

WIM-23.1

Section 2.26 Weigh-In-Motion Used for Vehicle Enforcement – Proposal to Amend –

2024 NCWM Interim Meeting, Jan 7-10, New Orleans, LA



Team

NEW YORK CITY



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measure. analyze. innovate.

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Agenda

- 1. Efforts since Interim 2023
- 2. Demonstration at Madison SWEF
- 3. Update to Proposal since 2023 Interim Meeting
- 4. Implementation at BQE Site
- 5. Conclusions



Efforts since Interim 2023

Proposal Status – 2023 Efforts

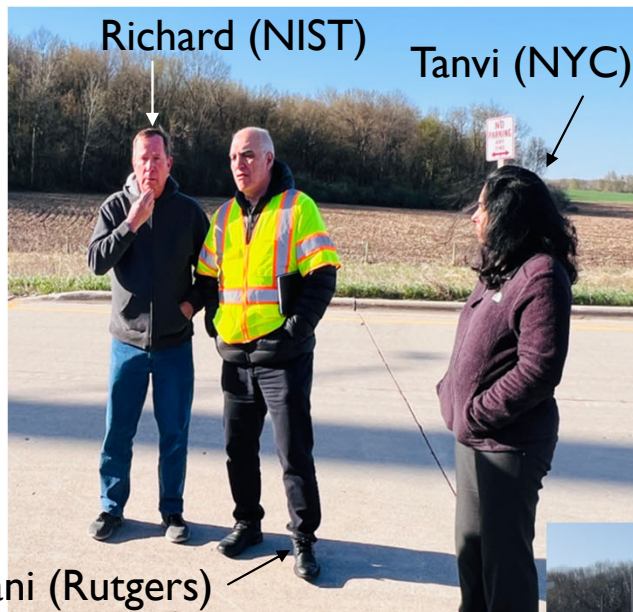
- **Based on efforts of 2022, Proposal received **Informational Status** at the 2023 Interim Meeting**
 - Presentation at **CVSA (Commercial Vehicle Safety Alliance) Size and Weight Committee** (8/30/21, 9/20/22)
 - WIM providers attendance: Intelligent Imaging Systems (IIS), Intercomp Company, International Road Dynamics (IRD), Kapsch TrafficCom, Kistler, Instrument Corp., Loadometer Corp., PrePass, Mettler Toledo.
 - **Task Force Meeting** with states' enforcement, agriculture dept., academia, WIM providers, and experts (7/25/22, 9/14/22)
 - States Representatives: MD, MT, FL, CA, AK, IL, ME, AR, NC, MI, NY, NH with FHWA and NIST
 - WIM Manufacturers/Providers: Mettler Toledo, Kapsch, IRD, IIS
- **Efforts in 2023 based on comments received**
 - **Coordination with NIST** to improve proposal to meet their needs (final meeting 10/23/23)
 - Recommended to prepare a new Section 2.26.
 - **Demonstration** of feasibility of the procedure (4/18/23 ~ 4/19/23)
 - NIST and States Agriculture Unit participated in and provided comments.
 - Attended and presented **ALL national and regional W&M meetings** in 2022 and 2023.
 - **Voting** Status @ NEWMA and CWMA & Informational Status @ WWMA and SWMA
- **Implementation of proposal at BQE (10/27/23 ~ 10/29/23)**
 - Site tested per the requirements and NYS Dept Agriculture **certified** the BQE site, direct enforcement started.

