One of the main aims of governments and authorities is **TO ACHIEVE THE BEST SAFETY IN TRAFFIC AND PRESERVE INFRASTRUCTURES.**

Overload is one of the biggest impacts on the pavements of the roads.

Girwim solutions provide various CONTROL and SANCTION systems.
The devices of the units of measure of data acquisition are installed on the road surface in a position which complies with the specifications defined in the document COST 323 (COST 323, “Weigh-in-Motion of Road Vehicles, Final Report, Appendix 1, European WIM Specification Version 3.0, August 1999, pp. 149).

The compliance with the specification is one of the most important factors related with the accuracy and lifespan of the weighing systems.

<table>
<thead>
<tr>
<th>HIGH SPEED WEIGHING HSW</th>
<th>REGISTER GOAL</th>
<th>ANALYSIS GOAL</th>
<th>MONITORING GOAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSW system registers telemeter information of the vehicles which travel on rapid roads or high speed, up to 180 km/h.</td>
<td>Register of the telemeter information of the current traffic.</td>
<td>Accurate analysis of the information; it is for control and statistics.</td>
<td>Overload detection to protect roads and bridges.</td>
</tr>
<tr>
<td>The accuracy of the system is not affected by the type of tyre, the number of wheels or the pressure. The system measures a signal which is defined as a horizontal load.</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

| MEDIUM SPEED WEIGHING MSW | | |
| MSW systems register the information of vehicles to up to 50 km/h. These vehicles are the ones shortlisted at the control site HSW to do a second pilot survey. | | |
| PROCEDURE: The registered data of the vehicles is transmitted to the central of control for their analysis and to be contrasted with the information registered in the first control site. | | |
| The telemeter information of the vehicle is registered by the data logger GIRWIN DYN B612. | | |
| GIRWIN DYN B612 is an amplifier and signal analyzer manufactured by GIRWIN, which provides information of the weight per axle, total weight, speed, vehicle direction, distance between axles, etc. | | |
| The information given by GIRWIN DYN B612 is registered together with the information of the auxiliary devices, such as cameras CCTV, cameras LPR, 3D scans, etc. | | |

| LOW SPEED WEIGHING LSW | | |
| The shortlisted vehicles in the earlier control sites are diverted to the third and last weighing station at Low Speed (LSW), up to 15 km/h or to a static weighing scale system, with the aim of doing an accuracy weighing. | | |
| The infringement process is only valid if this has been done with industrial weighing devices which hold the relevant metrological certification. | | |
The systems HsWIM are commonly used to detect vehicles on rapid roads, such as motorways and dual carriageways, with overload. The weight sensors, integrated in the pavement, register telemeter data of the vehicles for purposes of classification and/or short listing.

The data registered by the system when the vehicle is travelling on the HsWIM zone includes: number of axles, loads per axle and total weight, speed, distance between the axles, direction, etc.

HsWIM is equipped with WIM-DIS (video) system of digital images, which allow the reproduction of images of vehicles in real time associated with the data of the vehicle.

The system is appropriate for speeds to up to 180 km/h.

**girwim HSWIM system**

- Detection and short listing
- Height sensors measure
- Speed detection over the speed limit
- Temperature sensors
- Sensors for detection and placement on road
- Weighing system: quarts sensor
- License plate recognition (LPR System) and closed-circuit television (CCTV System)
- Cabinet system with data logger to collect and process data and control room to supervise.
- Warning system of evasion of control.

The high speed system HSWIM allows the registration of telemeter data of the vehicles which travel on the control site at a speed to up to 180 km/h.
ELEMENTS of the overall system (per lane and depending on the degree of precision required)

- Between two and four sensors of quartz Lineas (Kistler)
- Two inductive loops
- A camera of automatic number plate recognition (LPR)
- A camera of general overview (VMS)
- 3D volumetric scan (optional)
- For the set of the road it is also necessary to assemble a gate or support depending on the place.
- Central cabinet, where the data logger and all the electronics is assembled.

THE INDUCTIVE LOOPS
They are the sensors in charge to detect the vehicles. They allow different combinations depending on the necessities.

GANTRIES
Steel structures which are used to sustain the posters of vertical signage on the roads, in such case they are structure with 2 holders.

VARIABLE MESSAGE SIGNS (VMS)
They are used on variable message panels of high quality and their purpose is to act as traffic guidance and give information. They allow managing traffic with individualized indications.

CAMERAS OF GENERAL OVERVIEW (CCTV)
Video surveillance cameras allow a general vision of the weighing area of high speed.

