

ISWIM NEWSLETTER

Message from the ISWIM president

ISWIM Members and Friends,

Welcome to the second edition of our Newsletter for 2022.

This month the ISWIM community is coming together, both physically and virtually for the 3rd Regional ISWIM Seminar from 6th to the 8th of July in Pretoria, South Africa. This promises to be a great event along with the 40th Southern African Transport Conference. The seminar theme is 'Optimising Road Freight Transport using WIM Data' which is very significant to practitioners. I want to thank the organizing committee and in particular its local members for ensuring local input and the seminar's significance to local practitioners.

This edition of the newsletter presents a number of articles across the full scope of ISWIM member activities and regions across the world.

In the last newsletter edition, I informed readers that ISWIM had published a 'Glossary of Terms' as a first in a series of ISWIM 'Practitioner's Guides'. I would now like to add to this and advise that we now have published its second Practitioners' Guide, namely 'WIM Data for Bridge Engineering – what should I know, what should I do?'. Its main goal is to present the possibilities of using WIM data for various bridge applications in an easy-to-understand way. The idea of these series is to provide WIM practitioners, technicians, and end-users with a series of practical guides illustrating "best practices" about the various aspects involving WIM technology, systems and their applications. These publications are published on the ISWIM website (www.is-wim.net).

ISWIM produces this Newsletter to inform its membership and the broader community about the developments within the association and to provide a snapshot of the world of WIM. I invite you all to contribute to the Newsletter.

Thank you all for your contribution.

Chris Koniditsiotis

President – ISWIM

■ [Chris Koniditsiotis](mailto:ChrisK2.0@bigpond.com) | ChrisK2.0@bigpond.com

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Young Researcher Award

Two young scientists (Amin Moghadam and Lucas Franceschi) have received the ISWIM Young Researcher Award for 2021. They have been selected based on their contribution to the Weigh-in-Motion (WIM) field and passion through their studies or early professional life. ISWIM will fully sponsor them to attend the 9th International Conference on WIM (ICWIM9) in Brisbane, Australia in November 2023 to present their work, visit the exhibition, and further develop their industry knowledge and global network.

Lily Poulidakos, Chair ISWIM Young Researcher Award Committee.

■ Lily Poulidakos | Lily.poulidakos@empa.ch

3rd Regional ISWIM Seminar in South Africa

It is almost time for the 3rd Regional ISWIM Seminar that will be held from 6-8 July at the CSIR Convention Centre in Pretoria, South Africa. The theme of the seminar is 'Optimizing Road Freight Transport using WIM Data'. By bringing together end-users from this region ISWIM wants to support the development of WIM in Southern Africa. For the seminar we have joined forces with the annual Southern African Transport Conference (SATC) from 4-7 July in the same venue, hence right before and in parallel with our seminar. More information on the SATC can be found on: www.satc.org.za.



The program of the seminar consists of two days with different types of sessions followed by a technical tour on the Friday and of course we have included a South African style BBQ (Braai). The topics of the sessions are specifically selected to match current conditions, developments and challenges of end users in Southern African countries. For example we have presentations on WIM implementations in Tanzania, Uganda and South Africa combined with experiences from around the world; Brazil, Europe and Australia. At the opening session we have presentations from key-note speakers as: Mr. Chris Koniditsiotis (president of ISWIM), Mr. Nazir Alli (President of PIARC), Mr. Louw Kannemeyer (Engineering Executive at SANRAL) and Mr. Rogatus Mativila (CEO at Tanroads).



Union Buildings in Pretoria.

Disclaimer

The projects described, ideas shared, and claims made in this Newsletter do not necessarily represent the official view or position of ISWIM.

While care has been taken in the preparation of the content of this Newsletter, ISWIM accepts no responsibility in its use, for any omission, or damage that may be caused and does not endorse any specific product presented in the Newsletter.

ISWIM Website

Please visit the official ISWIM website: www.is-wim.net. Here you will find information on our society, all Newsletters, past ISWIM Events, the Guide for Users of WIM and links to our all Vendors & Consultants.

New is our online, searchable library with over 300 articles, papers and reports related to Weigh-In-Motion.

ISWIM LinkedIn Group

Besides the new ISWIM website and the periodical Newsletter there is another way of keeping up to date with the latest developments in Weigh-In-Motion; the ISWIM LinkedIn Group.

In this group, researchers, end-users and vendors can find AND post short articles on initiatives, new projects, test result, or other developments related to WIM-technology, applications and data.

The ISWIM LinkedIn Group has currently more than **400** members. If you want to join, please visit:

[linkedin.com/groups/13400438](https://www.linkedin.com/groups/13400438)

The main sessions will cover topics like: Practical applications of WIM, Implementation of WIM, Quality of WIM data, WIM for direct weight enforcement and self-regulation in overload control. In addition there will be an exhibition where six of our ISWIM-Vendors will show their latest technologies, applications and solutions. The seminar is concluded on Friday with a technical tour to the Mantsole Overload Control Station and WIM test site where participant can see a practical implementation and make new connections in an informal setting.

