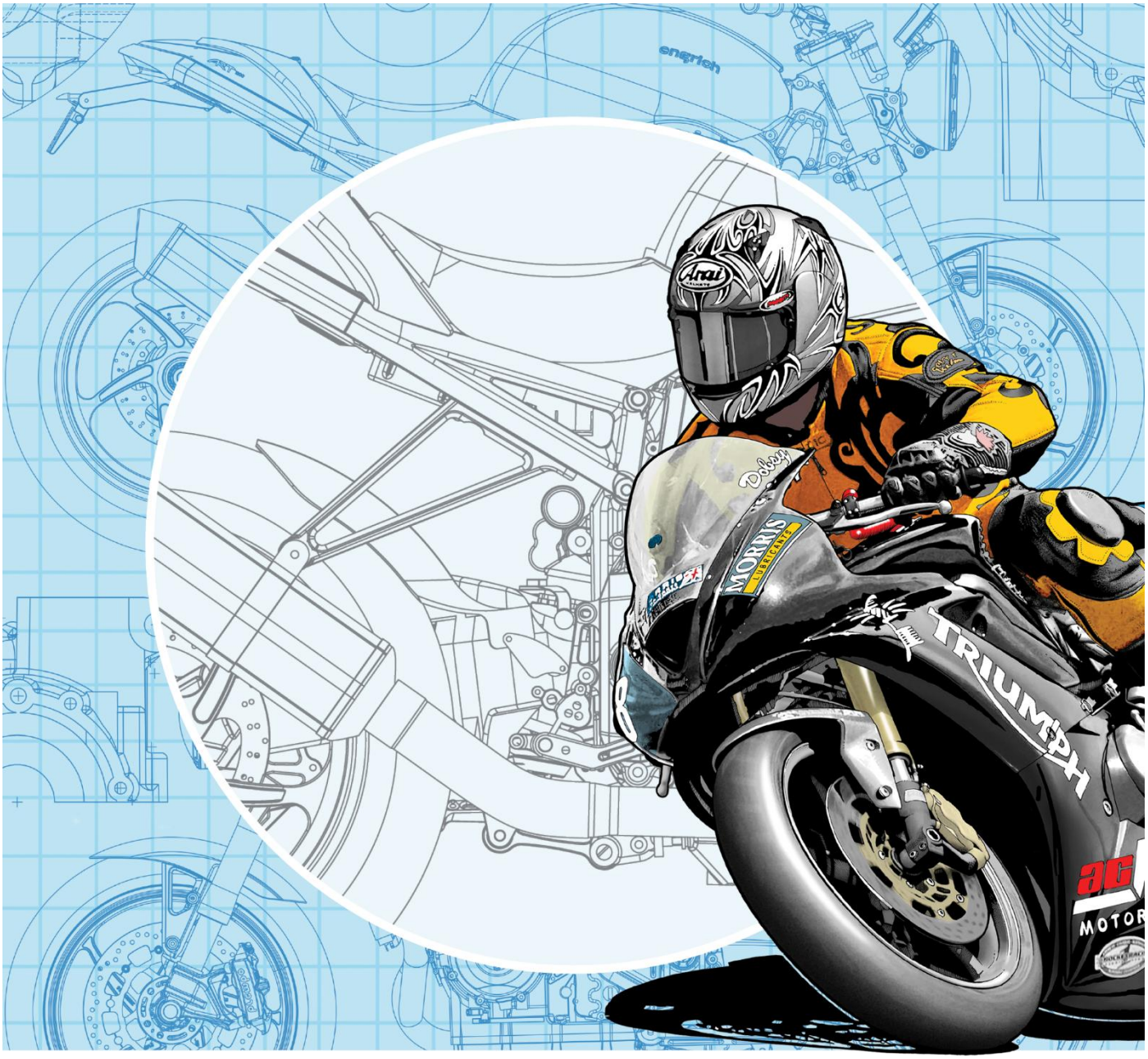
Low Volume Vehicle Technical Association (inc)

