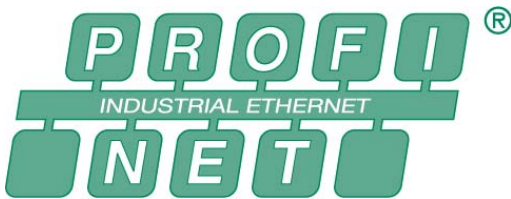




PROFIBUS and PROFINET • North America

A PTO Application Report PROFIBUS full Automation solution in Alvorada do Bebedouro Sugar and Alcohol (ABAA) Unit



Brazil - PROFIBUS full Automation solution in Alvorada do Bebedouro Sugar and Alcohol (ABAA) Unit

Alvorada do Bebedouro Sugar and Alcohol Unit, located in the municipality of Guaranésia, Minas Gerais state in Brazil, started this year the production of VHP (Very High Polarization) sugar, a raw material for the food industry. With the goal of 106.250 tons of sugar exports up to 2009, it invested R\$ 60 millions in the expansion of its Crushing, Steam Generation, Juice Treatment, Evaporation and Sugar Plant implementation.

Smar Application Engineering, coordinated by the Application Engineer Leonardo Mansur Pinheiro, jointly with the ABAA unit technical team chose the PROFIBUS industrial network for the job. The main factors leading to this choice were the high degree of acceptability and trustability of this protocol in the market, due to its open, interoperable communication standard that works with several suppliers, besides its easy installation, and simple configuration and architecture. The automation system chosen was the Smar System302-7, which combines connectivity flexibility and the integration with specialist administration, quality and maintenance systems like the MES (Manufacture Execution System) and the ERP (Enterprise Resource Planning).

Therefore, the administrative, production planning and industrial management sectors may access the information necessary to their needs and make possible to follow up, control and improve production and the support to the logistic chain, through more accurate decision making, and bring

more efficiency and effectiveness to the implemented actions, while improving plant availability.

A flexible architecture with broad connectivity with System302-7

The architecture project included the implementation of PROFIBUS DP for the MCCs (Motor Control and Command), PROFIBUS PA for

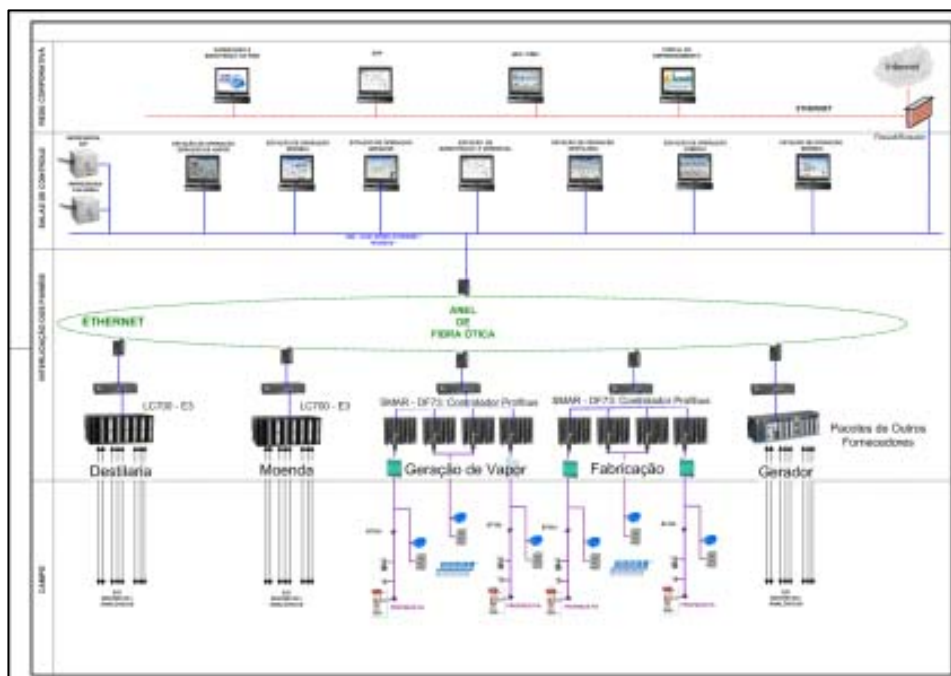


Figure 1: Alvorada do Bebedouro Sugar and Alcohol system architecture

continuous field control equipments and AS-I for discreet field startup equipment distributed among master PROFIBUS DP controller. Horizontal communication between the controllers may be done by using an Ethernet 100 Mbits network providing control and supervision protocol.