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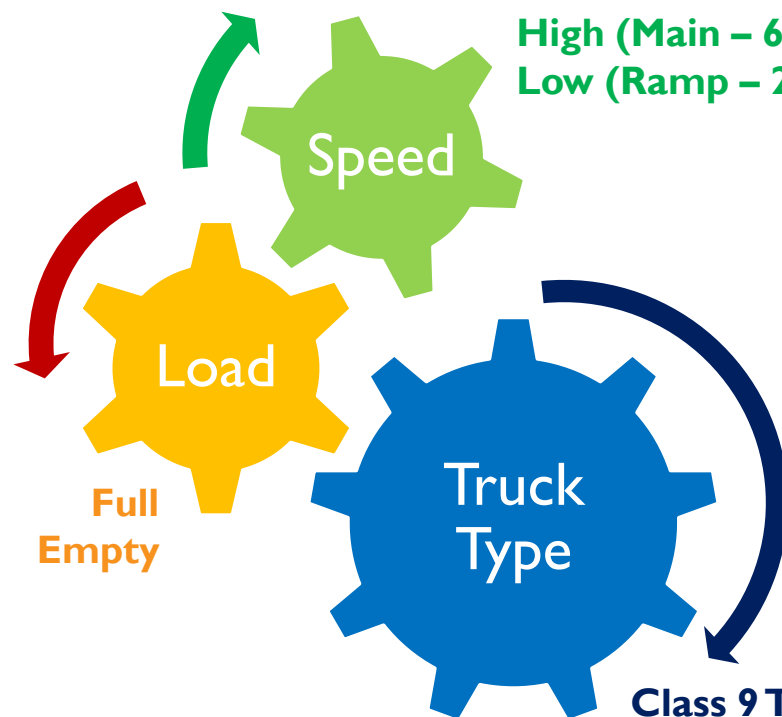
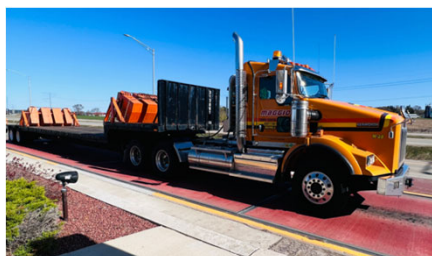
Demonstration of Technology and Proposal to NIST Handbook 44

Madison SWEF Demo Work

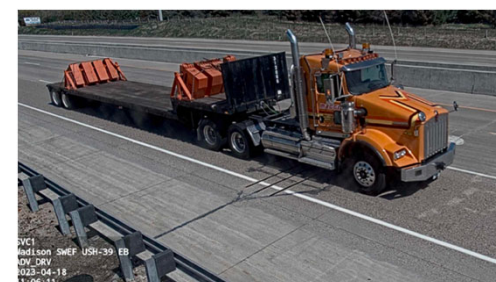


NIST and Dept of Ag
(NYS, MN, WI) representative
attended demo.

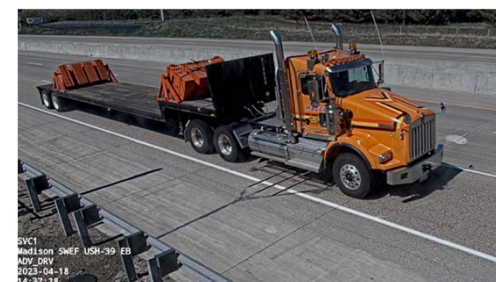
Calibration Procedure



High (Main – 65 mph)
Low (Ramp – 25/35 mph)



Off Scale



On Scale

- Procedure updated with input from NIST and Dept. of Ag. members

Demo Results Discussion

| Full Load | Valid | Pass | Ratio |
|--------------|------------|------------|-------------|
| Single (20%) | 131 | 131 | 100% |
| Tandem (15%) | 102 | 102 | 100% |
| GVW (10%) | 99 | 99 | 100% |
| | 332 | 332 | 100% |

| Empty Load | Valid | Pass | Ratio |
|--------------|------------|------------|------------|
| Single (20%) | 74 | 74 | 100% |
| Tandem (15%) | 54 | 50 | 93% |
| GVW (10%) | 55 | 54 | 98% |
| | 183 | 178 | 97% |

- **100% compliance** for single, tandem and gross vehicle weight for the **fully** loaded case.

- **Full load** case achieved target accuracy at **100% compliance**. All OW trucks will be at or above full load case.
- **Empty load** cases resulted in under weighment beyond accuracy requirement for tandem and GVW because of the **high vehicle dynamic** when the vehicle was not loaded.
 - It was advised to remove the empty load case and add the half load case because enforcement is for the loaded trucks.
- **Position test (left and right) was very subjective** and dependent on the truck driver behavior.
 - It was advised to remove the position test as system is required to identify Off-scale records (when the vehicle was not on the load receiving element of the sensor). Any weighment with a position warning could be identified excluded from enforcement.