Day	Time	Tuesday 5 th	Wednesday 6 th	Thursday 7 th	Friday 8 th
Morning	08:30-10:30		Plenary Session SATC	Techn. Session 3	Technical Tour
			Opening Session	Quality improvement of WIM data	
			3rd Regional Seminar on Weigh-In-Motion		
	Break				Mantsole Control Station & WIM test site
11:00-13:00		Techn. Session 3	Discussion Session		
		WIM for direct weight enforcement	WIM for direct weight enforcement in SA		
Lunch			At exhibition	At exhibition	At lodge
Afternoon	14:00 - 15:00		End-user Session 1	End-user Session 2	Drive and Braai in Dinokeng Game park
			Practical applications of WIM	Practical applications of WIM	
	Break				
	15:30-17:00		Techn. Session 3	Special Interest	
		Implementation of a WIM network	Self regulation in overload control		
			Closing Session		
Evening	17:30-19:30	Welcome Cocktail	Braai (BBQ South Africa style)		

Program at a glance of the ISWIM seminar.

The official hosts of the seminar are ISWIM, SATC, PIARC Technical Committee TC2.3 'Freight' and Mikros Systems. The seminar is supported by: ITS South Africa, South African Road Federation, SANRAL, World Bank, ASANRA, CSIR, FEHRL, HVTT, Namibian Road Agency, Bakwena, N3TC, Trac-N4 and the Cross Border Agency. Special thanks to our Major Sponsors and exhibitors: CAMEA, Intercomp, IRD, Mikros, Q-Free and Cestel. For more detailed information on the program, registration and exhibition please visit: www.is-wim.net or www.satc.org.za.

■ Jacqui Oosthysen | satc.conference@gmail.com

■ Chris Koniditsiotis | Chrisk2.0@bigpond.com

9th International Conference on Weigh-In-Motion (ICWIM9)

ISWIM is happy to announce that the 9th International Conference on Weigh-In-Motion (ICWIM9) will be from 6 to 10 November 2023 in the Brisbane Convention & Exhibition Centre in Australia. After Asia, Europe and the Americas the ICWIM conference will now come to Australia for the first time.



ISWIM Vendors

APM	www.apm.pl
Axtec	www.axtec.co.uk
Betamont	www.betamont.sk
CAMEA	www.cameatechnology.com
Captels	www.pesage-captels.com
Cestel	www.cestel.eu
Ciemsas	www.ciemsas.com.uy
Cross	www.cross.cz
Dynaweigh	www.dynaweigh.com
ECM	www.ecm-france.com
Excel Technology	www.exceltech.com.au
GEC Scales	www.gecscales.com
Girwim	www.girwim.com
Intercomp	www.intercompcompany.com
IRD / PAT Traffic	www.irdinc.com
iWIM	www.iwim.it
Kistler	www.kistler.com
Mikros	www.mikros.co.za
Osmos Group	www.osmos-group.com
Q-free	www.q-free.com/products
Sterela	www.sterela.fr
TE Connectivity	www.te.com
TDS	www.traffic-data-systems.net
Tramanco	www.tramanco.com.au
VanJee Technology	www.wanji.net.cn

Interested to join the ISWIM Vendors, just contact:

■ Andy Lees | andrew.lees@q-free.com

■ Hans van Loo | hans.vanloo.int@gmail.com

Furthermore, ICWIM9 will be held jointly with the 17th International Symposium on Heavy Vehicle Transport and Technology (HVTT17). After Paris, France in 2008 this will be the second time that an ICWIM conference will be held jointly with a HVTT symposium. As such the conference will be a truly joint event, namely the joint ISWIM and HVTT Forum international scientific conference.



View of Brisbane, Australia.

The joint event will be held as a series of scientific and technical sessions, a few panel discussions and end-users' sessions with best practices and practical application of WIM data. The conference is designed to address the broad range of technical topics related to heavy vehicles, size and weight measurement systems, and transport technologies, providing access to the latest research results and best practices, and related policy issues. It is a multi-disciplinary, inter-agency supported event especially intended for:

- Agencies responsible for the design, construction and maintenance of road infrastructure, pavements and bridges.
- Government agencies responsible for size and weight enforcement and the operation and control of heavy vehicles.
- Agencies using weight information to support policies on (international) freight mobility, traffic safety, and road pricing.
- Researchers and student in WIM technologies, WIM data analysis, design of road infrastructures vehicle-road interaction and freight transport logistics.
- Manufacturers, vendors and users of WIM systems, data, or related equipment and services.

