Session 3A – 3rd Regional Seminar on Weigh-In-Motion

Session 3A-1 Optimizing Road Freight Transport using WIM Data.

The session was chaired by Mr. Hans van Loo, ISWIM & Corner Stone Int., Switzerland.

- Mr. Chris Koniditsiotis, the president of the International Society for Weigh-In-Motion (ISWIM) welcomed all delegates to the 3rd Regional Seminar on Weigh-In-Motion (RSWIM3). He gave a short introduction of ISWIM, its objective, activities and membership base. He explained the objective of the RSWIM3 is to bring together end users, researchers and manufacturers of WIM systems and data to exchange experiences, ideas, latest developments and needs for the future for the use of WIM in Southern Africa.

- Mr. Nazir Alli, the founding CEO of South African National Roads Agency Limited (SANRAL) and current president of the World Road Association (PIARC) gave an introduction of the PIARC organization, its history, members and activities. He stressed the importance of the cooperation and exchange of experiences between road authorities, technical experts and systems providers in all topics relevant to the usage, operation and maintenance of the road infrastructure including Weigh-In-Motion.

- Mr. Louw Kannemeyer, the Engineering Services Executive of the South African National Roads Agency (SANRAL) presented an overview of the current implementation of WIM systems and use of WIM data in South Africa. He explained SANRAL's plans for the future use of WIM for direct weight enforcement in South Africa.

- Mr. Hans van Loo, coordinator of promotional activities of ISWIM and international expert on WIM from Corner Stone Int. provided an overview of the recent global developments in WIM. This included; the improved accuracy and reliability of WIM systems and new sensors capable of detecting tire pressure that may be used for traffic safety applications. Next he showed the implementation of WIM for direct weight enforcement in several countries around the world and the need for a practical international standard for this. Finally the combination of different technologies was described, e.g. Road- & Bridge-WIM, In-Road & On-Board WIM.

Session 3A-2 Overload Detection and Mitigation in the World.

The session was chaired by Mr. Hans van Loo, ISWIM & Corner Stone Int., Switzerland.

- Mr. Bernard Jacob from the University Gustave Eiffel in France presented an overview of the current practices in overload detection, direct enforcement and mitigation around the world. He presented the different applications of WIM systems that are currently for weight enforcement and their main (dis-)advantages. Finally he explained the challenges, pre-conditions and requirements for the use of WIM for direct enforcement and examples of implementations in a number of European countries.

- Mrs. Alta Swanepoel, the owner of Alta Swanepoel and Associates CC (ASA) in South Africa. Her presentation addressed the current legal position on the requirements for mass measuring. She assessed the scope and requirements of the relevant legislation, the Trade Metrology Act, 77 of 1973, the Legal Metrology Act, 9 of 2014 and National Road Traffic Act, 93 of 1996 for the controlling overloading of vehicles. She concluded with the challenges to use weigh in motion measurements to prosecute operators and drivers criminally or administratively.

- Mr. Gustavo Otto from Labtrans/UFSC presented on behalf of Mr. Fernando Bráulio from the National Department for Transport Infrastructure (DNIT) in Brazil. Gustavo presented an overview of the current implementation of WIM systems as pre-selection tool for remote operated weigh stations in Brazil and DNIT's plans for the implementation of WIM for direct enforcement in Brazil in the coming years.

- Mr. David Bétaille from the University Gustave Eiffel showed the approval method for direct enforcement of overloading in France. He started with an overview of the more than 60 years of history of the use of WIM systems in France. In 2013, the General Directorate for Infrastructure, Transport and the Sea (DGITM) of the French Ministry of Transport launched a new WIM project, led by IFSTTAR and involving Cerema, to investigate the feasibility of using HS-WIM systems for direct enforcement in a legal metrology frame. Finally he described the working method used in order to approve High Speed WIM systems for direct enforcement purposes.

Session 3A-3 Practical Applications of WIM.

The session was chaired by Mr. Andy Lees, ISWIM & Q-free, UK.

- Mr. Rob Sik from MIKROS in South Africa gave an overview of the role of Mikros Systems in the more than 40 years of history of the implementation of WIM systems in South Africa. He explained the Technical Methods for Highways (TMH) that ensure uniform methods for highway engineering in South Africa in general and specifically the TMH3 that covers WIM monitoring services.

- Mr. Leonardo Guerson from INTERCOMP in the USA presented the experience of Intercomp and Fiscal Tech in Brazil on three different strategies of WIM for direct enforcement. He explained the main differences and advantages of the 3 modes of WIM for weight enforcement currently used in Brazil: automated fixed weigh stations, mobile weigh stations and High-Speed WIM for direct enforcement.

