

ISWIM
International Society for Weigh in Motion



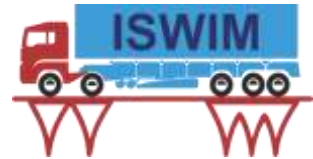
International Standardization of WIM

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Corner Stone International SAGL
International Society for Weigh-In-Motion

ANTT-Labtrans-ISWIM Webinar





Content

1. Implementation of WIM for Direct Enforcement
2. International Standards for Weigh-In-Motion

Weigh-In-Motion



Not Weigh-In-Motion



Introduction

1993 – 1997	National Police Agency (NL)	WIM + Video
1997 – 1999	National Railways (NL)	Video Inspection
1999 – 2006	Ministry of Transport (NL)	WIM for Direct Enforcement
2006 – 2013	Kalibra (NL / CH)	WIM Calibration Vehicle
2013 – 2024	Corner Stone Int. (CH)	Independent WIM Consultant
2007 – 2024	Int. Society for WIM	Promotions Officer





Applications of WIM for Weight Enforcement

- Statistics & Planning
- Pre-Selection
- Company Profiling
- **Direct Weight Enforcement**
 - Fine directly based on WIM measurement
 - High Accuracy and Reliability
 - High Efficiency, 24/7 Operation

Measurement
by WIM



Fine for
Overloading



<p style="text-align: center;">Direct Enforcement / Tolling by Weight</p>	<p style="text-align: center;">Other Applications</p>
<ul style="list-style-type: none"> ● Quality of each <u>individual</u> measurement <ul style="list-style-type: none"> - Max. permissible error (MPE) - 100% of measurements (used) 	<ul style="list-style-type: none"> ● Quality of <u>average</u> measurement <ul style="list-style-type: none"> - Mean error - Standard deviation
<ul style="list-style-type: none"> ● <u>Evidence</u> of vehicle/driver behavior 	<ul style="list-style-type: none"> ● <u>Indication</u> of vehicle/driver behavior
<ul style="list-style-type: none"> ● Performance certified by a notified body <ul style="list-style-type: none"> - Type approval + Initial verification 	<ul style="list-style-type: none"> ● Performance agreed between vendor & buyer <ul style="list-style-type: none"> - Acceptance test



Implementation of WIM in General

3 Elements for implementation:

- Selection of a proper location
 - Pavement conditions
 - Traffic conditions
- Proper Installation
 - Depending on technology
 - Use experienced installation crews
- Proper maintenance
 - Depending on technology
 - **Performance will deteriorate over time!**

1st Law of WIM:

A WIM system installed on a good road may give good results; a WIM installed on a poor road will always give poor results.

ISWIM Guide for Users of Weigh-In-Motion

www.is-wim.net

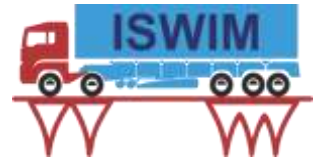
Implementation of WIM for Direct Weight Enforcement



3 Elements for implementation:

- System Approval
 - By Legal Metrology Institutes
 - Based on (inter-)national Standard
- Legal Acceptance
 - Legal framework with Criteria, Conditions and Procedures for Operation.
- Data Quality Management
 - Guarantee of Quality of all Measurements!





Content

1. Implementation of WIM for Direct Enforcement
2. International Standards for Weigh-In-Motion



International Standards

Standards:

- COST-323
- ASTM E1318
- OIML R134
- NMi-WIM



International Standards

COST-323

- EU Specifications
- Intended for HS- and LS-WIM systems
- Research manual (μ , σ)
- + Useful Information
- + Practical Classification A(5)
- Mix of Requirements and Recommendations
- No standard test procedure
- Questionable statistical basis

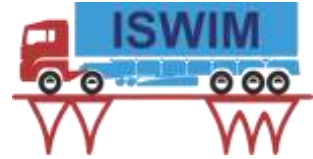


Not suited for Legal Metrology

International Standards

ASTM E1318

- US American Standard
- Intended for LS- and HS-WIM systems
- Procurement of WIM systems (μ , σ)
- + Practical Information
- + Use of common Statistics
- Mix of Requirements and Recommendations
- Fixed relation with Applications
- Only Weighing specifications



Not suited for Legal Metrology



International Standards

OIML R134 (2003, 2009*)

- International Standard
- Used for LS and HS-WIM systems
- + Accepted in Legal Metrology
- + Accepted worldwide
- + Performance requirements in MPE
- + Standard Test Procedure and Report
- Based on Static Weighing
- Not intended for HS-WIM*

* Under revision since 2019



Is suited for Legal Metrology



International Standards

NMi WIM-Standard (2016)

- International Standard
- Intended for LS and HS WIM systems
- Technology independent
- + Developed by experts in WIM and Metrology
- + Accepted for Legal Metrology
- + Performance requirements in MPE
- + Standard and practical test procedures
- Not (yet) widely accepted worldwide



