Category: Food industry solutions

S04: Technology monitoring in a fish processing plant

The suggested solution S04 for industrial environment monitoring presents an implemented sample solution for monitoring operational conditions (temperature, humidity, technology status) in a fish processing plant.
Sensors are placed in all rooms of the plant, and the CapTemp application is used to monitor the technology, alert to critical situations, and generate HACCP reports.

Customer's problem

The customer is a fish processing plant. The process requires several rooms with defined temperatures, which range from -50°C to +50°C.

The customer needs to ensure that standards are met, and optimize energy costs at the same time.


Initial requirements at the start of the project:

- Autonomous system that is easy to install and can be used by the company technologist.

- The system should produce reports that can be used for HACCP certification.

    o Option to export data into Excel, or as graphs and histograms.

- Option to install a central control program on a standard Windows PC.

- Monitoring of several alarm conditions (e.g. freezer door open for more than 5 minutes), alerting of floor personnel, optional SMS output.

- Analysis of cooling costs, finding reserves in energy consumption.

- Technical capabilities

    o Temperature monitoring in several rooms, temperature range from -50°C to +50°C.

    o Connection of Dry Contact outputs of the cooling equipment.

    o System should be extensible since a new hall is planned in 2 years.

Description of the solution

The monitoring solution in the plant is split into two circuits that use the Industrial Bus (RS-485). Two Poseidon units are located at the roof of the building, sensors lead down to the temperature-controlled rooms.

- Contacts of the first Poseidon 1250 unit monitor the power center and all the mains phases.

- The first room (1) contains two Pt100 thermometers hanging from the ceiling, connected using three-wire cables for more accurate measurement.

- A Spider unit monitors the doors of the second (2) and third (3) room. If the door is open for longer than 5 minutes, the technologist is alerted; after another 10 minutes, a SMS is sent to the operations manager.

- The first bus is terminated in the handling room (4). Its total length is 230 m.

- The cold chamber (6) is monitored with six Pt100 thermometers connected to the second circuit.

- Temperature in the offices (7) is monitored with cheaper Temp-1Wire Outdoor sensors connected to a Spider unit.

- In the technologist's room, there is a dedicated Windows computer with the CapTemp application that evaluates data from the two Poseidon 1250 units. CapTemp reads the values, plots graphs, watches for boundary conditions and sends text messages (SMS) and e-mails whenever alarms occur.
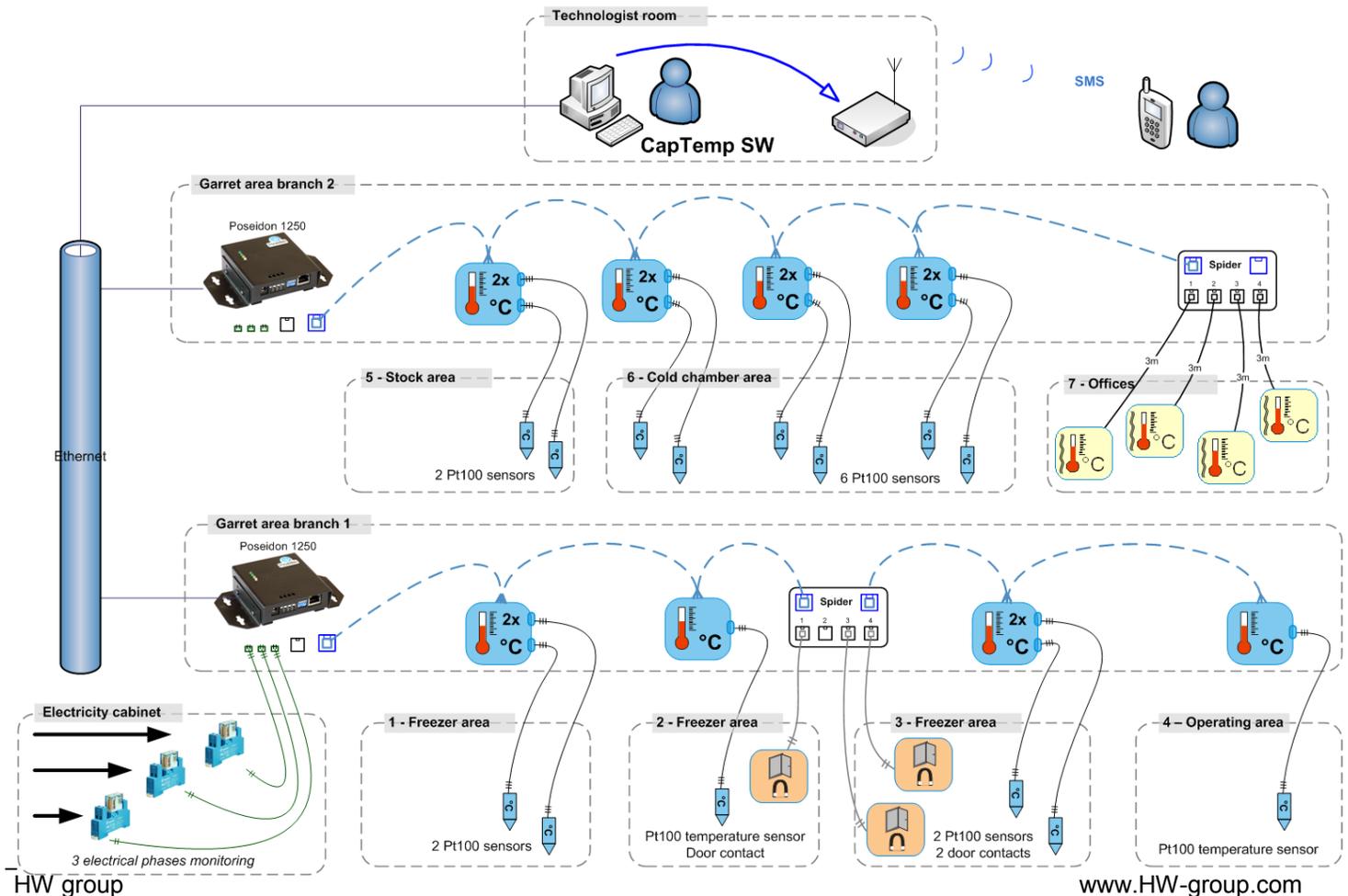
Bill of materials

