Information Exchange & Fieldbus System

Dispelling the Mysteries of Serial Data Transfer

Introduction

Instrumentation has advanced significantly in the past few years. It is equally crucial to highlight that data communication has kept up with all of the demands of the contemporary plant and hasn't fallen behind. The goal of this training course on data communication and fieldbus systems is to demystify data communication systems in both current and future networks, as there is a growing trend towards improved data communication, particularly in industrial settings.

This training course on Course N Carry Information Exchange & Fieldbus System covers every facet of data communication. It begins with an overview and then goes into detail on each of the key topics that are essential to the majority of current users. Additionally, special consideration is given to the hybridised systems (such as HART) and the crucial fieldbus alternatives, which are now crucial for field device communication. This training course is designed to be easily understood by both beginners and those who are new to the subject of fieldbus and data communication, as well as those who want to brush up on or improve their existing expertise.

This training session on Course N Carry will emphasise:

- Data transmission and fundamental concepts
- Communication guidelines
- Media for communication
- Protocols for communication
- Fieldbus and its relationship to contemporary instruments

Objectives

- Recognise the fundamentals of cabling used with fieldbus and data communication systems.
- Possess a thorough awareness of industrial protocols
- Differentiate between the standards for physical communication (232, 423, 422, 485)
- Analyse the OSI model's several facets.
- Discuss, evaluate, and compare fieldbus systems and data transmission network hardware and architecture.

Training Methodology

Beginning with the fundamentals, participants will gain proficiency with all major forms of fieldbus and data communication technologies. The most crucial aspects of the assignment are covered theoretically, but the instructor will also make sure that each delegate receives a frequent individual assessment. There will be pre- and post-training exams, individual and group activities, open discussions, and the use of tried-and-true adult learning methodologies and facilitation approaches in this Information Exchange & Fieldbus System training course. The transmission of important information is the main focus. It is recommended for participants and delegates to exchange information.

Organizational impacts

After completing their training, delegates will be well-prepared to optimise the functionality of the data communication networks that are currently in use as well as lead decision-makers in the development and execution of future fieldbus and data communication strategies.

- Having individuals with in-depth expertise in fieldbus systems and data communication
- Having personnel with a strong basis for knowledge acquisition
- Having employees that can converse with their peers about the topic matter in an effective manner
- Having employees who can recognise potential issues before they arise and what remedies could be needed
- Having personnel who are knowledgeable about every piece of gear related to fieldbus and data communication systems
- Having personnel on hand to help specify data transmission and fieldbus extensions for both current and past networks

Personal Imapct

Participants will learn new information, develop or polish existing skills, and discover how to give their all at work. Increased knowledge frequently translates into improved career opportunities inside the company and the understanding that the individual may take on a more significant leadership role in their area of expertise.

Personal effects might consist of:

- Increasing their own degree of self-assurance about the topic
- Effectively interacting with coworkers, operators, managers, and supervisory personnel
- Improving one's knowledge and comprehension of the topic
- Granting them the confidence to take part in insightful research and conversation about fieldbus systems and data communication
- Shorten the time spent solving problems as a result of your increased subject-matter knowledge. This ought to translate into better time management.
- The capacity to demonstrate to the company that they are an important member of the team and that they can advance in their current positions

Who should attend?

People who actively participate in the evaluation, selection, and purchase of data communication and fieldbus devices, as well as those who are involved in the maintenance and installation of such equipment, are the target audience for this training course on Information Exchange and Fieldbus System. However, it is not intended solely for these people; rather, it is meant to meet the demands of all staff members who are interested in data communication and fieldbus systems, regardless of their professional experience.

This makes the Course N Carry training course appropriate for a variety of professionals, but it will be especially helpful for:

- Personnel with Instrumentation
- Employees engaged in network topologies and data transmission
- Other-field artisans that could be interested in or able to help with fieldbus systems and data connection
- Financial Participants in the Acquisition of Fieldbus and Data Communication Equipment
- Engineers for Commissioning
- Process Control Specialists
- Representatives for Health and Safety
- Administrative Personnel
- Supervisors and Foremen who manage employees operating fieldbus and data communication equipment Cost-controllers
- Upper, Middle, and Lower Management
- Non-instrumentation discipline engineers

Course Outline

Day 1

Data Transmission and Fundamental Communication Concepts

- A Historical Overview and Point of View on Fieldbus Systems and Data Communication
- Physical Parameters
- Data Exchange Concerning Contemporary Instrumentation, Control Systems, and Intelligent Devices
- The Digital Communication Signal's Breakdown (bits, nibbles, bytes, etc.)
- Principles and Modes of Communication: Asynchronous and Synchronous Data Transfer
- Error Identification
- Data Coding and Transmission Characteristics
- UART stands for Universal Asynchronous Receiver/Transmitter.

Day 2

Error Detection, Communication Media, and Serial Data Communication Standards

- Organisations for Standards
- Interface Standards (such as those found in 232, 423, 422, and 485)
- Troubleshooting Test Equipment and Serial Data Communication Systems
- Converters for Serial Interfaces
- Universal Serial Bus (USB) and General Purpose Interface Bus (GPIB)
- Variables that May Affect the Transmission of Signals
- Error Identification, Management, and Remedial
- Media used for communication (such as fibre, copper, microwaves, etc.)

Day 3

Communication protocols, modems and multiplexors, and electrical noise

- Potential Electrical Noise Sources in the Modern Plant
- Criteria for shielding, earthing, and grounding
- Interchange Circuits Important for Multiplexers and Modems
- Flow Controls to Take Into Account
- Modulating techniques (such as FSK, ASK, PSK, and QAM, among others)
- Variety of Modems on Offer
- Moderate Standards, Selection Criteria, and Multiplexing-Specific Concepts
- File transfer protocols, binary-synchronous, HDLC, SDLC, and flow control

Day 4

Industrial Protocols, HART Equipment, and the OSI Model

- The OSI Model, or Open Systems Interconnection
- The Modified OSI Framework
- Protocols based on ASCII
- The Protocol for MODBUS
- The Protocol for Data Highway (Plus)
- Protocols for MAP and TOP
- HART stands for Highway Addressable Remote Transducers.

Day 5

Local Area Networks with Various Fieldbus Devices

- Advantages of the Current Fieldbus Architecture
- Different Fieldbus Network Classes
- Fieldbus Options (including Foundation Fieldbus, Profibus, FIP, WorldFip, ASI, Seriplex, Canbus, Devicenet, SDS, and Interbus-S)
- Different Network Topologies
- Control mechanisms for transmission techniques and media access
- Local area networks (LANs) and their standards
- Ethernet and Its Related Aspects
- Network Architectures and Protocols, Network Operating Systems, and Internetwork Connections

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