For more information on the submission of abstracts, registration for delegates, the possibilities for sponsoring and participating in the exhibition will be made available soon on: www.is-wim.net, and www.hvtt.org or contact:

■ **Chris Koniditsiotis** | ChrisK2.0@bigpond.com

■ **Gavin Hill** | GavinH@tca.gov.au

Guide on WIM Data for Bridge Engineering

In May 2022, ISWIM published its second Practitioners' Guide, 'WIM Data for Bridge Engineering – what should I know, what should I do?'. Its main goal is to present the possibilities of using WIM data for various bridge applications in an easy-to-understand way.

ISWIM Consultants

Corner Stone www.corner-stone-int.com

FIMAU www.FIMAU.com

NMi www.nmi.nl

RTS GmbH doupal@hispeed.ch

Static Motion www.staticmotion.co.za

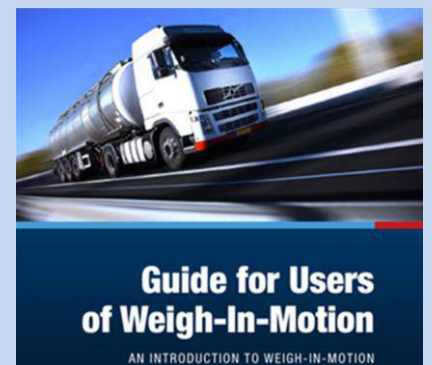
Interested to join the ISWIM Consultants, just contact:

■ **Andy Lees** | andrew.lees@q-free.com

■ **Hans van Loo** | hans.vanloo.int@gmail.com

ISWIM Guide for Users of WIM

The ISWIM Guide for Users of Weigh-In-Motion serves as a basic, yet comprehensive introduction to Weigh-In-Motion. The Guide covers different aspects related to the working, specifying, buying, installing, testing, maintaining and using of WIM systems and data. To enhance accessibility for users starting with WIM, these topics are described in easy-to-understand language.

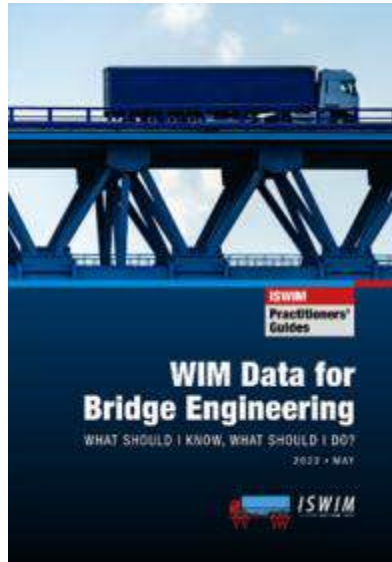


A PDF version of the WIM User Guide can be downloaded at the ISWIM website: www.is-wim.net.

■ **Hans van Loo** | hans.vanloo.int@gmail.com

All WIM data has applications in bridge engineering, whatever the technology used to secure it. Perhaps the most critical application is in traffic loads. With some statistical calculations, WIM data can be used to determine the characteristic maximum load effects on bridges and hence their design values. This has applications in developing traffic load models for countries and finding site-specific design loading for a particular bridge.

The WIM data can also be used to protect bridges with lower load-carrying capacity. It can support posting policy or issuing a warning to heavy vehicles using a variable message sign. WIM, particularly Bridge WIM, can also be used for bridge health monitoring. Having load and bridge performance under this load significantly improves the quality of the information on the overall safety of a bridge structure. This, in turn, can be used to optimise the remedial measures required, extend the safe working life of a bridge and ultimately reduce its carbon footprint.



The 2nd ISWIM Practitioners' Guide.

The document ends with a brief discussion on data quality specific to bridge applications, where the focus is on having no bias in the data rather than on the accuracy of individual vehicle records. It is also essential for most bridge applications that the WIM system provides accurate time stamps.

■ Aleš Žnidarič | ales.znidaric@zag.si

IRD & Mikros Systems Partner on South African WIM

International Road Dynamics continues to enjoy a 35+ year longstanding and mutually beneficial relationship with Mikros Systems.

Mikros Systems manufactures the RAKTEL range of traffic data loggers that makes provision for all popular WIM sensors and is supported by a comprehensive software suite. IRD's Bending Plate scale sensors were one of the first WIM sensors incorporated with the RAKTEL WIM logger and these continue to be deployed in the Southern African region which is a testament to the quality of the Bending Plate sensors and WIM systems deployed by IRD globally. The RAKTEL loggers are primarily used for data logging and pre-selection control.

Mikros Systems have been installing Bending Plates in pre-selection lanes on a number of Weigh Stations in South Africa. The first Weigh Station commissioned by the then newly formed South African Roads Agency (SANRAL) was fitted with IRD Bending Plates since its inception in 1998. During subsequent upgrades, the bending plates continue to be successfully re-installed.