THE SENSORS OF QUARTZ LINEAS (KISTLER)
A wheel rolling on the sensors Lineas applies the vertical forces to the quartz glasses practically without any type of distortion. The quartz discs piezoelectric produce an electronic change proportional to the applied forces. The piezoelectric sensibility is practically independent of the temperature, the time and the speed. The signals of electric load are converted by an amplifier of load in voltages, exactly proportionate. Additionally, they can be processed as it is needed.

CAMERAS OF AUTOMATIC NUMBER PLATE RECOGNITION (LPR)
High precision cameras for number plate recognition on rapid roads, with specific applications for the traffic agents and controls of access. The installation of the cameras with a powerful engine of recognition of characters allows an optimal tracking of the vehicle applying the necessary individualized indications if overload is detected.

CONTROL ROOM
It allows the control of multiple signals in real time coming from road sensors, GPS systems and other intelligent systems of transport, allowing a quick answer in case of emergency; divert transit traffic or fine vehicles with a better efficiency.

CABINET
The cabinet is placed on the side of the road on the weighing area, with a structure of metal cabinet. It includes a power source with circuit breakers and all the requisite electronics for the manoeuvring of the various elements.

DATALOGGER DYNAB612
MsWIM classifies and selects the lorries which arrive, on the basis of a weighing threshold fixed by the personnel of the weighing station.

The system can give the following information:

- Number of axles
- Loads per axle and total weigh
- Distance between the axles (optional)
- Height of the vehicle (optional)
- Type of vehicle

The vehicles which do not exceed the threshold are immediately told to follow the lane, through a sign of variable messages, to return to the main road. The rest of the vehicles are directed, with the variable messages signs, to the derivation lane to be weighed on the scale of low speed (LSW) or the static scale.

MsWIM is equipped with license plate recognition cameras (LPR) and systems of digital images, which allow the application of the management of images in real time associated with the data of the vehicle.

The system is appropriate for speeds to up to 50 km/h.

MsWIM allows the short listing of vehicles which have been selected in the highway or Main Street and have joined the access line where the vehicles are weighing with a classifying bending plate.

**girwim MSWIM system**

- Detection and preselecting
- Height sensors measure
- Speed detection over the speed limit
- Sensors for detection and placement on road
- Weighing system: Bending late, axle weighing device
- License plate recognition (LPR System) and closed-circuit television (CCTV System)
- Cabinet system with data logger to collect and process data and control room to supervise.
- Variable message area (entrance signage or continuation of the movement of the vehicle)
- Warning system of evasion of control
**ELEMENTS** of the overall system

(per lane)

- Bending Plate GIRWIM
- Inductive loops
- License plate recognition cameras (LPR)
- Variable Message Signs (VMS)
- Central cabinet, which includes data logger and the electronics needed to manage the system.
- Height sensor measure (optional)
- Camera of general vision (CCTV) (optional)

**BENDING PLATE**

The bending plate consists of two steel platforms of 1.75 m, placed one at the side of the other to cover about 3.5 m of width of the lane. The plates are equipped with strain gages and strain gauges. When the wheels of the vehicles go through the effective areas of the Bending plate, these ones release an electrical signal. The measured deformations are analyzed to determine the load of the wheels.

If the Bending Plate is correctly installed and gauged, it can provide the gross weight within an accuracy rate between 5%-10% of the real weight of the vehicle for the 955 of the measured vehicles.
This scale is usually placed after the MSWIM system. The system selects the vehicles with overload. A traffic light or a variable messages sign, placed after the scale automatically advises the offenders to deviate or to go to the place where they are going to receive their fine or the traffic agent is going to make a further revision. On the other hand, the vehicles which are travelling without overload and which do not have done any type of infringement are immediately directed to the exit.

If a vehicle does not follow the indications of the signal and does not deviate, the camera placed on the exit lane is going to take a picture of the vehicle and an alarm sign is going to appear in the software of the traffic agent as an escape infringement.

The scale of the system is installed near the control room.

The system is appropriate for speeds to up to 15 km/h

**girwim LSWIM system**

- Detection and preselecting
- Height sensors measure
- Speed detection over the speed limit
- Sensors for detection and placement on road
- Weighing system: Bending late, axle weighing device
- License plate recognition (LPR System) and closed-circuit television (CCTV System)
- Cabinet system with data logger to collect and process data and control room to supervise.
- Variable message area (entrance signage or continuation of the movement of the vehicle)
- Warning system of evasion of control.

**LOW SPEED SYSTEM**

El LSWIM is autonomous equipment operated by the scale BPPEM with a data logger associated in the application area.

