

No. RW/NH-35072/1/2003-S&R (R)

Dated the 22nd November, 2004

To

Chief Secretaries/Secretaries (PWD/Roads) of all State Government/UTs dealing with National Highways and Centrally Sponsored Schemes, Chief Engineers of States/UTs dealing with National Highways and Centrally Sponsored Schemes, Director General (Border Roads), Chairman, National Highways Authority of India.

Subject: Guidelines for Installation of Weigh-In-Motion (WIM) System and Automatic Traffic Count-cum-Classifiers (ATCCs) on National Highways

Ministry had constituted a Committee of Chief Engineers to suggest the remedial measures to the problem of overloading of vehicles on NHs. The Committee has recommended the installation of the Weigh-in-Motion (WIM) and Automatic Traffic Counter cum Classifier (ATCC) system in combination of High-Speed (HS) & Low-Speed (LS) Weigh-in-Motion system on the selected locations along NHs.

2. In the High Speed WIM System two peizo sensors 3m apart and one induction loop situated symmetrically between the two sensors are installed in the Highway per lane. The sensors and loop are placed at a depth of 20mm and 60mm respectively in the pavement. The peizo sensors measure axle weight, axle speeds and inter-axle spacings. The induction loop detects vehicle presence and measure the vehicle length. The system incorporating the automated verification of operating credentials thus can operate on the main line and have the ability to track the suspected violators and alarm will be triggered for vehicles failing to follow the automated control signals. Technical Specifications and General Requirements for High Speed WIM & ATCCs System is enclosed at Annexure-I.
3. In the Slow Speed WIM System, a steel weighbeam of size (approximately) 3.0m x 0.75m permanently installed into a concrete weighlane. The weighbeam is supported in each corner by 4 load cells. The load cells are hermetically sealed to prevent the ingress of dust and moisture. The vehicle can pass over the weighbeam upto a speed of 5 km per hour with being accurately weighed. Technical Specifications and General Requirements for Slow Speed WIM System is enclosed at Annexure-II.
4. A combination of High Speed WIM and Slow Speed WIM system as described in the enclosed figure may be installed at the selected locations.
5. The priority locations for installation of the system shall be as follows:
 - i. The stretches having more concentration of heavily loaded commercial vehicles for example approaches to ports, mines, stone

quarries, steel/cement/chemical industries, sugar/cotton/rice/oil mills, oil refineries, centres of agricultural produces etc.

- ii. Inter-State borders
- iii. Toll plazas

6. It is requested that suitable locations for installation of WIM/ATCC system along National Highways within your jurisdiction may be identified in association with this Ministry's Regional Officer and requirement sent to this Ministry by 31st December, 2004 in the year 2004-05 and by 31st May in subsequent years.

(Enclosure at Ministry's Letter No. RW/NH-35072/1/2003-S&R) (R) dated 22-11-2004)

Annexure-I

Technical Specifications and General Requirements for High Speed WIM & ATCCs System

1.1.1 Type of Vehicle

The Indicative classification of common vehicles based on wheel base is given below.

Type of Vehicle	Probable Range of Wheel Base (in mm)
a) Four Wheelers (cars, jeep, vans)	1801-2675
b) LCV's	2690-3400
c) Trucks/Buses	3401-5600
d) Multiple axle vehicles	Varying number of axles and inter-axle spacings

1.1.2 Functional Requirements

The WIM system shall have capacity to obtain the data of the weight inter-axle spacing, speed and classification based on length of vehicle and number of axles etc. with least possible disruption to the flow of traffic. The system shall be capable to accommodate multiple installations of detectors/sensors. The WIM system shall be capable to collect the axle weight of continuous traffic with vehicle information system in a compressed format complete with date and time, so that information can be down loaded using WIM software. The system shall be capable of working with main electric power of 220 volts AC backed with detachable and rechargeable 12 VDC battery system and automatic on/off facility. The WIM system should be well equipped with a digital camera.

