All the way through Tunnel control

Telecontrol and monitoring in motorway tunnels is fast becoming more important in ensuring traffic efficiency and safety.

Telecontrol is becoming a vital necessity in public places especially where safety and efficiency are concerned not only in protecting the general public but also keeping public amenities and utilities safe and efficient to use, while trying to keep within public expenditure budget.
Monitoring can control systems in tunnels have become a particular importance, targeted at guaranteeing top-level security.
Even though automation and monitoring systems sound rather costly to implement, in reality it is quite the contrary where costs are returned due to the fact that pubic services become more efficient to run and safer.
Not only is this beneficial to the public, there is a substantial save in public expenditure all round with increased and improved efficiency and safety.
A practical example of this can be found in the “Spogliamonaco” Tunnel, located on the Lauria –Lagonegro motorway in Basilicata, Italy.
The tunnel patrons were searching for a control system based on a bus system and Scada software, with standards and

openness, to be installed for both local and remote surveillance from one Control Centre situated in the client's head offices. The architecture they chose consisted of a PC acting as the supervision and control unit, unaided by other devices such as PLCs or CPUs. This, in itself, allowed for a simpler system at a lower cost to be implemented where I/Os for data acquisition and control of all the devices have been distributed along the 1500 meters of the tunnel using the LonWorks bus system.

Movicon collect information from the bus and manage the system.

They chose Movicon as the Scada system most adaptable to their needs for guaranteeing not only supervision but also control of the I/Os with integrated softlogic. This choice took into account the fact that, in this case, I/O control using Scada based on Windows XP could not be deterministic, a requirement not needed by the tunnel's devices' response time. Therefore an I/O periphery has been provided, decentralized and interfaced with Movicon inserted with a LON card onboard the PC, for handling the 96 digital signals and 24 analog inputs on a bus positioned through the whole length of the tunnel.

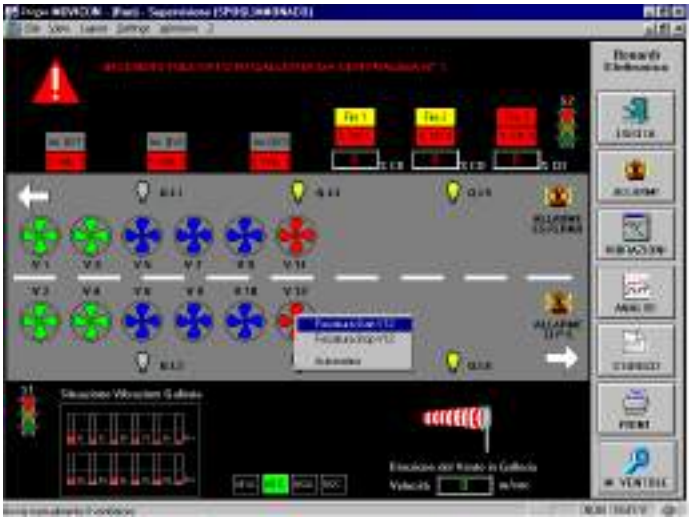
Most hardware products are usually completely compatible to the LonWork standard and therefore their interchangeability and retrievability with others on the market do not depend on their make.

The Movicon supervision application acquires the digital peripheries and analogs for managing and monitoring the onset of critical conditions or alarms, with references to critical high level contents of Carbon Dioxide CO2 values, dangerous vibrations (ie. Earthquakes), or excessive exhaust fumes from traffic prohibiting visibility within the tunnel.

Based on the acquired data relating to the anemometric sensors for wind direction, the logic, managed by the supervisor, processes the gathered data on visibility and CO2 and in function with this information manages the motors and directions of the tunnel's ventilators. The system also manages the tunnel's illumination levels and in extreme cases manages the hazard warning lights located at the tunnel's entrances.

Each parameter are always under control

From the supervision stations, situated both in the local control stations and in the main control centre, users can monitor all situations using screen pages and pages displaying data gathered and historically logged. All the commands can be easily and intuitively set through the supervisor graphically. Although already set automatically by the Movicon logic, users can manually set traffic lights and ventilators with a few clicks of the mouse. The acquisitioned analog values are historically logged and filed by the system,



consenting accurate analysis of all situation occurrences, whether as events, alarms or as Trends of all the significant tunnel data.

Furthermore, a management has been provided to program system maintenance, by establishing the intervention times for maintenance workers to service each device in the tunnel. This enables the system to alert, in advance, when servicing needs to be done in order to prevent any malfunctioning from

happening and to optimize maintenance worker timetable schedules.
By using the predisposed telephone lines, remote control centers can connect to the system and monitor situations and interact when needed, by operating and commanding the devices by remote control and setting set points or acknowledging alarms. This ensures safety in the tunnel at all times especially for those situations unaided locally.
The use of SMS and vocal calls, integrated in the supervisor, consent on-call maintenance workers to be alerted immediately at any given moment allowing them to get to the scene of emergency faster.
Movicon has proved its worth in being able to create an innovative telecontrol solution in next-to-no-time at a lower implementation cost being an all-in-one system application with graphical interfacing, historical logging and logics management.

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