Coming Events (subject to change)

ISWIM 3rd Regional Seminar

Pretoria, South Africa

6-8 July 2022

www.is-wim.net

ABCR Congress

Brazilia, Brazil

30 Aug + 1 Sept 2022

www.congressoabcrbrasvias.com.br

ITS World Congress

Los Angeles, CA, USA

18-22 September 2022

www.itsamericaevents.com

CVSA Annual Conference

Rapid City, SD, USA

18-22 September 2022

www.cvsa.org/events

Transport Research Arena (TRA)

Lisbon, Portugal

14-17 November 2022

www.traconference.eu

Gulf Traffic

Dubai, UAE

6-8 December 2022

www.gulftraffic.com

Transport Research Board (TRB)

Washington, USA

8-12 January 2023

www.trb.com

CVSA Workshop

Memphis, Tennessee, USA

23-27 April 2023

www.cvsa.org/events

PIARC World Road Congress

Prague, Czech Republic

2-6 October 2023

www.piarc.org

ICWIM9 + HVTT17

Brisbane, Australia

6-10 November 2023

www.is-wim.net

NaTMEC

Boise, Idaho, USA

2-5 June 2024

www.natmec.org

Do you know other WIM-related events? Please contact:

■ Hans van Loo | hans.vanloo.int@gmail.com

Join the Technical Tour of the RSWIM3 on Friday 8th July to visit the Mantsole Traffic Control Centre.



Aerial View of the Mantsole Traffic Control Centre

Mikros Systems have been installing Bending Plates in pre-selection lanes on a number of Weigh Stations in South Africa. The first Weigh Station commissioned by the then newly formed South African Roads Agency (SANRAL) was fitted with IRD Bending Plates since its inception in 1998. During subsequent upgrades, the bending plates continue to be successfully re-installed.

In addition to SANRAL, Mikros Systems has been supplying Weigh-In-Motion Systems to local and provincial authorities and private road concessionaires. Not only has Mikros Systems supplied WIM equipment for Traffic Control Centre and Weigh Stations but also for a large number of statistical monitoring stations with IRD's Bending Plates as the primary WIM sensor.

Mikros Systems is an accredited TMH3 Systems supplier. The TMH3 specification is a national specification regulating Traffic Monitoring and WIM standards.

■ **Rob Sik** | rob@mikros.co.za

■ **Rish Malhotra** | rish.malhotra@irdinc.com

APM's intelligent vehicle WIM-system (iWIM)

Together with researchers from technical universities, APM PRO has spent the past two years working on an R&D project entitled 'intelligent vehicle Weigh-In-Motion system (iWIM)'. The iWIM is equipped with a precise and flexible datalogger and, thanks to advanced algorithms based on fuzzy logic, allows to assess the reliability of a record. The reliability is calculated based on data from various parameters such as vehicle dynamics and environmental conditions.

The test site was located in Mikołów in southern Poland. The station was equipped with strain gauges sensors for wheel load measurement, piezoelectric polymer sensors mounted at 45° for tyre width, double wheel and tyre-sensor point detection, induction loops, road sensor, weather station and a set of cameras.

Glossary of Terms

After the 8th International Conference on Weigh-In-Motion (ICWIM8) in 2019 ISWIM has started the development of the 'Practitioners Series'. The aim of these best practices publication series is to provide WIM practitioners, technicians, and end-users with a series of practical guides illustrating "best practices" about the various aspects involving WIM technology, systems and their applications. All publications will be published via the ISWIM website:

www.is-wim.net.



Earlier this year the first guide in the series was published. The 'Glossary of Terms', has an overview of definitions of terms frequently used in WIM. ISWIM guide contributors have discussed practices used around the world, some differences in definitions and terms are included, representing the rich spectrum of global WIM practitioners. It does not circumvent any available standard WIM specifications or calibration procedures.

The following Practitioner Guide are expected later this year:

- Calibration of in-road WIM systems
- Selection of in-road WIM Sites

For more information on the ISWIM Practitioners' Guides contact:

■ **Olga Selezneva** | oselezneva@ara.com

■ **Hans van Loo** | hans.vanloo.int@gmail.com



The APM Intelligent WIM system

A number of truck runs loaded with mass standards were carried out as part of the research work. The loads were each time verified by static measurements at the road inspectors' control site. Over 360 records were registered during the study. The runs were carried out to allow evaluation of the influence of traffic dynamics, meteorological conditions, pavement conditions, temperature distribution on the thickness of the mineral-asphalt package and the tyre-sensor contact point. In addition, the parameters of all vehicles involved in normal traffic were recorded in a continuous mode.



APM iWIM test site in Poland

■ [Aleksander Konior](mailto:aleksander.konior@apm.pl) | aleksander.konior@apm.pl

The carried-out calibration tests demonstrated that the average relative error of the GVW measurement did not exceed 2%. This research was part of the project titled 'Intelligent weight-in-motion system' no. RPSL.01.02.00-24-00A3/19, financed under the Regional Operational Programme for Śląskie Voivodeship for the years 2014-2020.

Minimizing Impact of WIM Sensors on Road Integrity

Developers of WIM sensors face many challenges. The sensor's design should naturally follow the primary purpose of WIM systems – road protection. As any cut in the road is a potential source of future damage, these should be minimized, both in number and in depth.

