Sasco Africa
Accurately Weighing Africa

sanas
Verification Laboratory
LTF0070

WIM 4000S

SASCO SLOW SPEED ADVANCED WEIGH-IN-MOTION SYSTEM

Cybernetic Overloading Surveillance

SASCO WEIGHING SYSTEMS

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WIM 4000s

Overloading regulations that have been enacted across most Africa countries. Twenty-two African countries have agreed under the COMESA-EAC-SADC Tripartite Vehicle Load Management Agreement, to both standardize permissible limits ad seek to build from national prosecution systems, a multi-national African overloading management system.

Roads Departments of National Governments have generally used multi deck weighbridges as the preferred choice of weighing equipment a Weighing Prosecution Stations The required level of investment in a Weighing Prosecution Station is high and involves the construction of a weighing infrastructure which includes buildings, a holding area, a multi deck weighbridge and an off ramp from and back to the main road from these facilities.

The required cost of investment and staffing required to establish a Weighing Prosecution Station can only be justified on busy national main roads. If there is no form of overloading surveillance on important but lower volume roads, overloaded trucks will simply default to these routes.

The challenge facing National Governments is therefore how to put in place overloading surveillance systems that are substantially less costly than Weighing Prosecution Stations, are effective and can be integrated with existing Weighing Prosecution Stations.

The WIM 4000S is that solution.

Based on the same cybernetic technology found in the WIM 4000, the WIM 4000S has been reconfigured to deliver a fully automated weigh-in-motion road traffic overloading surveillance system, designed for installation in an existing tar road.

The WIM 4000S is therefore the ideal road traffic overloading surveillance system for less busy main roads where overloading is still a potential issue.

Attractions of Weigh-in-Motion

Weigh-in-motion (WIM) is a technology used to determine the weight of vehicles as they are moving. In contrast to traditional truck scales, which require vehicles to stop to be weighed, WIM systems are increasingly used for commercial vehicle weight enforcement, offering several advantages over conventional truck scales.

One of the main advantages of WIM systems is their speed and efficiency. Because vehicles do not have to stop to be weighed, WIM systems can quickly and accurately determine the weight of many vehicles.

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WIM therefore allows for more efficient commercial vehicle weight enforcement, eliminating the need for vehicles to queue up at traditional truck scales.

Secondly, in addition to their speed and accuracy, WIM systems also offer the advantage of being able to collect data on the weight and size of vehicles. This information can be used for various purposes, such as monitoring trends in vehicle weight and size and identifying potential safety concerns. Traditional truck scales do not have this capability.

Finally, WIM systems are also more cost effective than traditional truck scales and because they do not require vehicles to stop, WIM systems can be installed in locations where traditional truck scales cannot, such as on bridges or at intersections. This allows for more comprehensive commercial vehicle weight enforcement without the need for expensive and time-consuming construction of traditional truck scales.

