SVOD SYSTEM FOR VISUAL DETECTION OF DEFECTS







SVOD system for visual detection of defects is designed for visual control of the metro and railway infrastructure facilities while the train is in motion as well as in the post-processing mode. The system provides for early detection of locations capable of causing an emergency due to some faulty or missing component. SVOD provides for real-time detection of the faults which are critical for the rail traffic safety such as out-of-gauge areas by comparing data from clearance control system and video data.

The system is installed on any vehicle and can perform continuous automated inspection by capturing and processing high-resolution images from video cameras which are located in the immediate vicinity of the objects being monitored.

To provide for efficient equipment operation in all environmental conditions, SVOD can be equipped with cooling and heating, dust removal, and mechanical external wiper systems.

All acquired video data is precisely referenced to geographic and track coordinates and synchronized with the data from other diagnostic systems installed on the vehicle.



Parameter	Value
Operating speed, km/h, not more than	150
Camera resolution, pixels	1600 x 1200
Frame rate, frames/s	30
Video data compression method	MJPEG
Number of video inspection channels, not less than	8
Range of operating temperatures, °C	-40 +50

SVOD-2 SYSTEM FOR HIGH-SPEED VISUAL INSPECTION













In the modern realm of high speed, each metro infrastructure component is essential for maintenance of the general operating condition of a track section. However, until recently not all defects of the permanent way could be revealed by means of instrumentation. To ensure timely detection of deviations in the condition of these facilities, essentially new inspection techniques shall be applied. To eliminate periodic surveys and inspections by metro personnel, TVEMA specialists have developed a number of systems for visual inspection of infrastructure facilities, including SVOD-2 system for high-speed visual defect detection.

Such components as rails, sleepers, clamps and fish-plates, braces and insulators are now inspected during the travel of the inspection vehicle using computer-aided procedures. One of the system's basic components is a set of high-speed linear cameras providing image acquisition with high resolution (0.5 mm/pixel) at up to 250 km/h speeds.

The novel dedicated illumination system ensures capture of a clear and well-contrasted image at any time of the day and under any weather condition.

A powerful data logging/analysis system provides image compression without loss of quality in real time, thereby increasing the independent total inspection length up to 10,000 km. The range of analytical software allows solutions for a number of customer specified tasks in detection of infrastructure component defects. The automated analysis system facilitates real-time, post-processing detection of the following defects:

- rail end batters;
- rail tread shelling in the joint area;
- welded joint damages;
- side steps in rail joints;
- stagger of rail joints for both rail threads;
- abrasion from skidding;
- rail tread cracks;
- missing or damaged clamps;
- insufficient bolt tightening;
- sleeper misalignment and cracks;
- ballast spillage and filling;

The system also helps to localize joint gaps and measure their dimension.

Employment of this system makes it possible to detect early locations capable of causing deviation in track geometry due to faulty or missing permanent way components, hence improves traffic safety.

In addition to permanent way surface inspection system, TVEMA specialists recommend the installation of a fishplate inspection system, providing for automated detection of such defects as cracks and missing bolts, the inspection of insulating joints and joint connectors.

The system is installed on a vehicle bogie and makes it possible to monitor all permanent way components within the assembled rails and sleepers.





Parameter	Value
Operating speed, km/h, not more than	250
Camera resolution along rail, mm, not less than	1
Camera resolution across rail, mm, not less than	0.5
Information input rate, Mbit/s	15
Video data compression method	JPEG
Number of video inspection channels	2 6
Range of operating temperatures, °C	-40 +40