Cabling is a major source of cuts in the pavement. Traditionally, all the sensing technologies built in the road at the WIM site need a cable to connect with the cabinet. That includes weighing sensors, inductive loops, position sensors, and temperature sensors. To reduce the number of cuts, all the named parts can be

RSWIM3 Program Wednesday 6 July

1 Opening Session, Optimising Road Freight Transport using WIM data.

- **Mr. Chris Koniditsiotis (ISWIM)**

Welcome and Introduction of ISWIM

- **Mr. Nazir Alli (PIARC)**

Introduction of PIARC

- **Mr. Louw Kannemeyer (SANRAL)**

Use of WIM data in South Africa

- **Mr. Rogatus Mativila (TANROADS)**

WIM projects in Tanzania

2 Technical Session, WIM for Direct Weight Enforcement

- **Mr. Bernard Jacob (Univ. Eiffel)**

Overload detection and mitigation

- **Ms. Alta Swanepoel (AS&A)**

Legal Framework in South Africa

- **Mr. Fernando Bráulio (DNIT)**

Impl. of WIM for Direct Enf. in Brazil

- **Mr. David Bétaille (Univ. Eiffel)**

WIM for Direct Enforcement in France

3 End-User Session, Practical Applications of WIM

- **Mr. Rob Sik (MIKROS)**

- **Mr. Leonardo Guerson (INTERCOMP)**

- **Mr. Jan Fučík (CAMEA)**

4 Technical Session, Implementation of a WIM Network

- **Mr. Brendan Ezeanowi (IRD)**

Uganda Virtual WIM Project

- **Mr. Lucas Franceschi (LABTRANS)**

Selection of WIM locations in Brazil

- **Mr. Hans van Loo (CORNER STONE)**

A hybrid implementation of WIM

- **Evening, Braai**

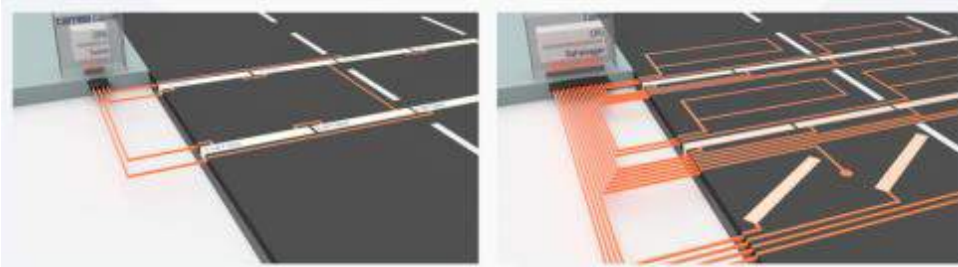
(BBQ South Africa style)

For more information on the RSWIM program please contact:

■ [Jacqui Oosthysen](mailto:Jacqui.Oosthysen@satc.conference@gmail.com) | satc.conference@gmail.com

■ [Hans van Loo](mailto:Hans.vanloo.int@gmail.com) | hans.vanloo.int@gmail.com

embedded in only one component – the weighing sensor, saving up to more than 10 cables per road lane, as well as valuable time, and significant amounts of money as a consequence of both. The cable efficiency can go even further. Commonly, each sensor is wired separately. A ring daisy-chain interconnection is a more elegant solution that results in up to 4 times less cables used.



Described solution vs common WIM installations

Furthermore, the road wear is accelerated with the depth of the installation. That is why it ideally should not reach other than the surface layer of the road. The thinner the sensor and the thicker the layer of high-quality pavement beneath it, the less vulnerable the road is to damage.

Recently, we have introduced a digital WIM sensor WIMTRONIC that was developed with respect to knowledge shortly presented above. Its low 45mm body (including a high 12mm abrasive layer) features embedded sensing technologies and digital processing of measured data, and multiple sensors can be interconnected in a ring daisy chain.

■ Prokop Kudlík | p.kudlik@camea.cz

Kistler and REVOTEC collaborate to safeguard an ageing bridge

Weigh In Motion (WIM) is now the go-to solution for bridge and road monitoring because it is the only technology that can automatically capture all four key traffic parameters: vehicle count, weight/axle load, speed, and classification. Highway authorities throughout the world are already using WIM systems such as KiTraffic Statistics from Kistler to optimize the protection, maintenance and planning of their assets.