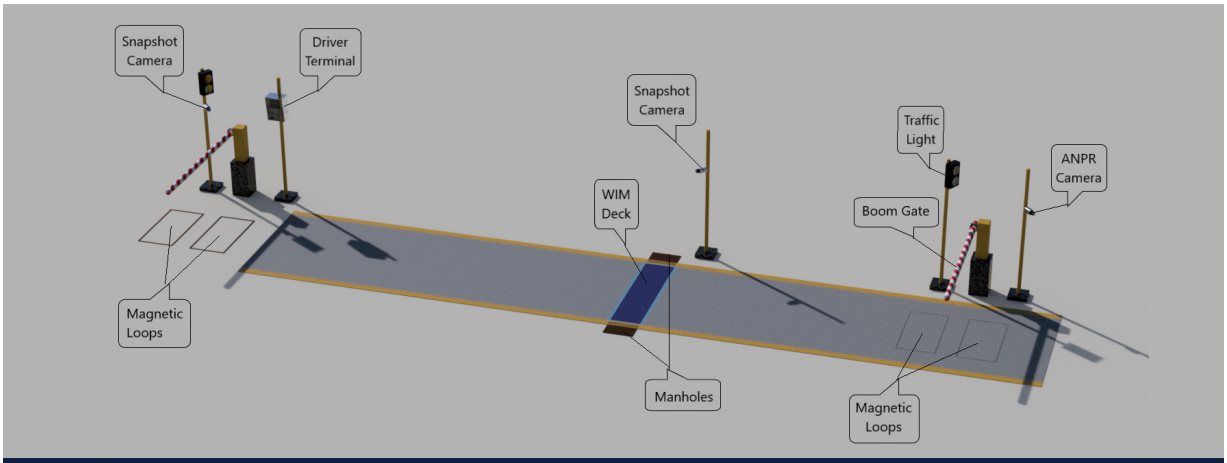
OVERLOADING ON AFRICAN ROADS

Sasco's WIM Range

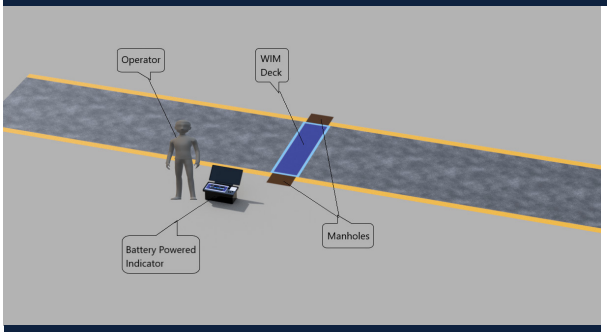
The capabilities of Sasco's WIM range include exceedingly accurate slow-speeding in-motion weighing of vehicles up to 5kmph right through to high-speed in-motion weighing of vehicles at up to 120 kmph, but with lower accuracy.

Through our wide range of solutions comprising Low-Speed Basic (WIM 1000), Low-Speed Advanced (WIM 2000), Low-Speed Ultra (WIM 3000), Low-Speed Cybernetic (WIM 4000), Sasco has pioneered the development of slow-speed road weigh-in-motion for the African market.

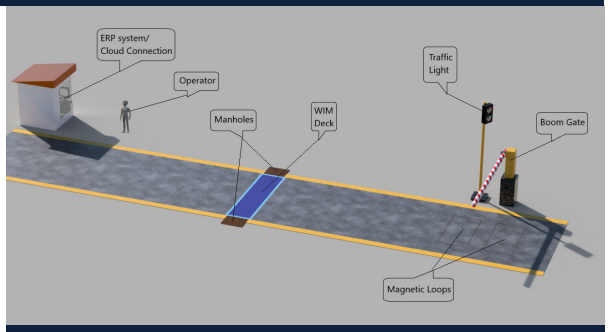
In addition to our range of slow-speed weigh-in-motion solutions, Sasco also offers a high-speed cybernetic (WIM 5000) weigh-in-motion system.



