Trams under the microscope.

Brno public transport has a precise overview of accidents on its tramlines.

Organization:
Dopravní podnik města Brna, a.s. (DPMB) – Brno Public Transport Authority

Location:
Brno, Czech Republic

Industry segment:
Transportation

Application:
Safety and security, remote monitoring

Axis partner:
ONE SYSTEM s.r.o.

Mission

The Brno Public Transport Authority was in need of an accident recording camera system for its trams. Cameras would provide a quality picture under any conditions and a reliable local record. The images should clearly show both the area immediately in front of the vehicle, and the surrounding traffic situation including road signs, traffic lights and the status of points in the direction of travel.

Solution

Given the specified requirements, it was clear that the aim was a camera which, thanks to its minimal dimensions, would be handily positionable in the driver's cab of any type of operated vehicle and, at the same time, would also provide the required wide angle view and high definition. AXIS F1005-E Sensor Unit would become the foundation, and AXIS F41 the main unit. The camera provides a video stream of up to 25 frames per second in full HD so that, in ideal conditions, even the registration plates of cars are legible while maintaining the continuity of movement at the given length of recording.

Recordings are stored on an SD card in a recording unit so that, if an incident occurs, they can be immediately viewed by employees authorised to investigate such an incident. Recordings are stored in a time loop and are automatically overwritten. Accident recording cameras have been installed in various types of trams, e.g., the 13T6, Anitra, Vario LF and KT8D5N. In total, around 50 vehicles have been equipped.

Result

The installation of cameras has undoubtedly enhanced the quality of transport, since even drivers have come to realise that the cameras will record their driving performance. It is in part thanks to this that DPMB can observe a yearly decline in traffic accidents. The work of investigators and employees of the transport authority has also been considerably simplified by the implementation of the camera system. The process of potential administrative proceedings has also been speeded up. At the same time, the integrator is considering developing new analytical tools and warning systems.

AXIS COMMUNICATIONS

72126/EN/R1/1806

"Though the installation of cameras does not have an absolute influence on accident rates, what is important is that thanks to accessories such as the camera system, even these can be quickly investigated. An incident in 2017 demonstrated how the installation of cameras can be helpful in this regard. The Axis camera came to the rescue of a driver in court, when a recording helped to prove that a child pedestrian caused a collision with a tram himself, after carelessly running into a tram as he tried not to miss his connection."

Ing. Zdeněk Jarolín, head of technical department, Brno Public Transportation Authority.

Test operations and initial successes

A tram accident is an unpleasant experience for everyone involved and, in such cases, a camera recording of the traffic situation in front of the vehicle has a much higher informative value than a mere description of events. The first test installation of front-facing accident recording cameras on DPMB trams took place as early as 2009. During the two-year trial operation, a number of additional suggestions were made regarding both technical solutions and the operation of the system. From this feedback, it became clear that the system would still have to undergo a great many changes to be accepted by the operator without compromise.

Roughly four years after the first installation, together with the demand for further expansion of the system, came the requirement for further optimisation.

From a total of 5 different proposed solutions, the eventual winner was a proposal which combined an AXIS F-1005E sensor unit with an AXIS F41 recording unit, which fulfilled the operator's vision from the very first moments. AXIS F-1005E sensor unit is located behind the windscreen in the upper part of the driver's cabin and, thanks to Axis WDR Forensic Capture technology, the camera can easily cope with any light conditions and contrast scenes. Even with the integration of this solution, technicians had to overcome certain initial difficulties. Due to the location of the controls on the driver's panel, drivers would often accidentally disconnect the power to the camera before being able to finish the recording properly, thereby damaging the file. However, this problem was easily resolved with the use of a backup power supply.

Statistics and examples speak for themselves

Though the installation of cameras does not have an absolute influence on accident rates, what is important is that they have led to a regular year-on-year decline.

To illustrate, the overall accident statistics of DPMB show that, while 986 accidents occurred in 2015, in 2016 there were a total of 893 and in 2017, only 874. The majority of cases only concern minor incidents, thanks to accessories such as the camera system, even these can be quickly investigated. An incident in 2017 demonstrated how the installation of cameras can bear fruit in this regard. The Axis camera came to the rescue of a driver in court, when a recording helped to prove that a child pedestrian caused a collision with a tram himself, after carelessly running into a tram as he tried not to miss his connection. The transport authority never releases these videos. It only provides them to the police and, after considering all legal aspects, only the police can make them public.

Trams will become even smarter

The possibilities of Axis cameras, however, do not end at the simple recording of an incident. The integrator is working on a way to gain even more from the presence of cameras. It intends to make use of their enormous computing potential, for example, to develop intelligent functions.

"We want to use image analysis to detect objects in the path of a tram, such as pedestrians or cars on the tracks. This is quite a challenge with city transport, however, because both people and vehicles often move around in front of trams. Our idea for the time being, is to attempt to detect objects on the tracks from a certain speed. If something happened, an alarm could sound in the cab, alerting the driver. It would be more of an auxiliary tool than a control capable of actually stopping the tram, but maybe it could be precise enough in the future, that it could stop the tram, for example, if the driver suffers a medical emergency," explains Václav Matura from ONE SYSTEM. It appears that a similar system is already being worked on by experts in Prague and other towns.

Dopravní podnik města Brna a.s.

ONE SYSTEM s.r.o.

For more information on Axis solutions, visit www.axis.com/transportation
To find a reseller of Axis products & solutions, visit www.axis.com/where-to-buy

AXIS COMMUNICATIONS