Helping New Zealanders Build & Modify Safe Vehicles

New Zealand Motorcycle Construction Manual

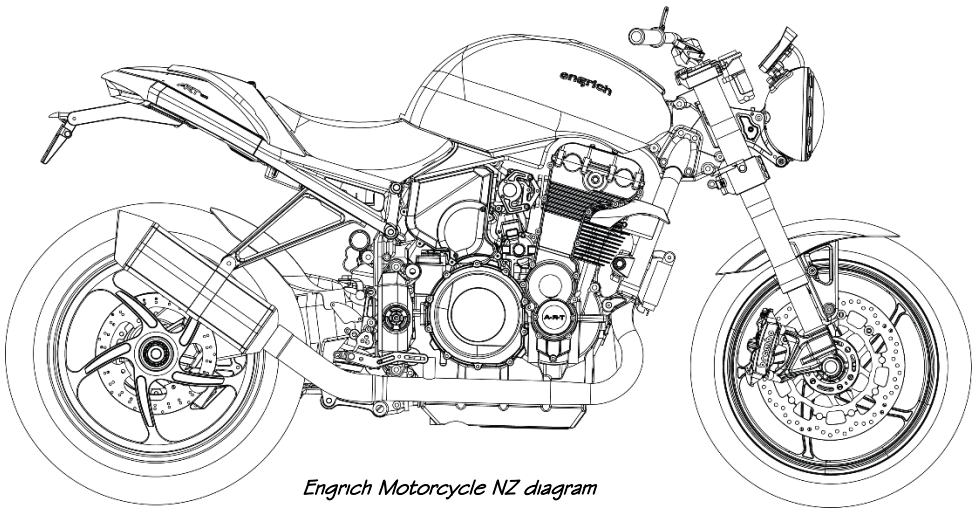
Chapter 13
Body Modification & Construction

Version 1 | Effective from 1 January 2026



Low Volume Vehicle Technical Association (inc)

Chapter 13
Body Modification & Construction



Engrich Motorcycle NZ diagram

Approval Record

Signed in accordance with clause 1.3(5) of the *Low Volume Vehicle Code* of the LVVTA	
On (date)..... on behalf of	
New Zealand Transport Agency	Low Volume Vehicle Technical Association .....

Amendment Record

Amendment details	Version #	Issue date	Effect date
• Original Issue	Version 1	1 December 2025	1 January 2026

About Motorcycle Construction Manual Chapters

NZ Motorcycle Construction Manual Chapters (the chapters) provide the necessary detailed technical requirements, and helpful information, to enable a modified or scratch-built motorcycle to comply with the corresponding low volume vehicle standards (LVV standards). The chapters provide modifiers and constructors with the same information that an LVV Certifier will use when inspecting a modified or scratch-built motorcycle which requires LVV certification.

Author, Publisher, & Owner

This chapter is authored, published, and owned by the Low Volume Vehicle Technical Association Incorporated (LVVTA). LVVTA is an incorporated society established in 1992, that represents a group of specialist automotive organisations (in turn representing approximately 150,000 members) who are dedicated to ensuring that motor vehicles, when scratch-built or modified, meet the highest practicable safety standards.

The information in this chapter has stemmed from work undertaken by LVVTA founding member organisations that commenced in 1989 and has been progressively developed as an integral part of the New Zealand Government's land transport regulatory system, by agreement and in consultation with the New Zealand Transport Agency (NZTA).

As a result, the considerable experience in applied safety engineering built up by LVVTA and its specialist automotive member groups over the past several decades can be of benefit to members of the New Zealand public who also wish to build or modify motor vehicles.

LVVTA's contact details are:

- Phone: +(00) 64 4 238 4343
- E-mail: info@lvvta.org.nz
- Postal address: P. O. Box 50-600, Porirua 5240, Wellington, New Zealand
- Website: www.lvvta.org.nz

Availability & Current Version

This chapter is printed and distributed by LVVTA, and is available to the public free of charge from the LVVTA website; www.lvvta.org.nz

Note that printed copies of this chapter, like any other printed LVVTA documents, may have been superseded by an amended version and become out of date. Therefore, this and all other LVVTA documents should not be relied upon without first ensuring that the Version # (on the right-hand side of the header above) is the current version – please visit www.lvvta.org.nz/nzmcm to check that this chapter is in fact the latest version.

