systems Group, Research Development and Engineering Corning Cable Systems LLC, Hickory, NC*

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 can 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, single 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.

7. MA101: SELECTION & USE OF MATERIALS IN WIRE & CABLE

Instructors:

Christopher McNutt, *Product Development Engineering Manager, Superior Essex, Kennesaw, GA*

Description

The selection and implementation of materials used in the construction of telecommunication wires and cables will be reviewed. Materials of construction will focus on Premises and Outside Plant applications for twisted pair, coaxial, and fiber optic cables. Using a performance based approach, the characteristics to be considered in selecting a material for use will be identified and related to the requirements of the finished product. Advantages and disadvantages associated with trade-offs in optimizing the cable construction will be discussed. All components of the

cable's construction will be reviewed including the transmission medium, 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.

8. MA201: THE ART AND SCIENCE OF EXTRUSION FOR WIRE AND CABLE – Part B

Instructor: *Dr. Stephan Puissant, Associate Professor, GIP-InSIC, France*

Description

The single screw extruder is a remarkably simple machine; the extrusion process however is extraordinarily complex as governed by interacting laws from mechanical engineering, thermodynamics, flow mechanics, the properties of solid and molten polymers etc. Physical characteristics (viscosity, conductivity, melting) of polymers used during extrusion are presented and are the keys to understand the functioning of the screw based extrusion process.

For successful extrusion one must understand the transport and pressure-generation taking place in the feeding zone, and the heating and melting taking place in the melting and conveying zones of the extruder. It will be shown how these mechanisms are affected by the polymer pellet properties), melt characteristics, screw and barrel geometry and by the pressure level at the end of the extruder. We will then present 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.

This course is intended for people involved in extrusion and who want base analysis tools for identifying bottlenecks in the extruder and

9. MA207: SUSTAINABILITY STANDARDS AND GREEN BUILDING CODES

Instructors: *Joe Mecca, Business Development Manager, UL Environment – Melville, NY*
Wendy Hennessy, Business Development Manager, UL Environment – Northbrook, IL

Description

Underwriters Laboratories has been creating standards for over 115 years and now UL Environment has inherited that knowledge to create sustainability standards for materials across a wide range of industry segments. Study after study have shown that consumers are confused and don't trust companies to make their own claims. They need a credible third party certifier, such as UL Environment, to help assist in separating the environmentally preferable products out from those that aren't stacking up. In order to have credible third-party certification programs, we need credible third-party developed sustainability standards. Since creating a 'standard' is both an iterative and collaborative process, the first part of this course will be in workshop-format which is designed to take participants through the standards creation process.

The second part of this course will be an examination of the current market for Green Building Codes, eg LEED, BREEAM. The intent will be to familiarize the global producer of wire & cable products with current 'green' trends as well as the impact these sustainable building rating systems are having on the industries in which they participate.