KiTraffic Statistics near a small bridge in central Austria

RSWIM3 Program Thursday 7 July

5 Technical Session, Quality Improvement of WIM data

- Mr. Gerhard de Wet (STATIC MOTION)
Updated TT WIM Calibration Method
- Mr. Bernard Jacob (UNIV. EIFFEL)
Revision of the OIML R-134
- Mr. Gustavo Otto (LABTRANS)
Correction Model for HS-WIM Systems
- Mr. Olivier Quoy (ATLANDES)
Truck Silhouettes Analysis with WIM Data

6 Panel Discussion, WIM for Direct Weight Enforcement

- Ms. Michelle van der Walt (SANRAL)
- Mr. Mike Hellens (MIKROS)
- Mr. Gerhard de Wet (STATIC MOTION)
- Mr. Bernard Jacob (UNIV. EIFFEL)
- Ms. Carla Davis (TRACN4)
- Mr. Tom Kearney (FHWA)
- Mr. Hans van Loo (CORNER STONE)

7 End-User Session, Practical Applications of WIM

- Mr. Thomas Greene (Q-Free)
- Mr. Brendan Ezeanowi (IRD)
- Mr. Matija Mavrič (CESTEL)

8 Special Interest Session, Self Regulation in Overload Control

- Mr. Chris Koniditsiotis (ISWIM)
Intelligent Access Program in Australia
- Mr. Paul Nordengen (HVTTA)
RTMS in South Africa
- Ms. Loes Aarts (RIJKSWATERSTAAT)
Intelligent Access in Europe

9 Closing Session, Optimising Road Freight Transport using WIM data

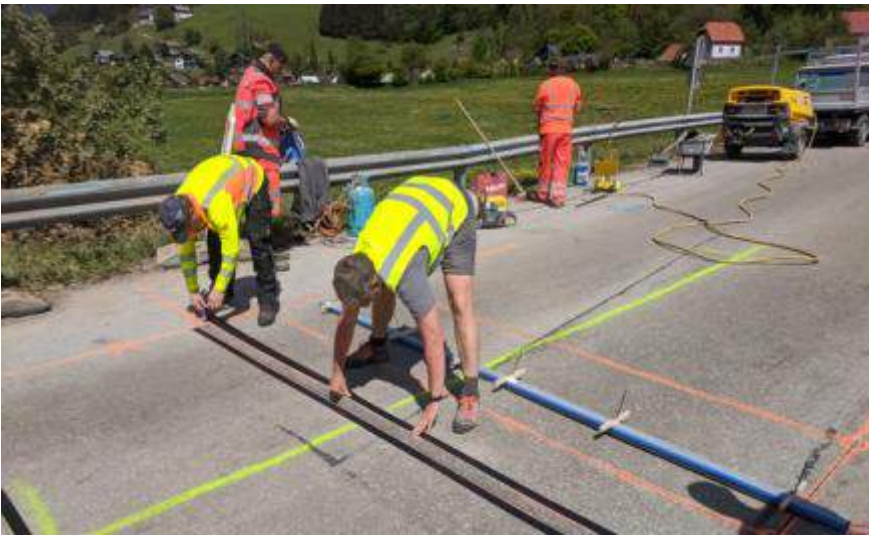
- Ms. Michelle van der Walt (SANRAL)
Future of WIM in Southern Africa
- Mr. Chris Koniditsiotis (ISWIM)
Conclusions and Closure

For more information on the RSWIM program please contact:

■ Jacqui Oosthysen | satc.conference@gmail.com

■ Hans van Loo | hans.vanloo.int@gmail.com

REVOTEC, the Vienna-based bridge monitoring specialist, was commissioned to survey and safeguard a sensitive load-bearing structure above a railway line. This small bridge provides road access to a village located in the center of Austria, because of a large sawmill nearby, the bridge is crossed every day by numbers of trucks carrying heavy loads of timber. The bridge had already sustained visible damage, making it essential to determine the real axle loads of trucks traveling over it so as to prevent further degradation – and above all, avoid the worst-case scenario of a collapse. Michael Vospernig, co-founder of REVOTEC, reports that installation of the KiTraffic Statistics solution from Kistler was completed within one day.



Installation of the Kistler Lineas WIM sensors

He adds: “The system is efficient to use – and thanks to the high quality and reliability of the data, this method can also be applied to other bridges.” With support from Kistler and REVOTEC, the local authorities successfully prevented any further overloading of the bridge. As this collaboration shows, planning and maintenance based on load data from WIM systems make it possible to improve and upgrade bridges instead of restricting access or closing them altogether. WIM from Kistler: delivering reliable data for effective planning and maintenance of traffic infrastructure.

■ [Tomas Pospisek](mailto:tomas.pospisek@kistler.com) | tomas.pospisek@kistler.com

Determining the condition of bridges with portable bridge WIM systems

Large, headline-making modern bridges, such as Duge bridge in China and the Millau viaduct in France, were designed with sophisticated structural health monitoring systems in mind, which give the owners of the bridge critical information on the behavior of the structure. But these colossal structures are exceptional in this regard, since the structural health monitoring systems are way too expensive to be used on tens of thousands of other bridges, which are used by people every day.

RSWIM3 Program Friday 8 July

10 Technical Tour, Mantsole Traffic Control Centre

- **Departure from Hotel**

- **Visit to the Mantsole Traffic Control Centre (TCC) and Mikros long term WIM sensor evaluation site.**

The Mantsole TCC is situated on the N1 (65 km north of Pretoria) on the Bakwena Concession route.