2x	600006	Poseidon 1250
6x	600112	Temp-485-2xPt100 "DIN"
2x	600114	Temp-485-Pt100 "Cable"
14x	600115	Pt30 - 2m Pt100 version
2x	600273	Spider
4x	600311	Temp-1Wire-Outdoor 3m
3x	600119	Door Contact
1x	600327	CapTemp GF2
1x	600312	GSM Modemcom G10

Usage of the system

- Whenever a mains phase fails, within a minute, CapTem sends a text message (SMS) to the responsible person and to the company manager.

- Whenever doors in zone (2) or (3) are left open (or improperly closed) for a longer time, CapTemp sends a SMS to the person responsible for the operations.

- The graphs of all temperatures are available to the company technologist.

- Servers in the offices are monitored to prevent overheating.

- Alarm messages sent by SMS or e-mail are routed according to a calendar with assigned duties.

- Histograms for HACCP reports are generated by the MonTemp application from the database.

  - For advanced statistics, MonTemp exports selected data to Excel.

Possible functionality that exceeds requirements

- For better employee awareness, large 4x20 character displays can be placed at several locations in the plant to display certain values from the CapTemp application.

- A Pt100 needle thermometer with a "temperature valid" button can be used to check the temperature inside packages. When the button is pressed, CapTemp captures the value and stores it into the database.

- For easier use, CapTemp version 3.x and newer supports map background with thermometer icons and an overview of current readings.

- The system can be extended by adding a new hall, as well as sensors at a remote location, if the company networks are interconnected (e.g. via VPN).

Project implementation

The project was implemented by a **system integrator** that has prepared the project and supplied a turnkey solution, including installation.

The customer – "DeltaFish - Produtos Alimentares, SA" – uses the system since 2006.

Conclusion

The solution has been working to a full satisfaction of the customer since 2006. Gradually, more systems and features are being added.

- The customer has shortened the time needed for CCP (Critical Control Points) analysis and reduced data manipulation costs.

- In the long term, cooling costs were significantly reduced thanks to the detailed monitoring system. However, due to the legacy cooling equipment, savings are limited to several percent.

- Thanks to the Poseidon system and the CapTemp software, the customer has gained a monitoring system with early warning capability upon alarm.

- The customer is now certified by SGS according to NP EN ISO22000:2005.