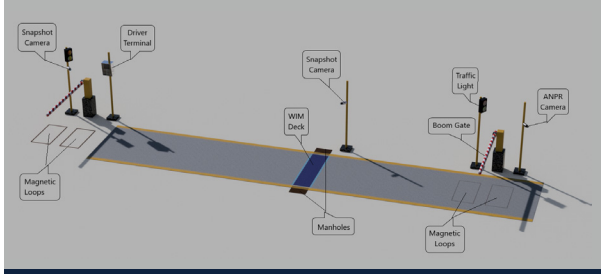
WIM 2000



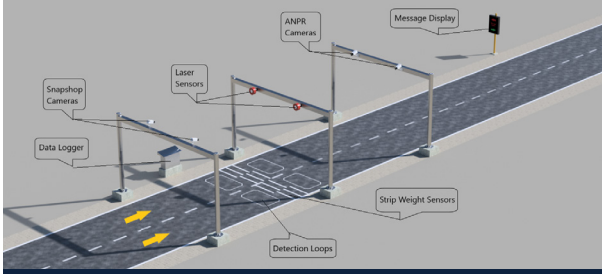
WIM 1000



WIM 3000



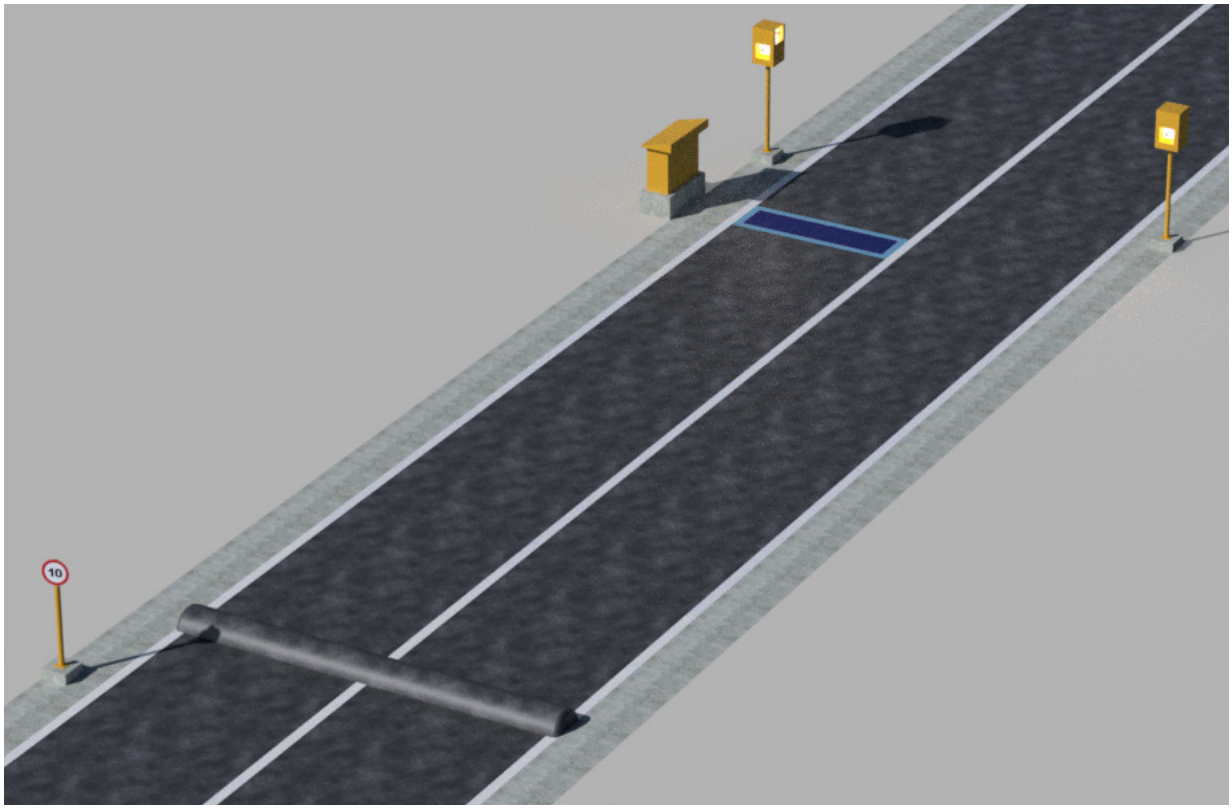
WIM 4000



WIM 5000

WIM 4000S Overview

The WIM 4000S comprises either one or two WIM Decks installed in the road, a truck sensing ground loop and two Sasco Surveillance Sentries.

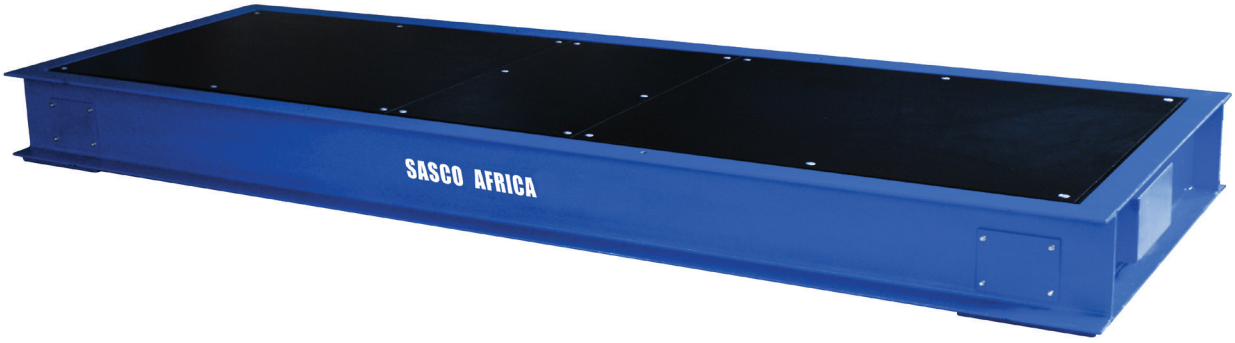


NORMAL WIM 4000S SITE VIEW WITH ONE WIM DECK INSTALLED

WIM Deck

The WIM 4000s uses the Sasco WIM Deck.