- Mr. Jan Fučík from CAMEA in the Czech Republic shared Camea's long term experience to develop a novel weighing digital sensor for further evolution of WIM technology. The new sensor is capable of measuring the tire position, single or double tire configuration and the tire footprints. This can be used to detect over- or underinflated tires and missing tires, this information can be used to improve traffic safety.

Session 3A-4 Implementation of a WIM network.

The session was chaired by Mr. Paul Nordengen, Heavy Vehicle Transport Technology Africa (Pty) Ltd, South Africa.

- Mr. Brendan Ezeanowi from International Road Dynamics (IRD) in Canada presented a recent WIM installation as part of the 'Source of the Nile' Bridge (New Jinja Bridge) Project in Uganda. WIM systems were installed at both approaches to the bridge in order to have a more efficient weight enforcement, to reduce overloading and to achieve the expected lifespan of 120 years. The Virtual Weigh Station (VWS) consisted of three rows of piezo quartz sensors capable of achieving ASTM Type III / COST 323 A[5] accuracy classes.

- Mr. Lucas Franceschi from Labtrans/UFSC in Brazil answered the question: Where to place WIM stations? Using the Brazilian approach including a novel data-driven spatial decision support system selection of WIM locations. It includes a multi-criteria method developed to facilitate decision-making in this process by summarizing a set of important information. The method is currently being used by the Brazilian National Land Infrastructure Department (DNIT)

- Mr. Hans van Loo from Corner Stone Int. in Switzerland presented a new hybrid method for the implementation of a WIM network using a combination of different WIM technologies. Short term Bridge-WIM measurements will be used to identify actual overloading hot-spots on the road network prior to investing in the installation of more costly, permanent In-Road WIM systems. This hybrid approach is especially suited for countries where no reliable information is available on the actual distribution of traffic overloading and has been used in the Serbia and Georgia in Europe.

Session 4A-1 Quality improvement of WIM data.

The session was chaired by Mrs. Michelle van der Walt, SANRAL, South Africa.

- Mr. Gerhard de Wet from Static Motion in South Africa talked from the Kruger park about requirements for updating the Truck Tractor (TT) WIM calibration method. He explained the history of the TT Method, how it Works and what accuracy can be achieved. He concluded with areas of improvement using variable target, accuracy markers accounting for vehicle composition updated TT Method.

- Mr. Bernard Jacob, University G. Eiffel, France, presented the status of the ongoing revision of the OIML R134 standard on WIM systems. He started with an explanation of the COST-323 recommendations. He gave an overview of the history of the OIML R134 and the main topics discussed during the current revision: new accuracy classes, use for high speed condition, the use of axle loads as references and acceptance for overload enforcement only.

- Mr. Gustavo Otto, from Labtrans/UFSC in Brazil showed a new correction model for HS-WIM systems based on pavement temperature and vehicle speed. The method was tested at the Labtrans WIM test site near Ararangua using three reference vehicles with known axle loads. The results show that the method reduces the spread of the errors, as observed by the standard deviation before and after the correction.

- Mr. Olivier Quoy, from Atlandes in France spoke about truck silhouettes analysis with WIM data from the two WIM systems on the A63 between Castets and Lesperon. The study focused on the detection of vehicles with one or more lifted axle(s) in order to improve the accuracy of the vehicle classification using a non-hierarchical classification method for mobile centers (k-means).

Session 4A-2 Discussion: WIM for direct weight enforcement.

The session was chaired by Hans van Loo (Corner Stone Int., Switzerland).
- Panelists were: Michelle van der Walt (SANRAL, South Africa), Mike Hellens (MIKROS Traffic Monitoring Ltd., South Africa), Gerhard de Wet (Static Motion Ltd., South Africa), Bernard Jacob (University G. Eiffel, France), Carla Davis (Trans African Concessions, (TRAC), South Africa) and Tom Kearney (Federal Highway Administration, USA).

During the 2 hour panel discussion several aspects of the use of High Speed (HS) WIM for direct weight enforcement were discussed. This included topics / questions like: What are the main advantages of the use of HS- WIM for direct weight enforcement? What are the crucial steps/elements and challenges in the implementation? What is the status quo with the implementation around the world, what are the experiences and which recommendations could be given for other (potential) future end-user of High Speed WIM for direct weight enforcement?

Session 4A-3 Practical Applications of WIM.

The session was chaired by Mr. Andrew Houliston, Mikros/Syntell, South Africa.

- Mr. Thomas Greene from Q-FREE in the UK showed their showcase project on targeted enforcement using Weigh in Motion for the Driver & Vehicle Safety Agency (DVSA) in the UK. DVSA use ANPR and the high-speed WIM for pre-selection of probably overloaded vehicles for road side controls. The quality of the WIM measurements is constantly being monitored by weekly analysis of the average front axle weight. This will be used to identify any potential issues with the data.