Field Networks

The circuit loops, motor startup and interlocks were configured on the DF73 PROFIBUS DP-V1 master



Figure 2: Panel detail – intelligent relays

controllers. All the controllers are connected to an optics fiber ring network that makes possible the exchange of control data between the controllers and supervision data between controllers and the operation, engineering and maintenance stations.

For motor startup, were specified intelligent MCCs with relays, inverters and soft starters with PROFIBUS DP communication protocol. In all, the PROFIBUS DP network has 162 equipments communicating at 1,5 Mbits/s, with a network range around 200 m maximum length. All the circuit switch sensors and on-off valve startup carry the AS-I communication protocol inserted in the



Figure 3: Panel detail – frequency inverters

PROFIBUS DP network through gateways that convert PROFIBUS DP into AS-i.

The convergence between the PA and DP networks was obtained through gateways and couplers. A total 106 Smar field equipments with PROFIBUS PA communication protocol were installed and distributed in six channels with a network length with a maximum 30 m distance that communicate at a speed of 31,25 Kbits/s.

All Smar field equipments are specially made to operate with PROFIBUS DP and PA protocols, such as FY303 series positioners for pneumatic valve actuators, series LD303 manometric and

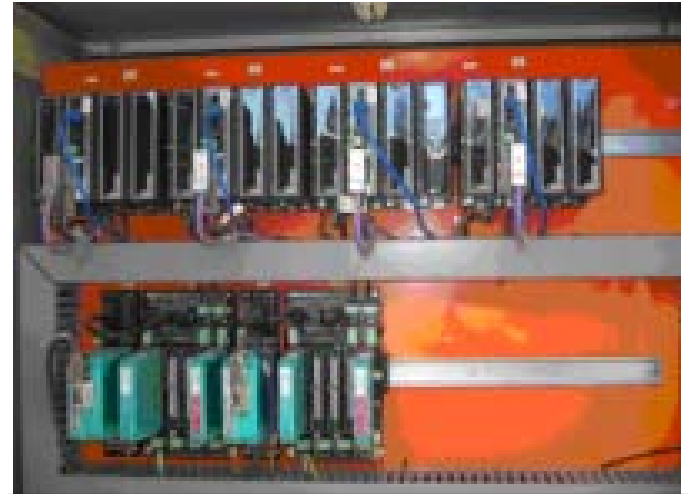


Figure 4: Panel detail - DF73 controllers, gateways and couplers

differential pressure transmitters, series TT303 temperature transmitters, series IF303, 4-20mA/PROFIBUS PA converters used to insert 4-20 output signal in the PROFIBUS PA network, and DF73 PROFIBUS DP-V1 master controllers.

Smar JM400 junction boxes were used on the PROFIBUS PA network to interconnect physically field equipments like network nodes, which permit easy and safe connection to make possible mounting an industrial network. The JM400 may be used in restricted explosion-proof areas, due to its certification.