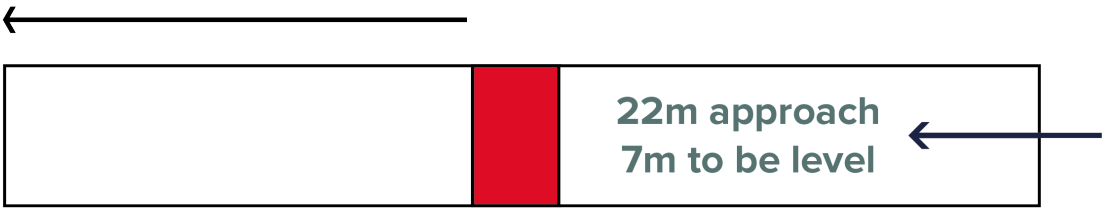
The WIM Deck is a steel weighing deck approximating 3 sqm in size and is flush mounted in the ground. Therefore, the concrete civil works around the deck are straightforward but the WIM Deck approaches must be level for at least 10m on the approach side.



PRO-WIM FLUSH MOUNTED DECK IS JUST 2.9 SQM

The WIM Deck is highly robust and can accommodate axle loadings of up to 30T per axle which is exceptionally strong.

Vehicles of any length can be weighed , and this is done in motion at speeds not exceeding 5 kmph. Once completed , vehicle total weight and group axle weight data is generated.



DD700 Indicator

The WIM 4000S uses the DD700 indicator. The specifications of the DD700 indicator are:

- USB host
- Full audit trail
- OIML approval
- 1 x RS232 serial port
- 1 x RS422 port
- NTEP 10.00 divs approval
- Two additional slot options
- Traffic device sequencing interfaces.
- Configurable memory storage for truck data
- Capacity to import and export CSV format data

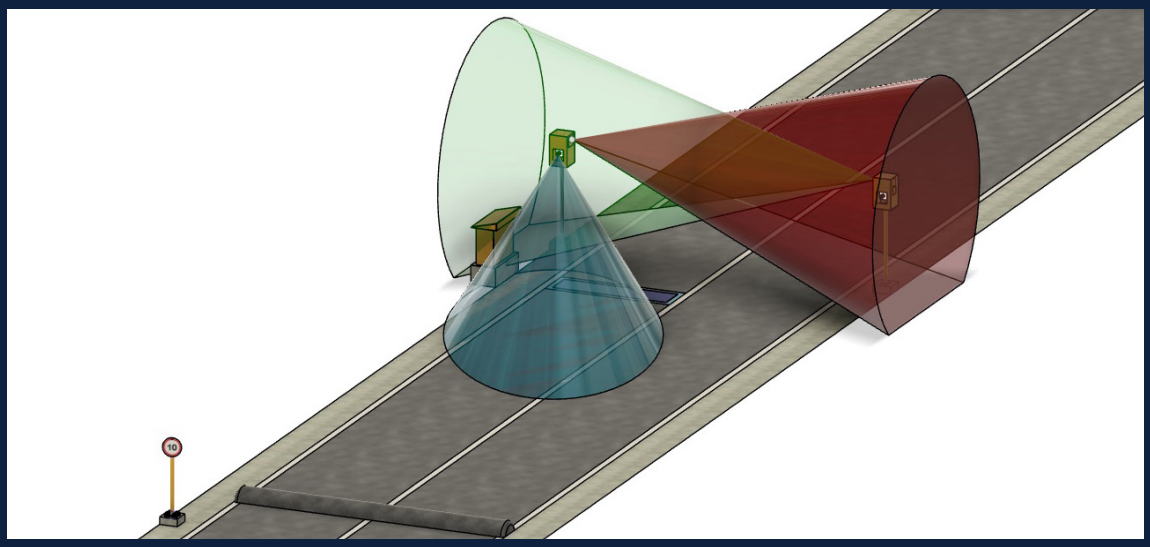
SASCO Surveillance Sentries

The WIM 4000S systems includes two Sasco Surveillance Sentries together with a secure equipment Houser:

