A new automated system to monitor potentially dangerous vehicles whilst in motion

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A European research project has tested the use of 3D cameras alongside the highways and sensors embedded in the roadside to detect dangerous, overloaded trucks as they move. The system enables a reduction in accidents, protects the road infrastructure and reduces fuel consumption and pollution by ensuring conformity to weight controls.

Overloaded trucks may cause excessive damage to the road infrastructure and lead to road accidents. For this purpose, there are strict government regulations imposed regarding permissible loads on the truck and its distribution. The main reason for overloading the trucks is to increase the profit of some operating companies by transporting the

greatest amount of goods in the shortest time.

Unfortunately this may lead to road accidents as well as increasing the amount of road and pavement damage. The overloaded trucks travelling down hill may travel too fast and overturn on a bend, or cause their brakes to overheat which can lead to their failure and hence to accidents. Overloaded truck accidents can be fatal, cars and their passengers have little chance of survival when hit by an overturned truck. Overloading and uneven load distribution can in certain situations lead to a truck tipping on a bend or lead to jack-knifing with its disastrous consequences on a busy motorway.

To help in preventing such accidents, weigh stations are set up along some of a major roads and motorways, where a commercial vehicles' weight is checked. However such a system depends on police experience to identify offending vehicles or on a random procedure where both lawful and overloaded trucks are checked leading to longer travelling time for lawful vehicles. These manual systems are now augmented or replaced by automatic systems. The Vehicle and Operator Services Agency (VOSA) has introduced its new Weigh in Motion Sensors (WiMS) which, together with automatic number plate recognition (ANPR), permits police to concentrate on trucks which appear to be overloaded. The road surface incorporates inductive loops and piezoelectric sensors which measure the passing truck weight when the vehicle is still in motion, and the adjacent ANPR camera takes the vehicle number plate.

Latest Developments

Asset Road is a European research project which has been piloted along a segment of highway in Bavaria, near Munich, using state-of-the-art cameras set alongside the highway, and sensors embedded in the roadside to identify the potentially dangerous vehicles whilst in motion.

Their weight and speed, and the state of their wheels and brakes, is monitored and suspect vehicles are called to inspection areas by the police.

The electronic data bus positioned alongside the road can weigh trucks in motion. When the truck drives over it, the pressure and position of each of its wheels is recorded. The type of vehicle is automatically identified, allowing the safety crews to determine whether it is overloaded or not. The crew also receives pictures from a series of 3D cameras along the highway allowing the vehicles to be modelled so that their safety distance and passing manoeuvres can be monitored. This reduces highway maintenance and accidents by keeping the flow of traffic smooth and overloaded trucks off the roads.

When the cameras have singled out suspect trucks, they are diverted to an inspection area for a series of semi-automated tests. These include scanning with thermal cameras to check the wheels and tyres, ensuring that they are in good condition. Problems with the brakes can be seen if they are not performing as they should. When the vehicle passes through the inspection area, the weight on each axle is measured to ensure conformity with the regulations for its type.

The advantage of this system is that it detects overloaded vehicles as they move, it checks the maintenance status of the vehicle, and the condition of its tyres and brakes.

It enables a reduction in accidents and protects the road infrastructure by taking the dangerous trucks off the road and reduces fuel consumption and pollution by ensuring conformity to weight controls.

Source: Youris.com