- Mr. Brendan Ezeanowi from IRD in Canada showed the results of using continuous calibration to improve WIM accuracy in commercial vehicle operations. The CCWIM automatic calibration algorithm minimizes the GVW error by considering multiple factors. It maintains WIM accuracy without any manual calibration over a long period of time (several years). He showed that it can be used to

improve data collection accuracy for: traffic research, roadway design, maintenance planning and to improve confidence for mobile enforcement and direct enforcement.

- Mr. Matjaž Sokol from CESTEL in Slovenia presented their portable SIWIM Bridge-WIM system where the sensors are installed under a bridge and measure the bending of the bridge when trucks are passing over. He explained the working principle of the system and the main applications and advantages. He also showed a current installation near Dar es Salaam in Tanzania.

Session 4A-4 Self-Regulation in overload control.

The session was chaired by Mr. Hans van Loo, ISWIM & Corner Stone Int., Switzerland.

- Mr. Chris Koniditsiotis, president of ISWIM and former Chief Executive Officer of Transport Certification Australia (TCA), Australia presented the Intelligent Access Program (IAP) that is being used in Australia. He explained how a combination of on-board WIM and vehicle location systems is used to optimize road usage without investing in the road infrastructure. High performance freight vehicles using these on-board systems are allowed to carry more load and/or allowed access to additional parts of the road network because their mass and position are exactly known. Finally he explained how the IAP is organized and what are the roles of the different partners.

- Mr. Paul Nordengen, director of his own consulting firm, Heavy Vehicle Transport Technology Africa, chairman of the South African national Smart Truck (PBS) committee for heavy vehicles in South Africa and Chairman of the RTMS national steering committee in South Africa. He presented the experiences with the Road Transport Management System (RTMS), a self-regulation accreditation scheme for heavy vehicles used in South Africa. The RTMS is a system that voluntarily regulates the heavy vehicle industry and has achieved significant results including a reduction in: overloading, speeding, number of breakdowns and accidents.

- Mrs. Loes Aarts, senior policy advisor at Rijkswaterstaat in the Netherlands, presented an overview of the current initiatives on Intelligent Access programs in four European countries, Italy, Estonia, Sweden and The Netherlands. She showed the similarities and differences between these initiatives and the River Information Services used on transport ships. She shared her views on the current and future role of WIM systems and data in IAP in the Netherlands.

Session 4A-5 Overview and Closure.

The session was chaired by Mr. Hans van Loo, ISWIM & Corner Stone Int., Switzerland.

- Mrs. Michelle van der Walt / Layton Leseane, SANRAL, South Africa, presented the future of WIM in South Africa. Operations at Traffic Control Centers (TCCs) in South Africa are not optimal. Issues are experienced with geometric design (queuing times and space in particular), effectiveness and accuracy of Weigh-in-Motion (WIM) screening equipment, availability and cooperation from traffic police, slow weighing procedures, errors caused by the human element, potential for bribery and corruption, ageing technology and lack of integration of interrelated processes and systems. Time wastage of law-abiding, compliant freight companies due to congestion at weighbridges, inaccurate WIM screening, repeated weighing at several weighbridges on the same route during a single journey etc. are detrimental to freight logistics, the economy at large and create negative sentiment within the freight industry.
  It is evident that the current overload control methods in South Africa need to be scientifically assessed to determine how they can be optimized and better integrated and to quantify what improvements could be realistically achieved. Furthermore, the use of technology has lagged behind over the years and innovative ways need to be explored using the latest technology and automation to not only improve weighbridge operations but also cover a much wider area of the road network and find alternative and more efficient and effective approaches to law enforcement.

- Mr. Hans van Loo, ISWIM and international expert on WIM from Corner Stone Int. provided a summary of the seminar. This included; the current implementations and future plans for use of WIM data in South Africa. And the developments from around the world: new sensors measuring tire pressure allowing for new safety applications, the improved performance of WIM systems by integrated quality checks and the combination of different WIM technologies e.g. Road & Bridge-WIM and In-Road & On-Board WIM. ISWIM providers (Camera, Cestel, Intercomp, IRD, Mikros and Q-Free) showed examples of practical applications of WIM from around the world.
  The use of WIM for direct weight enforcement is implemented in a couple of countries and preparations are ongoing in many more (incl. South Africa). For this application the quality of WIM data is crucial, which can be guaranteed through a combination of quality checks in the WIM system and post calibration in the data base. Both end users and manufacturers expressed an urgent need for a practical international standard for High Speed WIM systems for direct enforcement! Special attention was given to the self-regulation in overload control with practical examples from Australia, Europe, South Africa.
  After thanking the supporters, our sponsors and the members of the organizing committee the seminar were closed with an invitation to join ISWIM again at the 9th International Conference on WIM from 6-10 November next year in Brisbane Australia.