Housed within the two Sasco Surveillance Sentries is the following hardware and software:

- 2 x APNR cameras
- 2 x situational cameras
- 4G Network Equipment
- DVR Recorder
- Industrial PC
- ProWeigh software
- Digitizer
- UPS

Whether on a WIM 4000S solution using one WIM Deck or two, the Sasco Surveillance Sentries provide complete APNR and visual camera coverage of the critical areas around the WIM Deck and prevent any vehicle from by passing the WIM deck without having the transgressing vehicles details captured:



APNR AND SITUATIONAL CAMERA COVERAGE AROUND THE WIM

Proven Operational Accuracy

Under normal operating conditions, the accuracy of the WIM 4000S has been validated through parallel multi deck weighbridge cross testing to consistently deliver the following results:

EXCEPTIONAL TOTAL ACCURACY	PERCENTAGE ERROR ON TOTAL WEIGHT	PERCENTAGE ERROR ON AXLE GROUP
3 Kmph	<1%	<2.5%
5 Kmph	± 1%	<2.5%

Approach speeds in excess of 5 Kmph onto the WIM 4000S will impact the accuracy of the system.

Data Generation

The following data will be generated in relation to each vehicle passing over the WIM Deck:

- Time and date of weighing.
- Vehicle type.
- Vehicle color.
- Vehicle registration.
- Total weight.
- Number of axles.
- Weight of each axle.
- Average speed over the WIM Deck.
- Image of the complete vehicle.

In the case of a single WIM deck being used, the following data will be generated in relation to any vehicle that attempts to drive around the WIM Deck and thus avoid weighing:

- Time and date of transgression.
- Vehicle type.
- Vehicle color.
- Vehicle registration
- Image of the vehicle.

Data Integration

The WIM 4000S operates using the ProWeigh+ software with all the integration functionality that ProWeigh+ offers.

All generated by the WIM 4000S can therefore be integrated into ERP systems as further described below:

- ProWeigh+ offers two distinct integration methods, the first being Business Connector which synchronizes data between your various WIM systems with a central database, from here it can then be integrated into a host of applications including ERPs such as SAP, Sage, and Syspro as well as reporting tools like QlikView and Microsoft PowerBI.

- The second method is Web Services which is a standardized messaging protocol which allows you to closely interact with ProWeigh to maintain and monitor various aspects of the software. This is well suited for large workflow-controlled environments.

Figure 1: Webservices

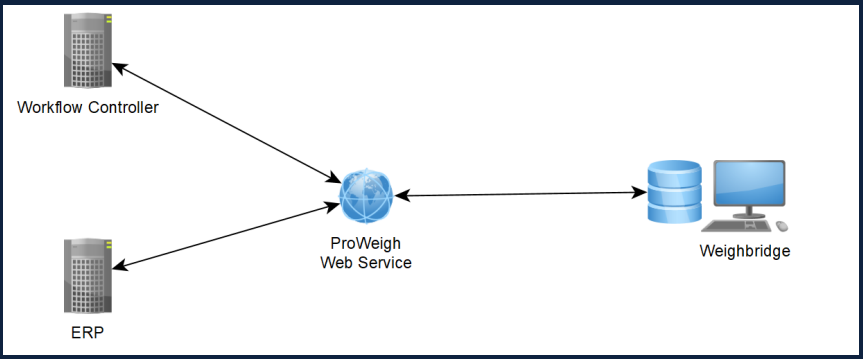
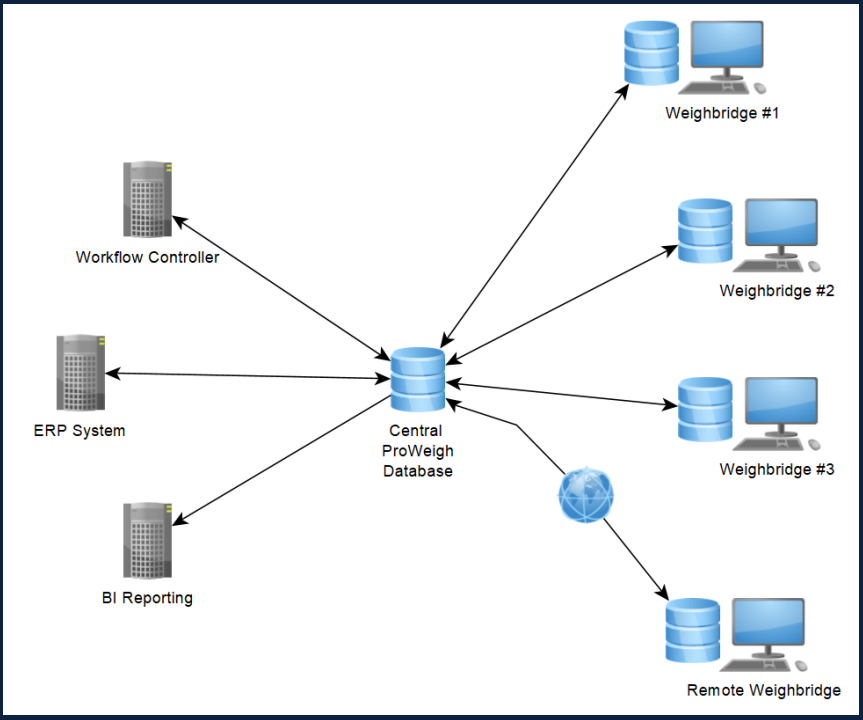