1.1.3 Technical Specifications

The WIM system shall consists of a peizo-loop-peizo configuration in a traffic lane, 3 m apart with a square or rectangle loop to ensure the proper coverage of the lane width systematically placed between the peizo sensors.

1.1.4 Level of Accuracy

Minimum : 90 percent.

1.1.5 Operational Speed:

Range : 5 to 160 kmp

1.1.6 Capabilities:

The system should be capable of conducting and recording the following information.

- Determination of axle loads

- Weight comparison on daily and peak hourly with stored limit tables
- Control traffic signals & diversion signs
- Classification of vehicles (minimum 95%)
- Graphic and tabular presentation of data, classification and overload on daily and peak hourly basis

1.1.7 Components:

The System should consist the following components

- Remote Site Electronic Unit equipped with CC TV and Cabinet
- Lane control system
- Piezoelectric Sensors
- Inductive loops
- Conduits and junction boxes
- Electronics control unit
- Computer with its peripheral and software
- Uninterruptable power supply backed with battery power input of 12 VDC

1.1.8 Climatic Conditions

The system shall be capable to function in all climatic conditions with ambient temperature range of -5°C to +60°C and under 100% humidity.

1.1.9 System Acceptance:

The system shall be accepted on undertaking given by the seller with following conditions.

- System review-Supplier will demonstrate the entire working system of the instrument as per tender requirement
- Documentation-Technical literature of the system and the software will be supplied by the supplier
- Acceptance Test-The working of the system will be demonstrated to the satisfaction of the purchaser with respect to the instrument & software etc.
- Training-A minimum of five days training of operation and documentation will be imparted by the supplier

1.1.10 Material:

It shall be responsibility of the seller for the quality product and to ensure that all the materials and components used in the system are suitable for the intended purpose and to the satisfaction of the purchaser.

1.1.11 Operational Language:

English

1.1.12 Abstract of Cost:

- Cost of equipment (FOB) including duties and taxes
- Freight & Insurance charges of country of origin
- Installation and commissioning
- Custom duty and other levies
- Cost of spares and consumables for two years

Annexure-II

Technical Specifications and General Requirements for Slow Speed WIM System

1.2.1 Type of Vehicle:

The Indicative classification of common vehicles based on wheel base is given below.

Type of Vehicle	Probable Range of Wheel Base (in mm)
a) LCV's	2690-3400
b) Trucks	3401-5600
c) Multiple axle vehicles	Varying number of axles and inter-axle spacing

1.2.2 Functional Requirement:

The WIM system shall have capacity to obtain the data of the axle weight and accommodate multiple

installations of detectors/sensors. The information system shall be in a compressed format complete with date and time, so that the information can be down loaded using WIM software. The system shall be capable of working with main electric power of 220 volts AC backed with detachable and rechargeable 12 VDC battery system and automatic on/off facility.

1.2.3 Technical Specifications:

The system shall have weighbeam and load cells combination well protected against dust and moisture.

1.2.4 Level of Accuracy:

<u>Speed</u>	<u>Accuracy</u>
Static-0 kmph Gross wt Dynamic	+/-0.5% of applied load
0-5 kmph Gross wt	+/-1.0% of applied load
6-10 kmph Gross wt	+/-1.5% of applied load
10-20 kmph Gross wt	+/-2.0% of applied load

The above accuracy specifications shall be based on a minimum of 5 runs of a standard test vehicle, in repeat run over the system.

1.2.5 Operational Speed:

Range : 0-5 kmph

1.2.6 Capacity:

The weighing platform must be capable of weighing the following loads Minimum Designed Structural strength : 70 tonnes
Load limit more than : 40 tonnes

1.2.7 Capabilities:

The system shall be capable for static as well as dynamic vehicle moving at very slow speed of less than 5 kmph, weighing and recording following information.