**LOW SPEED SYSTEM**

This scale is usually placed after the MSWIM system. The system selects the vehicles with overload. A traffic light or a variable messages sign, placed after the scale automatically advises the offenders to deviate or to go to the place where they are going to receive their fine or the traffic agent is going to make a further revision. On the other hand, the vehicles which are travelling without overload and which do not have done any type of infringement are immediately directed to the exit.

If a vehicle does not follow the indications of the signal and does not deviate, the camera placed on the exit lane is going to take a picture of the vehicle and an alarm sign is going to appear in the software of the traffic agent as an escape infringement.

The scale of the system is installed near the control room.
ELEMENTS of the overwall system

- Axle weighing scale BPPEM type
- Inductive loops
- Infrared curtain, to separate vehicles
- License plate recognition camera (LPR)
- License Plate Recognition
- Traffic light with green, red or deviation.
- Central room where all the elements are coordinated.

OPTIONAL
- Barrier to stop the vehicle and address it to the waiting zone.
- Camera to take pictures in case of escape infringement.

INDUCTION LOOPS

LICENSE PLATE RECOGNITION CAMERAS (LPR)

CONTROL ROOM

CABINET

DATA LOGGER DYNAB612

AXLE-WEIGHING SCALE BPPEM
Scale designed for the static and dynamic weigh, axle to axle of vehicles. It is thought for a quick and easy installation in the civil works as the scale includes a complete set, that is completely assembled and with a frame in the entire perimeter. It also includes cells, internal cabling, motion limiting and transport. Its assembly is always in-built.
The bridge is built with HEB-220 mm, and the perimetrical frame in UPN 300 mm. It has the load points outside the support area of the axle of the vehicle, to give greater stability.
The stoppers of movement are voltage barriers longitudinally or transversally shaped.

BARRIERS TO CONTROL ACCESS
The automatic, fast barriers are an ideal solution for the selection and traffic control of entrances and exits to streets; car parks etc., both for residential and industrial areas. They allow the management of quick access in public car parks, hospitals, motorways.
They are made with a reinforced steel structure with anti-rust treatment and lacquered with electrostatic dust, which offers a last duration and guarantee aesthetic characteristics.

INFRARED CURTAIN
SORTER / DIVIDER
This curtain is immune to sun. It has a height of approximately 1900mm and 3 separated areas. The nearest to the ground has a resolution of 10 mm to detect the presence of the lifted axles.
The second area has a resolution of 30 mm to detect the attachment or spear. The rest of the curtain has a resolution of 50 mm for classification.
It allows the control of the traffic in real time and collects the key data of the vehicle, such as the weight of the vehicle, loads per axle and with optional mode, the distances, the speed of the vehicle and much more.
GIRWIM DYNAB612 Data Logger is a unit of processing of data specifically designed to interact with GIRWIM systems. It allows the control of the traffic in real time and collects the key data of the vehicle such as the weight of the vehicle, loads per axle and with optional mode, the distances, the speed of the vehicle and much more.

The key is to improve the processing of data and prepare the signals of the BPPEM platform to achieve a better accuracy and weighing in low speed with the maximum reliability.

The data logger GIRWIM DYNAB612 can be easily integrated by the system integrator in its global system for a customizes solution, according to the necessities of the user.

GIRWIM DYNAB612 Data Logger is suitable to be used in applications such as traffic data collection and toll collection depending on the weight.

### GENERAL DATA FOR DATALOGGER

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Static weight</th>
<th>%</th>
<th>0.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range (per axle)</td>
<td>Tons</td>
<td>0 ... 30</td>
<td></td>
</tr>
<tr>
<td>Speed range</td>
<td>km/h</td>
<td>1 ... 15</td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>°C</td>
<td>-20 ... 65</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>WxDxH</td>
<td>213x77x136</td>
<td></td>
</tr>
<tr>
<td>Weight (4 channels)</td>
<td>kg</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

### POWER

<table>
<thead>
<tr>
<th>Power</th>
<th>VDC</th>
<th>10 ... 30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24V</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>mA</td>
</tr>
</tbody>
</table>

### OTHER INTERFACES

<table>
<thead>
<tr>
<th>Communication Ethernet ports (TCP/IP)</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital input channels</td>
<td>4</td>
</tr>
<tr>
<td>Digital output channels</td>
<td>4</td>
</tr>
<tr>
<td>Interface RS485</td>
<td>1</td>
</tr>
</tbody>
</table>
GESDYNWEN

GESDYN WEB presents an easy and intuitive interface which concentrates all the information generated by the different systems and GIRWIM devices.

The information is assessed on-line and immediately viewed through devices with internet access (such as mobiles, tablets, etc...).

The Web environment is consultant-oriented, traffic managers or police force.