Figure 2: Centralised Database



WIM 4000S Application Example

The National Roads Department is responsible for all national roads and has successfully reduced over loading through building a prosecution weighing station on several of national roads. The country however has a substantial network of other important older tar roads which are often used by transporters to avoid passing the weighing stations.

The D10 road is an example of an older road that runs close to a major new N2 national road. On the N2 is a national prosecution weighing station. Junction 10 is crossing of the older D10 road and the national N2. Further down the N2 a short distance from the Junction 10 is a prosecution weighing station which transporters are avoiding by crossing over the N2 at Junction 10 an intersection.

The National Roads Department want to force all transporters using the older D10 to be weighed at the Junction 10 and if considered overloaded to be instructed to go to the prosecution weighing station for re weighing and potential prosecution.

The optimal solution is the WIM 4000S, installed flush in the ground at the Junction 10 intersection.

The following additional hardware and software will also be installed:

- Display board advising Truckers that are potentially overloaded that their weighing information and other details have been electronically sent to the weighing station because they are potentially overloaded and instructing them to proceed directly to the weighing station a few miles away.

- Additional wireless-based communication hardware linking the WIM 4000S and the prosecution weighing station to provide robust connectivity for all weighing data.

WIM 4000S Technical Specifications

WEIGHING HARDWARE	DETAILS
Deck width	0.76m
Deck length	3.2m
Required level approach	7m
Number of load cells	4
Load Cell approval	OIML
DD700 approval	OIML
Maximum weighing Speed	5 Kmph
Minimum weighing Speed	3 Kmph
Speed recorded	Yes
Weighing accuracy at maximum Speed	+-99%
Weighing accuracy at minimum speed	>99%
Maximum number of axles	20
Manned or Unmanned	Unmanned
PC Required	Yes
Printer Required	No
Mains power required	Yes
Option of add on peripheral devices	Yes

WEIGHING SOFTWARE	DETAILS
ProWeigh	Version 4.6 or higher

WIM 4000S Technical Specifications

AUTOMATION AND OTHER HARDWARE	DETAILS
Industrial Computer	• CPU: Intel Core iS (8th generation or newer) or • AMD Ryzen 5 {3000 Series or newer) • RAM: 8GB or Higher • Storage: 500GB or More • Network: Ethernet and Wi-Fi Serial Port if serial communication needed • USB: 4 ports minimum • Display Resolution: 1920 x 1080 Operating System: Windows 10 or Windows 11
ANPR	• Automatic Number Plate Recognition Software. • Camera: 4MP or Higher
Situational Snapshot Camera	• 2MP or Higher
Other Hardware	• Networking Equipment • 4G Router • NVR • Weighing Indicator • Power Supplies

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