Users' Feedback

This chapter is constantly undergoing an evolutionary development process in order to keep pace with changing trends and technology. To assist in this, LVVTA invites users of this chapter to engage in an ongoing consultation process with us by making submissions for any changes, additions, or clarifications which might improve the chapter, at any time.

Any submissions made via this rolling consultation process will be thoroughly considered, and incorporated, where appropriate, at the next available amendment opportunity.

Submissions should be made to submission@lvvta.org.nz, with the name of this chapter in the Subject line.

Supporting Information

This chapter may be supported by other documents (referred to as 'supporting information') on the same subject, which could be helpful to someone using this chapter. Supporting information, if available, can be found at www.lvvta.org.nz/nzmcm and is all free of charge.

Legal Status & Copyright

This chapter supports *LVV Standard 145-55: Body Modification & Construction - Motorcycles*, which is incorporated within the *Low Volume Vehicle Code* (*LVV Code*). The *LVV Code* is, in turn, incorporated by reference within *Land Transport Rule: Vehicle Standards Compliance 2002*.

Disclaimer

LVVTA has made all reasonable efforts to provide sound and correct advice, based on the historical knowledge and best practice experiences of all parties involved in the development and production of this chapter.

However, no responsibility or liability is accepted by LVVTA for any error or omission, or any loss suffered by any person relying directly or indirectly on this chapter. Any person who builds or modifies a motor vehicle accepts that there may be some associated risks, and does so in the full knowledge of this, and accepts full responsibility for their own actions.

Credits

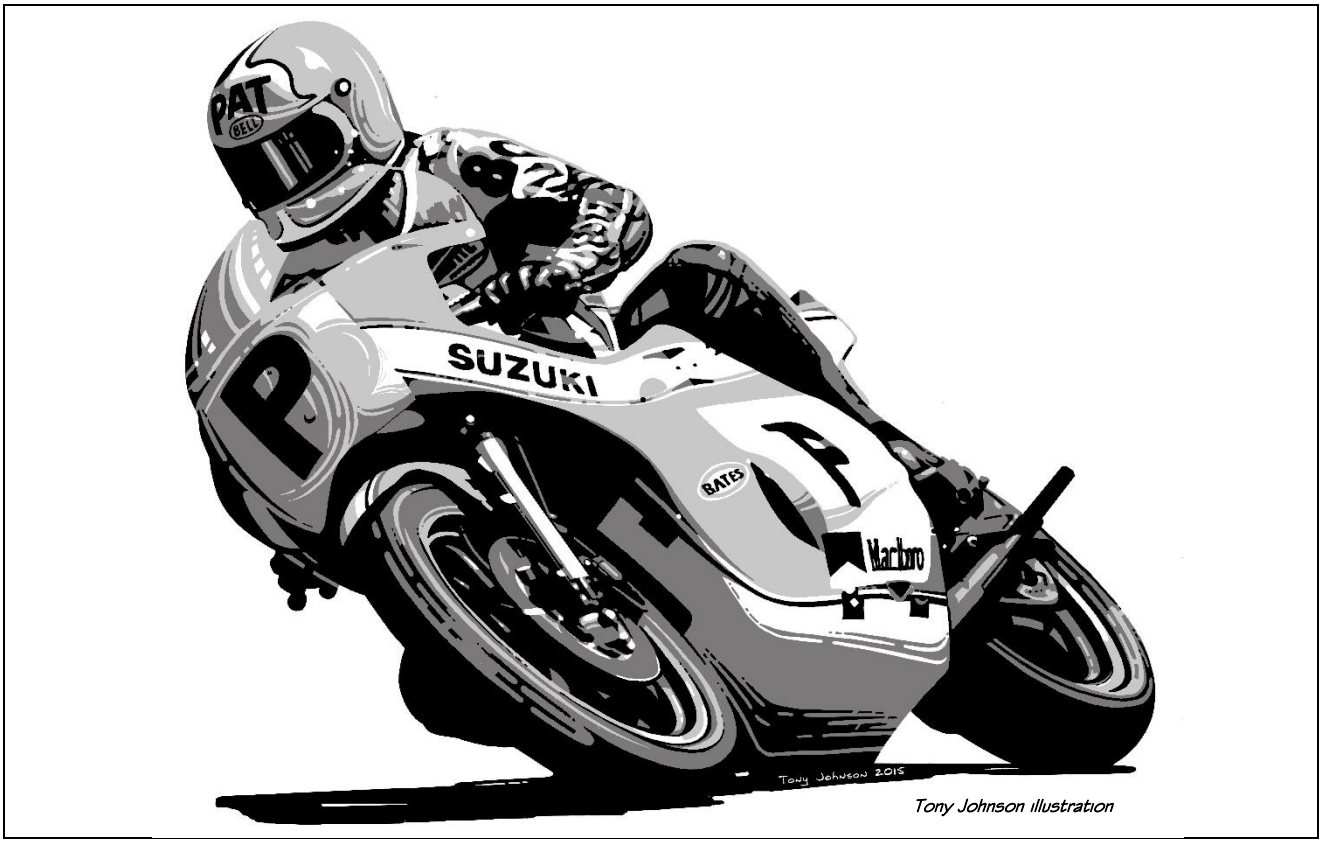
LVVTA acknowledges the following contributors for their assistance in the development of this chapter:

