Acceleration measurement instruments

Version : 11.0

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Summary

Introduction

The term "Acceleration Measurement Instrument" (AMI) relates to specialist computerised data collection equipment and its related software used to test positive or negative acceleration of vehicles across various surface types.

AMIs are used by Police for crime scene investigation purposes, particularly to obtain acceleration factors of motor vehicles as part of traffic crash or braking investigations.

This chapter governs the operation of AMIs.

AMI technology

This section contains the following topics:

The technology

An AMI has three integral components:

- An electronic clock.
- At least one internal accelerometer.
- A microprocessor.

Note: The unit may have a read-out display and may be able to download data to a computer.

AMIs used by Police must be set to provide data output in metric units and to show acceleration as percentages of the force of gravity. The acceleration of gravity is that measured at 45 degrees of latitude, 9.807 metres per second per second, commonly expressed as 9.81 m/s2.

Approved models

Approved models are:

- The Vericom™ brake-testing computer Model VC2000 and VC 2000 PC (approved as a brake-testing device on 18 October 1995; approval published by notice in NZ Gazette, 26 October 1995, Number 122, page 3775 (word document, 214 KB)).
- The Vericom™ brake-testing computer Model VC3000 (approved as a brake-testing device on 18 March 2003; approval published by notice in NZ Gazette, 27 March 2003, Number 30, page 847).

Where the accelerometer used is a Vericom™ device, the manufacturer's 'Profile' software is approved to be used for the data extraction, graph compilation and related processing.

Servicing

All servicing and repairs must be arranged via Manager: Crash Investigation and Calibration Services , Police Calibration Services, Ngauranga, Wellington.

Training

This section contains the following topics:

Approved training course

Approved training courses are delivered by Police and address the specific operation of the AMI device concerned.

Training in the use of AMIs

To ensure national consistency and quality of content and delivery, all training must:

- be approved by the National Manager: Road Policing; and
- comply with the quality assurance standards set by the School of Patrol & Operational Policing, RNZPC.

Approval of AMI instructors rests with the National Manager: Road Policing.

Duties and responsibilities

Table

This table shows the duties and responsibilities in respect of AMIs.

Position	Duties and responsibilities
District Commander	District commanders must ensure that all Police employees using AMIs are trained and deployed in accordance with this chapter.
Supervisor	Supervisors of employees deployed to use AMIs must ensure that: • personnel under their control operate within the guidelines of this chapter, and • the equipment being used meets operational requirements and that required repairs are carried out. See: Servicing.
Operator	Police employees who use AMIs must: • be authorised to do so, • have successfully completed the appropriate training course and, • have been issued with a certificate of attainment or, • has previously completed any other form of training approved by the National Manager: Road Policing • have permanent appointment, • have successfully completed the Advanced Crash Investigation training course delivered by the School of Patrol & Operational Policing, RNZPC, or equivalent qualification, approved by the National Manager: Road Policing • display the highest level of professional conduct, • operate the device in accordance with this chapter, and • be held responsible for their actions when operating the device.

Pre-deployment check procedures

Pre-deployment check

A pre-deployment check must be conducted before each deployment of an AMI by following these steps.

Step	Action
1	Check that the date and time recorder (if any) within the accelerometer unit has been correctly set.
2	Check that all related equipment is functional and in correct operating condition.
3	Complete horizontal and vertical accuracy verification checks, recording all results on the appropriate skid test data sheet.

Deployment procedures

This section contains the following topics:

Before you start

Mount the instrument on the test vehicle in a position that meets the standard requirements for operator and equipment safety, as well as the AMI device's mounting requirements.

Minimise disruption

Ensure that, as far as possible and reasonably practicable, the:

- tests are carried out with minimal disruption to other activities
- travelling public is inconvenienced as little as possible
- need for road closures is reduced or eliminated where possible
- tests are carried out as soon as possible after the incident took place.

Evidence integrity

Data collected using the AMI is recorded directly into the unit's internal memory. Scene data information from an accelerometer must be down-loaded using software approved by the National Manager: Road Policing for the purpose.

Conducting tests

Follow these steps to conduct tests.

Step	Action
1	Conduct at least three tests with an average acceleration force within a 10 percent range of each other. The acceleration force is shown on the AMI readout.
2	Ensure that the tests are conducted in the same direction of travel as that for the vehicle of interest.
3	For all calculations use the upper and lower values as determined from skid testing. **Note**: Do not use the average of all three tests.
4	When an acceleration graph is printed, the graph should show at least: **Where** / **What** X axis (horizontal) / Time Y axis (vertical) / Speed, distance, g-force Graphs for both the upper and lower ranges used should be produced.

Data accuracy tests

Follow these steps to conduct data accuracy tests.

Step	Action
1	Check the speed obtained by the AMI against a calibrated speed-measuring device. A result is satisfactory when the speed calculated by the AMI is within 10 percent of the calibrated speedometer reading, immediately prior to braking.

2	As an alternative to a speedometer test, you can check the distance reading obtained by the AMI against the distance recorded by a pavement marker activated by the vehicle braking system. A result is satisfactory when the distance calculated by the AMI is within 10 percent of the pavement marker distance, after appropriate adjustments have been made for mechanical delays and the AMI activation setting.

After deployment procedures

This section contains the following topics:

After the deployment

Follow these steps as soon as practicable after each deployment of an AMI.

Step	Action
1	As soon as practicable after deploying an AMI, carry out all vertical and horizontal accuracy verification checks.
2	A copy of the raw data relating to the skid tests must be retained with the incident file.

Integrity of evidence

Scene data information from an accelerometer must be down-loaded using software approved by the National Manager: Road Policing, for that purpose.