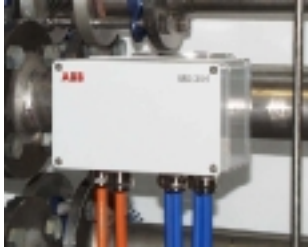


Success Story



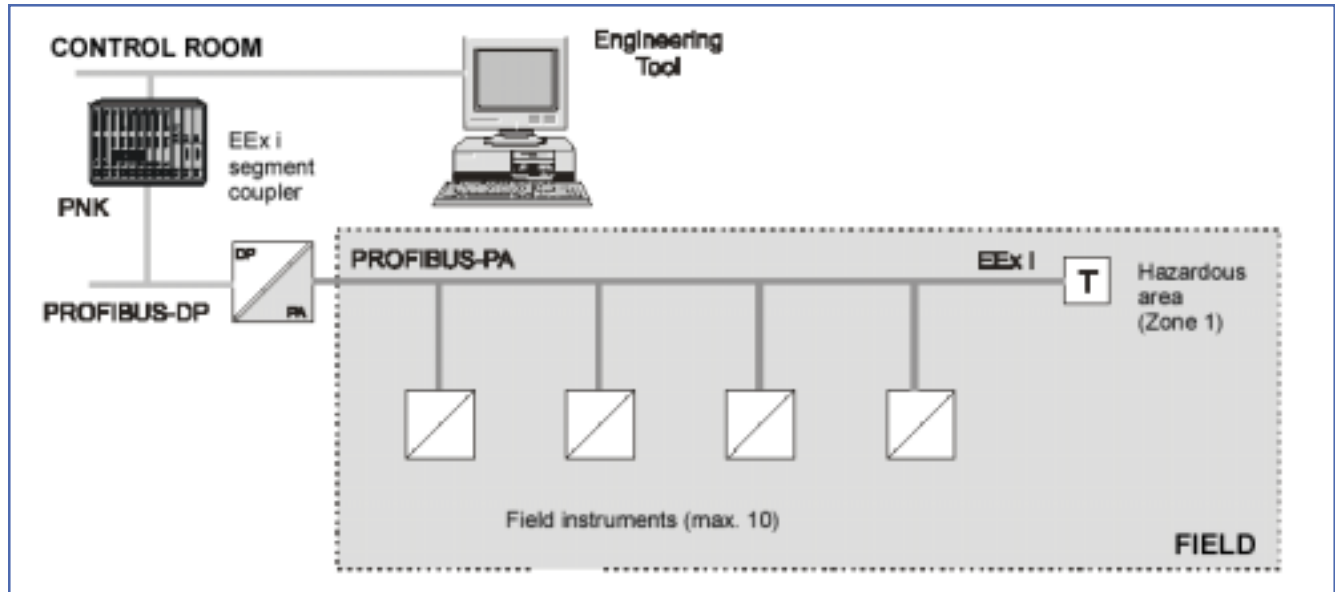
Multibarrier at DSM Fine Chemicals (NL)

Intrinsically Safe PROFIBUS-PA Technology in the Field

Client: DSM Fine Chemicals (NL)

Location: Venlo (NL) Plant

Scope of Work: PROFIBUS



Conventional EEx i connection technique

Besides many technical advantages, fieldbus technology provides a considerable cost saving potential. The main cost savings can be achieved in the planning, installation and commissioning phase, and later during normal operation of the plant.

In fieldbus based automation systems, PROFIBUS-PA is often used as the communication link between process control and distributed field instruments. PROFIBUS-PA meets the special process engineering requirements of the chemical or petrochemical industries. With conventional 4-20mA transmission technology--especially in hazardous areas--remote power supply and data transmission are realized through 2-wire circuits, with optional intrinsic safety EEx i. Besides many technical advantages, fieldbus technology provides a considerable cost saving potential. The main cost savings can be achieved in the planning, installation and commissioning phase, and later during normal operation of the plant.

Within the last years, the project planning division at DSM Fine Chemicals has gained a lot of experience with PROFIBUS-PA pilot systems. DSM uses PROFIBUS-PA in their Venlo (NL) plant. Many parts of the plant are located in hazardous Zone 1 areas. The MB 204 multibarrier from ABB is used as the Fieldbus distributor (4-fold PA-T connector) in this plant. The multibarrier is a 4-fold Fieldbus distributor of protection type IP66, for use in hazardous or non-hazardous areas. It has an RC bus termination which can be connected into the circuit.

For many parts of the plant DSM had to meet the high explosion protection requirements applicable to connectors and field instruments in Zone 1. The requirements were due to their chemical processes in which gases and dusts

may escape and then mix with the oxygen in the air to form a highly explosive mixture. Protection class “intrinsic safety” is especially suitable for applications in a hazardous environment of that kind. Contrary to other protection classes, this class does not refer to the individual devices, but also to the entire current circuitry with all its components.