- Technical content: Kiwi Trikers' Social Club (Inc), LVVTA Technical Advisory Committee, LVVTA technical staff
- Cover & page 2 CAD diagram: Engrich Motorcycle New Zealand
- Motorcycle illustrations on the cover, and on pages 4 and 6: Tony Johnson

Type Key (For full details of Type Key, refer to Chapter 2 – About this Manual)

Normal type:	Provisions of the NZ Motorcycle Construction Manual for all motorcycles.
Italicised type:	Used when referencing external documents that are not part of this chapter.
Normal type in shaded box:	Special provisions of the NZ Motorcycle Construction Manual for motorcycles built or modified before specified dates.
Script type:	Helpful hints, tips, explanations, clarifications, and interpretations.
Grey shaded text & grey vertical stroke in margin:	Latest amendments since previous version. Note that text which is highlit in grey shows amendments that have been made since the document's previous version, and a grey vertical stroke to the left of the text denotes new or changed information which is important (rather than just a grammatical, formatting, or numbering change).

Chapter 13 Contents



Tony Johnson illustration

CHAPTER 13: BODY MODIFICATION & CONSTRUCTION

Introduction

The purpose of this chapter is to specify sound practical requirements relating to the modification and construction of motorcycle body panels, fairings, mudguards, and other associated bodywork-related components, and the safe attachment of the panels and components to the frame of the motorcycle.

Note that the requirements in this chapter do not apply to unmodified production body panels (and associated bodywork components) attached in their original location using the original mounting systems.

Italics are used throughout this chapter when referencing '*external documents*' that are not part of this chapter.

For conciseness, all references to 'motorcycle' in this chapter mean a motorcycle that, due to being modified or scratch-built, is legally classified as a low volume vehicle.

General Safety Requirements

13.0 Requirements Applicable to all Motorcycles

13.0.1

A motorcycle must:

(a) be designed and constructed using materials and components that are fit for their purpose; and

(b) be safe to be operated on the road.

13.0.1

This is from *2.3* of *Part 2* of the *Low Volume Vehicle Code* (slightly amended for clarity), which makes it clear that, regardless of what technical requirements are or are not in place, every vehicle certified to the *LVV Code* must be fit for its purpose, and must be safe.

