Introduction

Over the last couple of years, instrumentation has come on in leaps and bounds. It is just as important to note the data communication has not been left behind, and has rightfully kept pace with all the requirements of the modern plant. There is an increased tendency towards better data communication (especially in the industrial environment), and the aim of this seminar is to take all the mysticism out of the data communication systems, in existing (and future) networks.

The seminar covers all aspects of data communication, starting from an overview perspective and then delves individually into all the major aspects that are considered important to current users. Special attention is also given to the hybridized systems (i.e. HART) as well as the all-important fieldbus options that currently play such an important role in communicating with field devices. The seminar is presented in a manner which is easy to understand and grasp, even for novices and those new to the field of data communication and fieldbus, as well as those that wish to improve / refresh their current knowledge.

This seminar will highlight:
- Data communication and basic principles
- Communication standards
- Communication media
- Communication protocols
- Fieldbus and how it ties in with the modern instrumentation

Objectives

- Understand the basics of cabling utilized with data communication and fieldbus systems
- Have a full understanding of industrial protocols
- Distinguish between physical communication standards (232, 423, 422, 485)
- Examine the various aspects of the OSI model
- Compare, contrast and debates network architecture and hardware pertaining to data communication and fieldbus systems

Training Methodology

Participants will be taken from basics, and built up in their ability to deal with all the major types of data communication and fieldbus systems. The most important components of the work are covered in a theoretical manner, but the instructor will also ensure that delegates are individually assessed on a regular basis. The seminar will make use of pre-and post-seminar tests, individual and group-based exercises, open discussions and make use of proven adult learning methodologies and facilitation techniques. The whole focus is on the transfer of vital data. The sharing of information, between delegates and participants, is encouraged.

Organisational Impact

Delegates will return to their place of work, equipped with the skills and knowledge required to maximize the performance of the current data communication networks, and the competency skills to guide decision-makers in the planning and implementation of future data communication and fieldbus strategies.

The organizational impact would include:
- Having people with comprehensive knowledge pertaining to data communication and fieldbus systems
- Having staff with knowledge that has been built up on a solid foundation
- Having staff members that can effectively communicate about the subject matter with their peers
- Having staff that can identify possible problems that may occur, and what the solutions might need to be
- Having people with an understanding of all the hardware associated with data communication and fieldbus systems
- Having people who can assist in the specification of data communication and fieldbus additions to current and existing networks
Who Should Attend?

The seminar would be particularly aimed at people who are involved either in the maintenance and installation of data communication and fieldbus equipment, or those that actively take part in the assessment, selection and purchasing of these devices. But, it is not specifically aimed only at these individuals, but also to cater for the needs of all levels of personnel, regardless of their working background, who have an interest in the field of data communication and fieldbus systems.

In this sense, this seminar is suitable to a wide range of professionals but will greatly benefit:

- Instrumentation personnel
- Personnel involved in data communication and networked topologies
- Artisans from other fields, who may assist, or be interested in data communication and fieldbus systems
- Financial people involved in the purchasing of data communication and fieldbus equipment
- Commissioning engineers
- Process control engineers
- Health and safety representatives
- Administration staff
- Foremen and supervisors who oversee staff performing functions on the data communication and fieldbus equipment
- Cost controllers
- Lower middle and top management
- Engineers from non-instrumentation disciplines

Personal Impact

Participants will gain knowledge, enhance / hone their skills and learn to apply themselves fully in their workplace. Improved knowledge often equates to better career prospects within the organization, and recognition that the participant can play a more meaningful leadership role in their field of expertise.

Personal impact would include:

- Building up their own levels of self-confidence in the subject matter
- Communicating effectively with their peers, operators, management and supervisory staff
- Enhancing the knowledge and understanding of the subject matter
- Giving them the peace of mind to participate in meaningful discussion and analysis pertaining to data communication and fieldbus systems
- Reduce the amount of time in problem solving, because of better understanding of the subject matter. This should equate to improved time management
- The ability to show the organization that they are a valuable team member, and that they can develop within their current careers
DAY 1
Data Communication and Basic Communication Principles
- Historical background and perspective on data communication and fieldbus systems
- Physical standards
- Data communication with respect to modern instrumentation, control systems and smart equipment
- The breakdown of the digital communication signal (bits, nibbles, bytes, etc.)
- Communication modes and principles, and asynchronous and synchronous data communication
- Error detection
- Transmission characteristics and data coding
- The universal asynchronous receiver / transmitter (UART)

DAY 2
Serial Data Communication Standards, Error Detection and Communication Media
- Standards organizations
- Interface standards (including the 232, 423, 422 and 485)
- Troubleshooting serial data communication systems, and test equipment
- Serial interface converters
- The General Purpose Interface Bus (GPIB) and the Universal Serial Bus (USB)
- Factors that can influence signal propagation
- Error detection, control and correction
- Communication media (including copper, microwave, fiber, etc.)

DAY 3
Electrical Noise, Modems & Multiplexors and Communication Protocols
- Possible sources of electrical noise, in the modern plant
- Shielding, earthing and Grounding requirements
- Interchange circuits pertinent to modems and multiplexors

DAY 4
The OSI Model, Industrial Protocols and HART Equipment
- The Open Systems Interconnection (OSI) model
- The simplified OSI model
- ASCII-based protocols
- The MODBUS protocol
- The Data Highway (Plus) protocol
- MAP / TOP protocols
- Highway Addressable Remote Transducers (HART)

DAY 5
Assorted Fieldbus Devices and Local Area Networks
- Benefits of the modern Fieldbus system
- Various classes of Fieldbus networks
- Fieldbus choices (including ASI, Seriplex, Canbus, Devicenet, SDS, Interbus-S, Profibus, FIP, WorldFip and Foundation Fieldbus)
- Assorted network topologies
- Control mechanisms used for media access, as well as transmission techniques
- Standards associated with Local Area Networks (LANs)
- Ethernet, and aspects associated with it
- Internetwork connections, Network Operating Systems and Network architectures and protocols
REGISTRATION DETAILS

LAST NAME: __________________________________________
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• Mode of Payment – The delegate has the option to pay the course fee directly or request to send an invoice to his/her company/sponsor. Credit card and cheque payments are both acceptable.
• Cancellation / Substitution – Request for seminar cancellation must be made in writing & received three (3) weeks prior to the seminar date. A US$ 250.00 processing fee will be charged per delegate for each cancellation. Thereafter, we regret that we are unable to refund any fees due, although in such cases we would be happy to welcome a colleague who would substitute for you.
• Hotel Accommodation – is not included in the course fee. A reduced corporate rate and a limited number of rooms may be available for attendees wishing to stay at the hotel venue. Requests for hotel reservations should be made at least three (3) weeks prior to the commencement of the seminar. All hotel accommodation is strictly subject to availability and terms and conditions imposed by the hotel will apply.
• Attendance Certificate – a certificate of attendance will only be awarded to those delegates who successfully completed/attended the entire seminar including the awarding of applicable Continuing Professional Education Units/Hours.
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