The control centre is operated by Zimele Investments, instrumented and maintained by Mikros.

- **Drive to Tshikwalo Lodge in Dinokeng Game Reserve for lunch (Braai)**

- **Return to Hotel**

Acknowledgements:

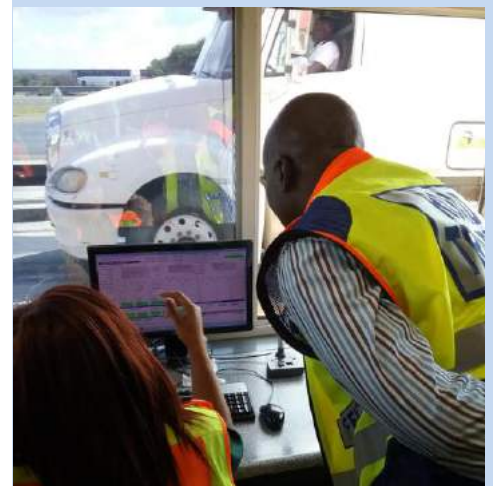
A special thank you to Mr. Andre Wepener of Bakwena and Mr. Phambili Gama of Zimele for sponsoring the lunch arrangements.

Also a word of thanks to SANRAL and the Inspectorate under Mr. William Robinson for accommodating this event.

For more information on the RSWIM program please contact:

■ [Jacqui Oosthysen](mailto:satc.conference@gmail.com) | satc.conference@gmail.com

■ [Hans van Loo](mailto:hans.vanloo.int@gmail.com) | hans.vanloo.int@gmail.com



Portable bridge weigh-in-motion (B-WIM) systems can fill in this information black hole that is currently hovering over arguably the most important part of a country's infrastructure. They give structural engineers missing information on the true behavior of a bridge under traffic loading with the help of the true influence line, real load distribution and the information on dynamic amplification factor.



The visual appearance of a bridge only tells half of the story'.

Such analyses, which can be done on the basis of short-term B-WIM measurements, have many practical applications for the owner of the structure. They can be used to either post a bridge for restrictive loads or reduce the existing posting limitations, which has enormous benefits for the population and economy in general. The data can also be used to adjust the inspection schedule of the structure and plan the future maintenance works. Real-life experience shows that most of the bridges are overdimensioned and B-WIM based bridge assessment thus often results in an increase in the lifespan of the bridge or serves as the first step in a more comprehensive monitoring of the structure.

While the infrastructure is rapidly aging, bridge owners have virtually no information on the state of bridges. Portable B-WIM technology offers a practical and economical solution to this information void and gives infrastructure owners the possibility of a methodical structural overview of bridges.

■ [Matija Mavrič](#) | matija.mavric@cestel.si

Intercomp HS-WIM in Alaska: Prime installation for extreme conditions

High WIM performance starts with a good installation. For this reason, the Best Installation Program was created by Intercomp to provide integrators and end-users with specialized support for prime installation processes. This support focuses on the longevity and consistent high accuracy of HS-WIM solutions, even under extreme environmental conditions. The program faced an interesting challenge in 2022, when the Intercomp strip sensors were installed for the weather conditions of Alaska.

Weigh-In-Motion Word Puzzle



Weigh-In-Motion Puzzle

T Y U R S S Y R E R L B U S I F M S V R
M N A G T U O U N R S O S Q P Q O Y D E
O I E A R V B L F A M N R T J Y T S A L
L P T M S W C S O B O D W T R F I T F I
S I Q N E G B N R A O S Z E N E O E L A
C G B Y C V A I C Y T F U M I O N M D R
W N H E X V A M E B H M H L O G C G O T
N O I T A T S P M S N R G R W G H V T I
I Y S E L C I H E V E L X A U W E T I H
O Y I O W L I D N L S N W I E R L J R C
H M F H C Y C Y T V S K S I L D E S U Z
N I A R T I J Z V U I D G O N Y E N T X
M E A S U R E M E N T H A G R N H G T Y
T K C U R T J T K P I D I O E A W N I D
X A U S H F T E Y N I S L G L M C I N A
R E O T Z G R K G N E E D R J I F L G O
P P H X D I O M G D P I Q O H C R L W R
Q G M X T C O N S T R U C T I O N O I A
P C O Q L H U Y W B S X H W W N V T U C
I N T E R N A T I O N A L P J D O Y V K

Try to find all words below:

- | | | |
|-------------|---------------|------------------------------|
| axle | bridge | bus |
| bus | car | construction |
| control | design | dynamic |
| enforcement | international | load meas-
urement motion |
| pavement | rail | overloading
road |
| rutting | sensor | smoothness |
| society | static | station |
| strength | system | tire |
| tolling | trailer | train |
| truck | van | vehicles |
| weighing | weight | wheel |

In case you need any assistance with this puzzle please do NOT contact:

■ [Hans van Loo](#) | hans.vanloo.int@gmail.com

The selection of strain gauge strip sensors was the first step towards measurement reliability under the harsh climates of Alaska. The best practices that were critical for the success of several HS-WIM programs over the years were planned with anticipation and applied in great level of detail for the installation in Alaska. The discussions before the installation included: lead cable protection through sleeving and appropriate routing; precise saw cuts and excavation procedures to avoid cracks in the pavement; proper mixing and pouring of epoxy-based grout materials; and strategies for positioning and grinding of the sensors.