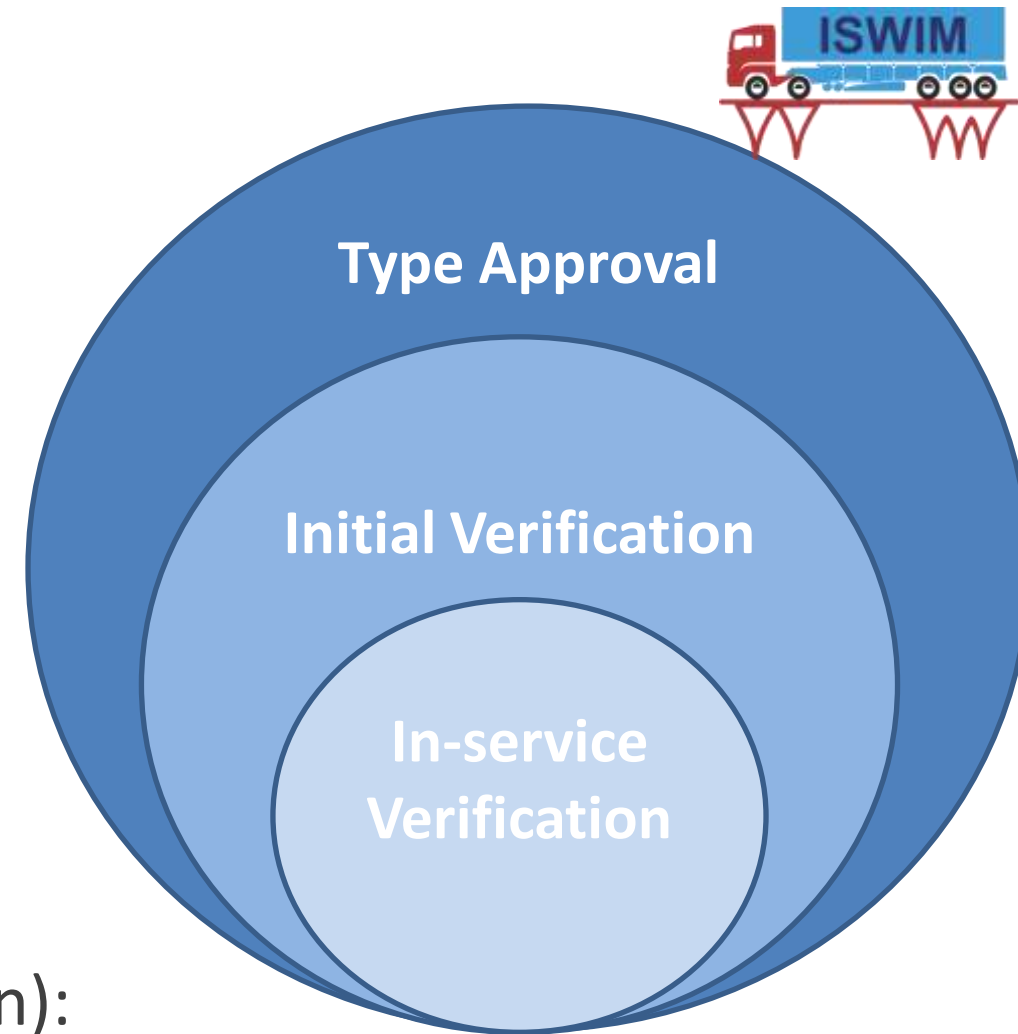
Is suited for Legal Metrology



International Standards

3 Levels of Testing (OIML & NMI):

- Type Approval:
 - Laboratory Tests + Large Field Test (90 runs)
- Initial Verification (System Approval):
 - Medium Field Test (60 runs)
- In-service Verification (Periodic Calibration):
 - Small Field Test (30 runs)





International Standards

OIML – Certification System

- Member States (63) + Corresponding Members (64)
- Issuing Authorities (13)
 - Approved Certification Body
 - Issue OIML Certificates
- Utilizers
 - Accept Type Approval Certificates
 - Implement in National Regulations
 - **Not all Members are Utilizers**
 - **Additions are allowed**



www.oiml.org/en/oiml-cs/oiml-cs-homepage





International Standards

National Standards

- Czech Republic (CMI)
- Hungary (MKEH)
- Poland (GUM)
- Brazil (INMETRO)
- USA (NIST Handbook 44)
- Russia, China, ...



In preparation:

- France, Germany, Italy, Austria, Estonia, South Africa, Argentina, ...



International Standards

National Standards:

- Dedicated to specific conditions
- Include additional specifications
- May include specific test requirements
- Require additional tests

Consequences:

- Additional costs for vendor
- **Limited competition in tenders = Additional cost for end user!**





International Standards

Brazilian Standard:

- INMETRO
- Accuracy Classes
- Reliability (MPE)
- Specific Brazilian requirements

Type Approvals (Class A1):

- Ecorodovias (Kistler)
- Consilux (Intercomp)

GVW	Type Appr.	In Service
1	2.5%	5.0%
2	3.5%	7.0%
3	5.0%	10.0%

Axles	Type Appr.	In Service
A	4.0%	8.0%
B	6.0%	12.0%
C	8.0%	16.0%



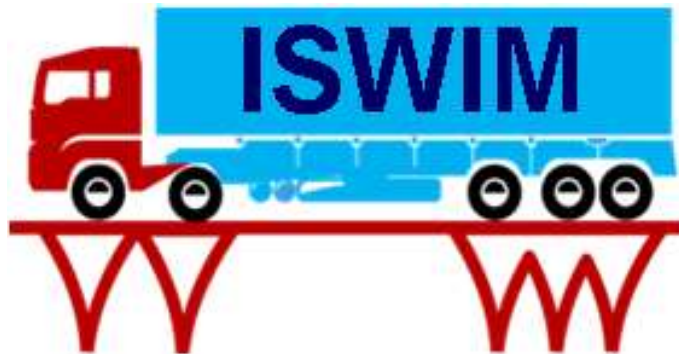
International Standards

Conclusions & Recommendations:

- ASTM E1318 & COST-323: *Both Not Suited for legal metrology*
- OIML R134 & NMi-WIM: *Both Suited, very similar, just pick one!*
 - Accept International **Type** Approval
 - Adapt Initial and In-Service Verification to local conditions
 - Weighing, Speed & Temperature ranges
 - Types and Loading of vehicles
- National Type Approval Standards: *Tempting, but be careful*
- Accept International Type Approval but ... : *Be careful*



Questions?



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