To meet the requirements of intrinsic safety, apparatuses with EEx i certificate must be used, and the relevant regulations and directives must be observed for installation. Based on these explosion protection requirements and on the technical guidelines for Fieldbus systems, the *FISCO* model (*Fieldbus Intrinsically Safe CO*ncept) has been developed. According to the *FISCO* model up to 10 field instruments can be supplied via a segment coupler in an intrinsically safe system. For applications outside the hazardous area, the number of nodes may be increased up to 32.

Criteria to decide for new ways of making connections in the field.

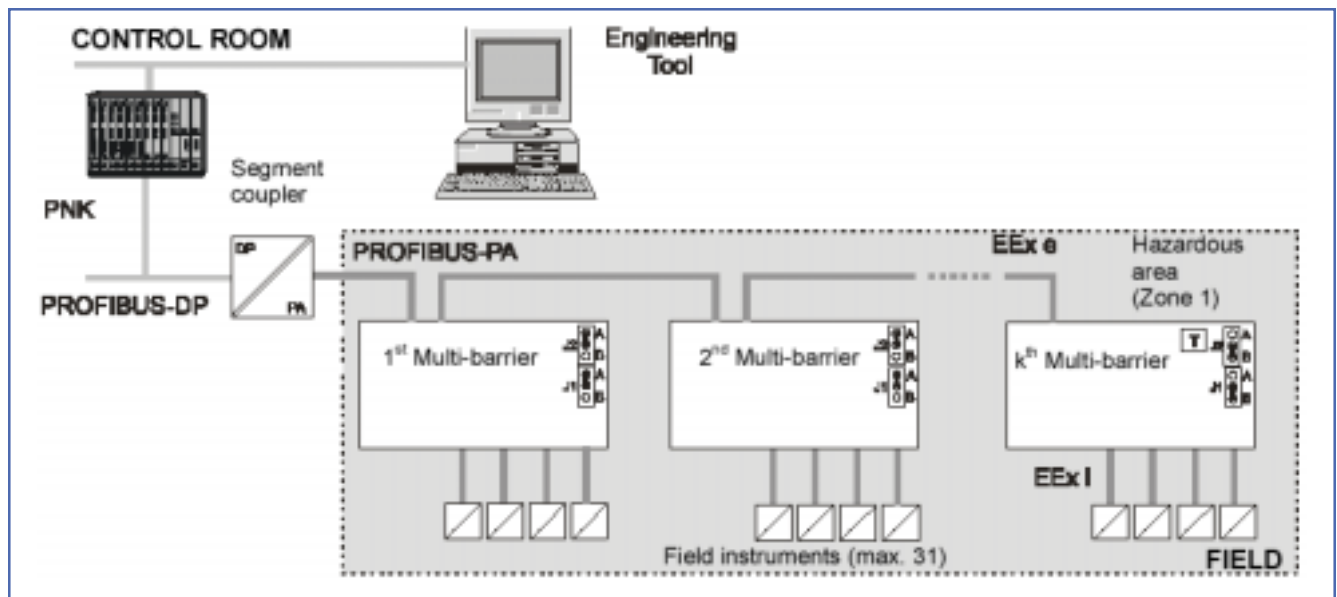
At least one segment coupler is needed for every 10 field instruments in intrinsically safe installations. The multibarrier provides major advantages in this field. Segment couplers without an explosion protection certificate can be used for connection to the PROFIBUS DP. The multibarrier connected behind the segment coupler then ensures intrinsically safe supply of up to four instruments, without requiring any power itself. As the barriers can be cascaded, up to 32 field instruments can be operated on a single segment coupler in

the hazardous area. Besides increasing the possible number of bus nodes per link to 32, the multibarrier also allows to set up a short-circuit-proof bus network, thus improving the availability of the entire PROFIBUS-PA segment. If a short circuit of any of the bus nodes occurs, the PA-bus link of this segment remains fully operational, i.e., using the multibarrier avoids simultaneous failure of up to 31 field instruments. This should be compared with conventional EEx i installation technology, where a short circuit will lead to the failure of the complete PROFIBUS-PA segment with up to 10 nodes.

When mounting the barrier with the segment coupler in the control room, you only have to take care that the main cable of the PROFIBUS-PA link meets the requirements of protection class EEx e. All instruments meeting the requirements of the *FISCO* model can then be connected to the branches of the multibarrier. Due to these facts, DSM were able to take full advantages of the advanced EEx i connection technique when they realized their PROFIBUS-PA project.

Abstract and outlook

The decisive factors for advanced EEx i connection technique (multibarrier as Fieldbus distributor) are the increased availability of field instrument communication through short-circuit-proof connections for the field instruments, and an additional cost reduction of around 30% for power supply and wiring of the Fieldbus system in the hazardous Zone 1 area, since up to 32 field instruments can be connected to the PROFIBUS-PA in an intrinsically safe circuit (EEx i).



Advanced EEx i connection technique



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