Installation of the Intercomp strain gauge sensor in Alaska

The Best Installation Program was designed to elevate the state of practice and promote high quality WIM data for all applications. Intercomp's 40+ years' experience supplying vehicle weighing products contributed to the development of recommendations based on industrial research and customer feedback. In this program, Intercomp provides personal direct support to customers for the planning and execution of successful installations like the one in Alaska.

■ **Leonardo Guerson** | leonardog@intercompcompany.com

Bridge diagnostics and protection system using WIM

The Transport Research Centre in Brno has started a new WIM project for the Technology Agency of the Czech Republic (www.tacr.cz). The objective of the project is to prepare a methodology for long-term measuring of bridge behaviour under real vehicle load in the combination of weigh-in-motion measuring and bridge behaviour measuring. The combined system of measuring should give on-line results to the road administrator about the actual situation on the bridge construction, (warning in case of problems like overloading, bending, etc.). The project has started in April 2021 and is scheduled for 3 years.

The topology of the high-speed weighing systems installations was designed in relation to bridge structures. The location for the system installation was

Contact ISWIM

Website:

www.is-wim.net

E-mail:

info@is-wim.net

LinkedIn:

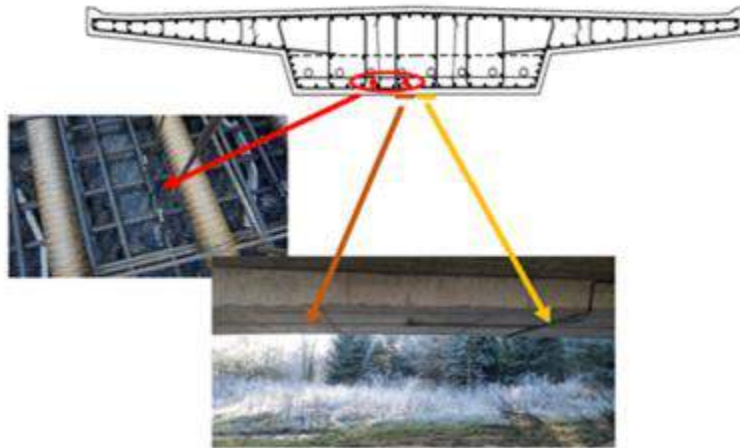
[linkedin.com/groups/13400438](https://www.linkedin.com/groups/13400438)

Newsletter:

hans.vanloo.int@gmail.com

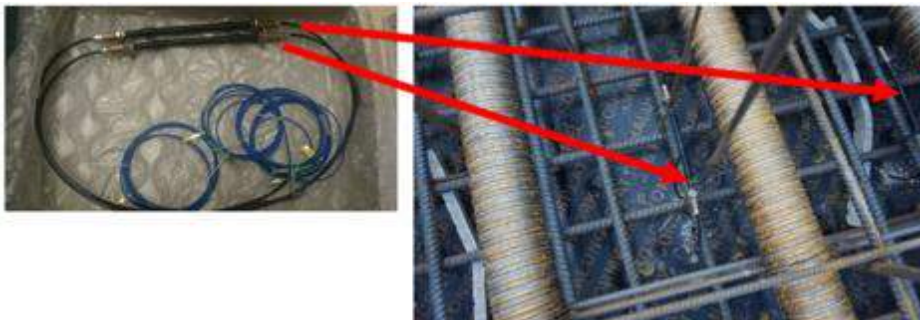


chosen on bridge on the road II/152 in the South Bohemian Region. In the first stage of the project, the installation of the WIM system and sensors that monitor the behaviour of the bridge structure under the load of moving vehicles were carried out. The accelerometer sensors (measuring the bending in mm) were installed direct on the bridge construction in the same position as the fibre optic sensors (measuring the strain in micrometre/m).



Cross section of the bridge with sensors

Red: internal FBG sensors, Ohre+Yellow: external GFRP sensors



Optical fibre sensors attached to embedded reinforcement anchor.

The measurement results are currently analysed and compared with the static calculations of the bridge. Following values has been evaluated; bending [mm] and strain [$\mu\text{m}/\text{m}$, frequency [Hz]. This article was produced with the financial support of the Ministry of Transport within the programme of long-term conceptual development of research institutions. „This article was produced with the financial support of the Ministry of Transport within the programme of long-term conceptual development of research institutions.“

■ Emil Doupal | doupal@hispeed.ch