Operation, Maintenance and Engineering Stations

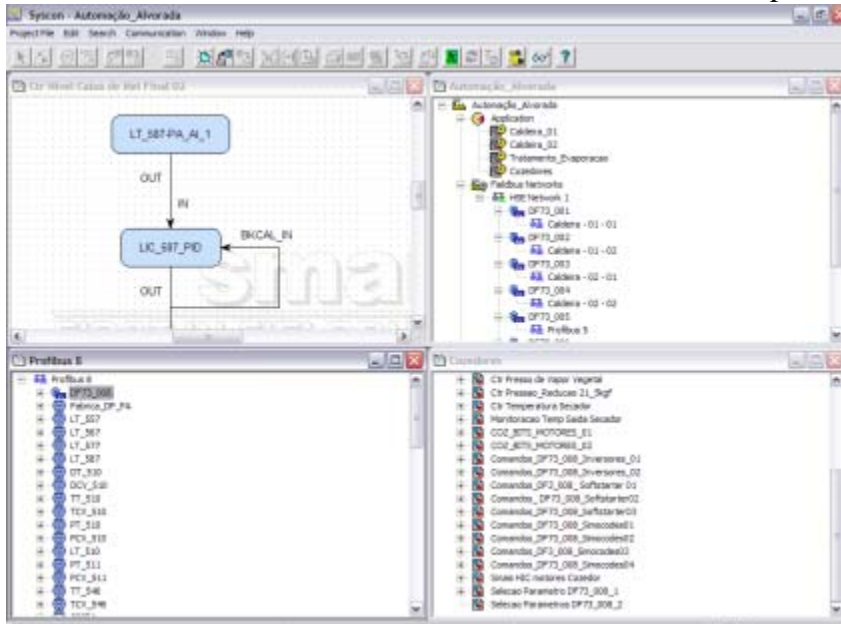


Figure 5: System302

These local operation stations make possible for operators supervise and command the plant through supervisory software with synoptic, tuning, graphs, alarms and history screens. The Maintenance and Management station, besides monitoring and making available process data for the via Web corporate network, has System302 tools necessary



Figure 6: Supervisory configuration screen

to configure the PROFIBUS DP/PA and AS-I networks (cyclic configuration), to access and alter parameters like field equipment calibration and diagnostic on the PROFIBUS PA network (acyclic configuration) and create the control logics. All field devices configuration on PA network was done using PROFIBUSView from Smar.

Corporate System

The System302 architecture makes possible the integration with corporate, quality and maintenance specialist systems, such as MES (Manufacture Execution System) and ERP (Enterprise Resource Planning). The administration, production planning and industrial management sectors may access the information they need to follow up, control and improve the production process and support the logistic chain, through better and well coordinated decision making, more efficient actions and higher plant availability.

Plant Commissioning and Startup



Figure 8: Field equipment connected to the PROFIBUS PA network configuration screen

Araobert Dantas de Medeiros, Fauze Renato Ardenghi and Washington Luis de Barros

from Smar Technical Assistance team commissioned, oriented and installed the field equipments, and put the system in operation according to schedule, due to the ease of installation afforded by the PROFIBUS industrial network technology. Smar's engineer Cesar Cassiolato and Edson Emboaba gave all technical support

to this phase of the project. The ABAA unit technicians were trained and oriented on the system maintenance and operation to guarantee its good performance.

The client's perspective

According to Mr. Eduardo Pitondo, Electric and Instrumentation Supervisor of Alvorada do Bebedouro Sugar and e Alcohol unit, the System302-7 is robust and able to provide the amount of diagnostic information on the equipments only offered by a purely digital system, including for analysis and checkup of the network structure.

One of the advantages provided by the PROFIBUS technology pointed by Mr. Pitondo refers to the panel internal space saved due to the reduction of the quantity and volume occupied by the hardware, the power sources, trays, terminal blocks and cables, which reduced the time spent on the identification and solution of problems and

increased the system trustability and plant availability.

Contacts

Leonardo Mansur Pinheiro – Smar Sugar and Alcohol Application Engineer:
mansur@smar.com.br

Araobert Dantas de Medeiros – Smar Automation and Instrumentation Technician: beto@smar.com.br

Fauze Renato Ardenghi - Smar Automation and Instrumentation Technician: fauze@smar.com.br

Cesar Cassiolato – Smar Product Manager:
cesarcass@smar.com.br

Edson Emboaba – Smar Project Leader:
eemboaba@smar.com.br

Washington Luis de Barros - Smar Automation and Instrumentation Technician:
washington@smar.com.br