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Amendments to Proposal since 2023 Interim Meeting based on NIST and S&T Committee Comments

NIST HB44 Section 2.26 Key Elements

Key Elements

- Edits based on findings from the demonstration (WI) and implementation (BQE, NYC) were incorporated into proposal
- Identified that removing the word “tentative” from Section 2.25 WIM screening code would have inadvertent repercussions for states that currently use Section 2.25 for screening and have their own procedures for calibration. Therefore, our proposal has been modified to make it a stand-alone Section 2.26 with input from S&T committee and NIST.
- Updates were made based on **feedback from the NIST:**
 - Update major parts of “S. Specification” and “T. Tolerance” mainly for Class E to **meet the requirement of OIML R134-I** and to prepare for NTEP certification (Temperature, Power Supply, Zero-Balance, Accident breakdown, etc.)
 - Add “**UR4. Enforcement Guidance**” to allow individual jurisdictions to consider their constraints for their best practice

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NIST HB44 Section 2.26 Updates

■ Alignment with OIML and Section 2.20 Scale Code

| Aspect | Section 2.26 | OIML R134-1 | Scale Code (Section 2.20) |
|-----------------------|---|--|--|
| Accuracy | Class E (Similar to OIML F10) 10% GVW, 20% Single, 15% Group | F10 10% GVW, 16% Single; 8% Group | N/A |
| Tolerance | Aligned with OIML | Interval 50-1000d @ d=200kg; min 50d | N/A |
| Influence Factor | Aligned with OIML | Temp range; voltage variation | Temp range; voltage variation |
| Technical Requirement | Covering all aspects in Scale Code + Equivalent to OIML | Zero-setting, zero-tracking, operating speed, marking, vehicle recognition, etc. | Less details than OIML. |
| Test Vehicle | 3 vehicles Class 8-9/Class 6-7/Class 5 with full/partially full load per decision from Demo | 3 vehicles Class 8-9/Class 6-7/Class 5 with full/empty load | 3 vehicles = Class 9/6/5 with full/half/empty load |
| Add'l vehicle | Aligned with OIML | If system is expected to weigh vehicle w/shifting weights, must include in tests | N/A |
| Speed Meas. | Aligned with OIML/Scale Code | Addressed | Addressed |
| Position Test | Excluded per decision at Demo | Addressed | Addressed |



Implementation of Technology and Proposal to NIST Handbook 44

BQE Direct Enforcement Current Status

- WIM System **Installation**: November 2022
- **Installation Calibration**: December 2022
- System **Validation**: January ~ July 2022
- Violation **Warning**: started on 8/10/23 for 90 days
- **Certification by NYS Ag.**: October 2022
- **Notice of Liability (NOL)**: Started on 11/13/2023



Class 9



Class 6



Class 5

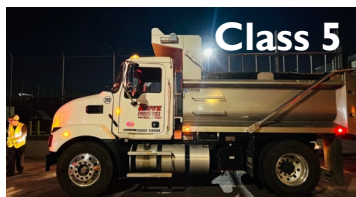


Table N.1.6: Minimum Number of Test Runs per Test Vehicle

| Load Condition | Speed |
|---------------------------------------|---------------------------|
| Half Load (10 runs) | High Speed Vmax (5 runs) |
| | Low Speed Vmin (5 runs) |
| Full Load (20 runs) | High Speed Vmax (10 runs) |
| | Low Speed Vmin (10 runs) |
| Total 30 runs per Test Vehicle | |