- Determination of axle loads
- Static weighing accuracy
- Gross weight calculations
- Traffic Signal Control

1.2.8 Components:

The slow speed weigh-in-motion system shall consist the following:

- Weighbeam
- Load cells
- The weigh site electronics
- Barrier
- Monitor
- Printer (receipt and reports)
- Remote weight display and computer connection
- Lightning Protection devices

1.2.9 Climatic Conditions:

The system shall be capable to function in all climatic conditions with ambient temperature range of -5°C to +60C and under 100% humidity.

1.2.10 System Acceptance:

The system shall be accepted on undertaking given by the seller with following conditions

- System review—Supplier will demonstrate the entire working system of the instrument as per tender requirement

- Documentation—Technical literature of the system and the software will be supplied by the supplier
- Acceptance Test—The working of the system will be demonstrated to the satisfaction of the purchaser with respect to the instrument & software etc.
- Training—A minimum of five days training of operation and documentation will be imparted by the supplier.

1.2.11 Material:

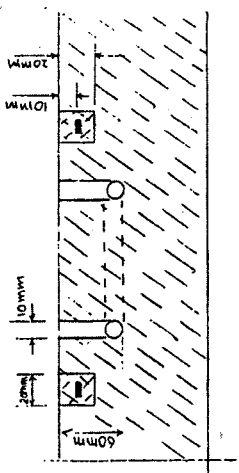
It shall be responsibility of the seller for the quality product and to ensure that all the materials and components used in the system are suitable for the intended purpose and to the satisfaction of the purchaser.

1.2.12 Operational Language:

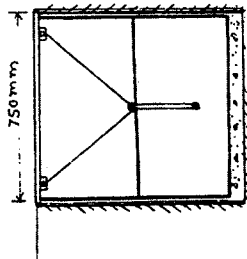
English

1.2.13 Abstract of Cost:

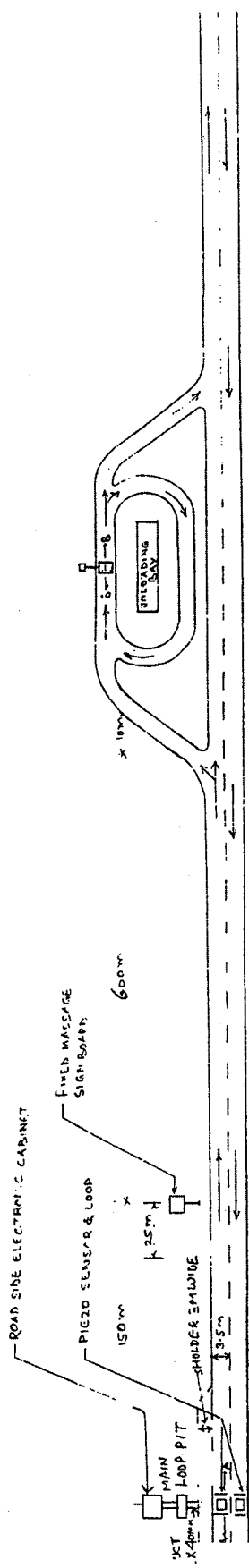
- Cost of equipment (FOB) including duties and taxes
- Freight & Insurance charges of country of origin
- Installation and commissioning
- Custom duty and other levies
- Cost of spares and consumables for two years



DETAILS OF SECTION A-A



DETAILS OF SECTION B-B



HIGH SPEED WEIGH-IN-MOTION - PLAN

NOTE:
1. LOOP PIT IS REQUIRED IF CABINET IS MORE THAN 6 METRES AWAY FROM SHOULDER EDGE
2. LAYOUT IS INDICATIVE ONLY

GENERAL LAYOUT OF HIGH AND SLOW SPEED
WEIGH-IN MOTION SYSTEM (NOT TO SCALE)

ALL DIMENSIONS ARE APPROXIMATES & INDICATIVE