

Implementing a monitoring and early warning system for the underpass in the Municipality of Rubiera, Reggio Emilia



The **underpasses** in via Contea (on the Provincial Road S.P. 51), in the Municipality of Rubiera, has shown some water run-off problems during **highly intense raining events** which are every day more frequent because of **climate change**; the evidence of this is the bad weather that, on February 2016, caused several damages all over the province of Reggio Emilia.

For this reason, with a view to ongoing improvement in the road network, the Administration decided that the underpass in question should be fitted with a **monitoring and early warning system**, to ensure the safety of all road users by **activating several traffic lights in real time** near the entrances of the underpass which can potentially be flooded.

Summary

Location: Province of Reggio Emilia, Italy

Conclusion: 2017

Focus: Hydraulic and hydrological risk

Challenges:

- Flooded underpasses due to highly intense raining events
- Ensuring the safety of all road users

CAE solutions:

- CAE monitoring and early warning system for underpasses
- Mhaster datalogger, on/off capacitive level sensors, pressure piezometric sensor, camera,...
- GPRS/UMTS communication module
- Automatic warning: SMS, warning signs, traffic lights

FEATURES

The system, which was promptly delivered and installed by CAE in the spring of 2016, has been developed to **prevent false alarms and/or malfunctions**, by deploying three different sensors (two capacitive switch-on/off sensors and one piezometric sensor). These sensors combine to work on a “majority” basis, activating a **local alert**, managed as follows:

- when the minimal hydrometric threshold is exceeded, the traffic lights will be kept off, but a **pre-alert notification** will be sent **via SMS** to the staff appointed by the local authority;
- in case that the alert threshold is exceeded, apart from **sending an SMS** to the staff appointed by the local authority, the Mhaster data acquisition station will **turn on the traffic lights** and **change the scenario**, therefore **acquiring data and photograms every 5 minutes**.

The scenario changes can also be implemented manually, in real time, by a qualified staff, in case that they consider it necessary.



COMPOSITION

This system is efficient even in case of electric black-out, as it is not supplied with a 220V supply, but with a solar cell and a battery and it includes:

- 2 capacitive level sensors;
- 1 pressure piezometric sensor;
- 2 traffic lights;
- 1 high-definition camera with its stand;
- 1 GPRS/UMTS communication module;
- 1 Mhaster datalogger.

The versatility and the power of the Mhaster datalogger allow the station to interface with hydraulic operating devices (electric submersible pumps, level sensors, etc.), as well as to handle the scenario changes, by differentiating pre-alert from alert activation logics.

The datalogger is also equipped with an interface to set the alarms on every single measurement or on a combination of them.