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System Certification

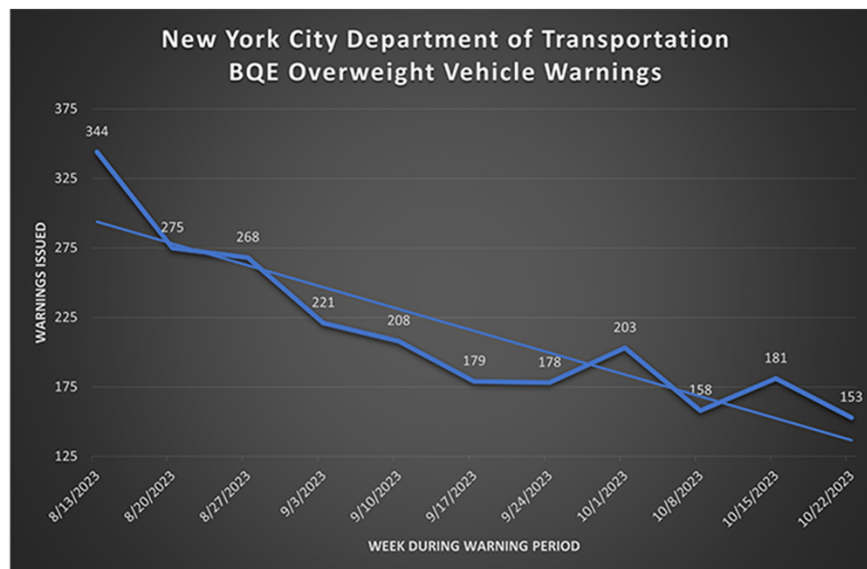
- Testing consisted of field visit, witnessing of reference scale weighment, measurement of axle spacing of each truck
- Test runs were viewed from multiple cameras along with direct feed from the data logger
- Test completed over 2 nights with assistance from NYCDOT attenuator truck for traffic management
- Concurrent logging of data by inspectors into their verification tabulation



| Table T.2.3: Maintenance Tolerances for Accuracy | | Test Result |
|--|-------------|-------------|
| Load Identification at 100% Compliance | Tolerance | |
| Axle Load | $\pm 20 \%$ | ✓ |
| Axle Group Load (including bridge formula) | $\pm 15 \%$ | ✓ |
| Gross Vehicle Weight | $\pm 10 \%$ | ✓ |

Warning Period

- 90-day warning period began on August 10, 2023 ended on November 8 2023.
- Warning notices will not carry a fine nor accrue points or any other liability on vehicle registration.



NEW YORK CITY New York City Department of Finance
Weigh-In-Motion Enforcement Program
PO Box 3641 Church Street Station New York,
NY 10008-3674

W
I
M

WARNING NOTICE

Owner's Name
Owner's Address
City, State, Zip

PLEASE TAKE NOTE: In accordance with New York State Vehicle and Traffic Law section 385-a, the photographed vehicle has been detected by the NYCDOT Weigh-in-Motion violation monitoring system located on that portion of Interstate Route 278 (also known as the Brooklyn-Queens Expressway) specifically from the vicinity of Atlantic Avenue to the vicinity of Sands Street in Kings County (Brooklyn), NY traveling:

- at least 10% above the gross vehicle weight limit (80,000 lbs.) at the above stated date and time.

| Gross Vehicle Weight Measured | |
|-------------------------------|--|
| Sensor Set 1 | |
| Sensor Set 2 | |

This is a Warning Notice.

There are no penalties associated with this Notice.

There are no points associated with this Notice.

No response or action is necessary.

Please be advised that Weigh-in-Motion violations may subject you to a fine.



C2SMARTER
CONNECTED COMMUNITIES WITH SMART
MOBILITY TO EQUITABLY REDUCE CONGESTION



RUTGERS
Infrastructure Monitoring
and Evaluation (RIME) Group

KISTLER
measure. analyze. innovate.

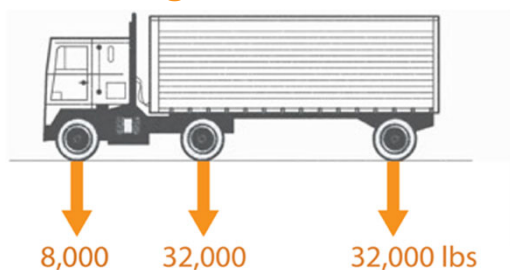


Conclusions

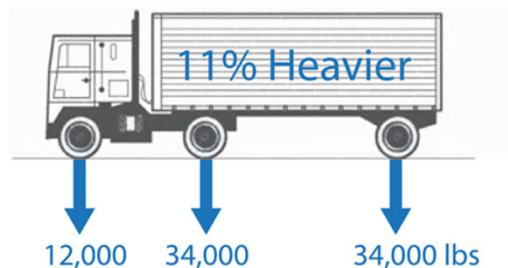
The Truth about Truck Loads and Enforcement

- Legal load has been increased significantly, and the actual load is higher than structure's designed load.

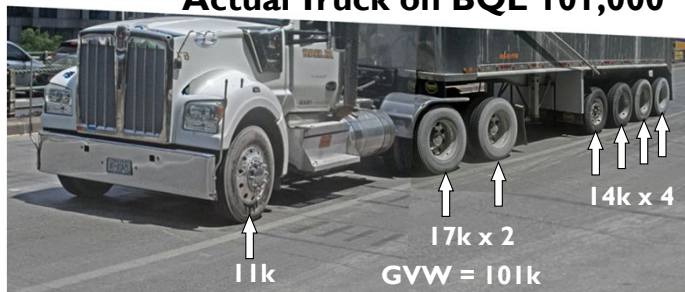
Standard HL-93 AASHTO Design Truck Load



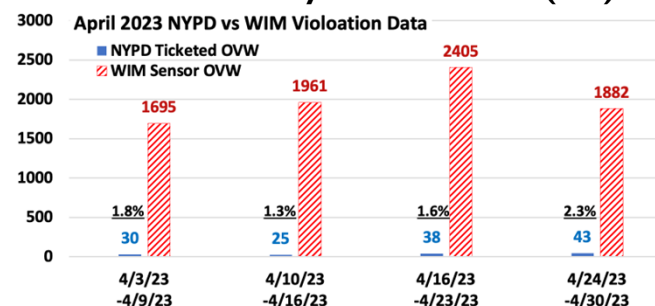
NYS Legal Load



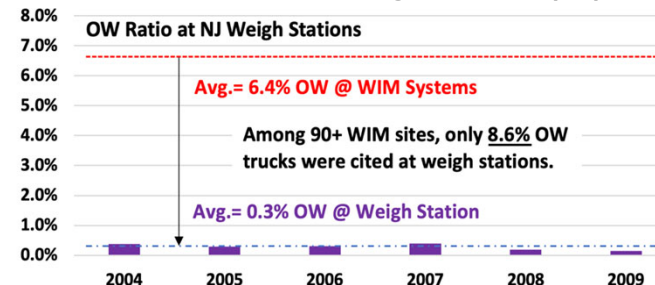
Actual Truck on BQE 101,000



Enforcement by Portable Scale (NY)



Enforcement at Weigh Station (NJ)



- the number of violations issued compared to the actual volume of overweight vehicles on the road does not drive a culture of compliance and creates an uneven playing field

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Weigh-In-Motion Used for OW Enforcement

- While different ways of enforcing truck weight limits exist, the high degree of inherent inefficiency e.g. lack of space for static scales, personnel limitations, or the speed with which a screening site operates severely limits enforcement of weight limits. The **demonstrated accuracy of WIM system** is in keeping with the need to address this urgent safety issue.
- The inclusion of this proposal in the code provides clear guidance for those jurisdictions who want to use WIM for enforcement and rely on the handbook for enforcement related efforts.
- WIM Systems are inherently different from scales and must be evaluated accordingly
- The proposal aims to develop a standardized procedure to **certify the WIM system for legal purposes** without compromising the commercial scale market.
- Handbook update **will not require** jurisdictions to change their enforcement practices if they are not using WIM for enforcement or if they do not currently use the handbook for other enforcement equipment
- Automated weight enforcement not only **benefits taxpayers, legally operating trucking companies,** and law enforcement but also enhances safety for the motoring public and contributes to societal well-being.

Conclusion

- The team has demonstrated the technology to weigh vehicles in motion **meets/exceeds** what is proposed, testing completed over the years, independently checked or State witnessed, in the U.S. & Globally.
- The team has worked for 2 years to get feedback on this proposal from FMCSA, 10 States, the WIM manufacturers, and the Commercial Vehicle community (CVSA).
- The team has developed HB44 Section 2.26 based on the **feedback from NIST and S&T Committee**
- States can continue their current practice of screening OW trucks, and **this change provides an option for vehicle enforcement** to have a more comprehensive standard for the benefits outlined
- The proposal (HB44 Section 2.26) has been successfully implemented at BQE as determined as **providing the inspectors appropriate testing requirements and tolerances defined in sufficient detail.**
- The team believes this proposal is ready to be made a **voting** item for the NCWM interim meeting.

Thank you!