13.0.2

A motorcycle must comply with the following general safety requirements:

(a) ornamental objects and fittings must not protrude from the motorcycle if they could injure any person; and

(b) protruding objects and fittings which have a functional purpose must, if installed and operated on motorcycles that are used on any public road, be such that their risk of causing injury to any person is minimised; and

(c) protruding objects and fittings must not adversely affect driver vision or driver control; and

(d) components of low volume motorcycles, including damaged or corroded body panels, must be such that their risk of hooking any vehicle, or hooking or grazing any person is minimised.

13.0.2

These are the applicable general safety requirements from the *Land Transport Rule 32008 External Projections* (slightly amended for clarity), which are required as part of this chapter, and are reproduced here in the interest of convenience.

Body Panel Requirements

13.1 Body Panel Design & Construction

13.1.1

A body panel on a motorcycle must be designed and constructed in such a way that the panel can withstand, during normal operation:

(a) aerodynamic loading without resulting in significant deformation; and

(b) inertia loading applied from acceleration and deceleration; and

(c) any loads that might be applied by the rider or pillion passenger.

13.1.2

A body panel on a motorcycle must incorporate a radius of not less than 3 mm on any exposed hard edge.

13.1.3

A body panel on a motorcycle must not incorporate any forward-facing protrusions that could create additional injury to a pedestrian, which are not essential to the operation of the motorcycle.

13.1.4

A luggage carrier fitted to a motorcycle must be designed and constructed in such a way that it is easily able to support the weight of the carrier and any luggage that may be carried on it.

13.2 Body Panel Attachment

13.2.1

A body panel on a motorcycle must be attached in such a way that, during normal operation:

(a) no interference can occur between the panel and any of the control systems used to operate the motorcycle; and

(b) adequate clearance is maintained with:

(i) the road surface throughout all lean angles; and

(ii) any moving components throughout the motorcycle's full range of suspension travel; and

(iii) any steering components throughout the full range of steering movement.

13.2.1(b)(ii)

Moving components includes tyres, suspension components, brake components, drive-shafts, drive-belts, or chain-drives.

13.3 Mudguards

13.3.1

A motorcycle must be fitted with a mudguard over each wheel, which:

(a) covers no less than the full width of the tyre tread; and

(b) when compared to a similar style of unmodified road-going production motorcycle:

(i) covers a similar amount of tyre circumference; and

(ii) provides no less effectiveness in preventing spray and debris from affecting the rider's vision; and

(iii) provides no less effectiveness in reducing the displacement of spray and debris to following vehicles.

13.3.1

The mudguard can be a part of the motorcycle's fairings, panels, or equipment, or it may be a separately mounted component.

13.3.1(b)

A mudguard that maintains similar effectiveness and coverage of the tyre tread when compared to an equivalent road-going mass-produced motorcycle is acceptable.

See the Useful Information section at the back of this chapter for more information about mudguards on motorcycles.

13.4 Condition

13.4.1

A body panel on a motorcycle must:

(a) be protected against corrosion; and

(b) not have any significant rust or corrosion; and

(c) not have any cracking, or other kind of damage or deterioration, which could result in weakening the body panel or the structure to which it is attached.

Other Requirements

13.5 Fasteners

13.5.1

All fasteners incorporated within the modification or construction of a motorcycle body panel must meet all fastening requirements specified from *18.2* to *18.6* in *MCM Chapter 18: Attachment Systems.*

13.6 Welding

13.6.1

All welding incorporated within the modification or construction of a motorcycle body panel must meet all welding requirements specified in *18.7* and *18.8* in *MCM Chapter 18: Attachment Systems.*

13.7 Registration plate

13.7.1

A motorcycle must be fitted with a registration plate of a type specified by the Ministry of Transport, which is:

(a) fitted at the rear of the motorcycle; and

(b) positioned in such a way that each letter and figure is easily visible.

13.7.1

See the Useful Information section at the back of this chapter for information about the orientation of registration plates on motorcycles.

13.8 Glazing & Vision Modifications

13.8.1

A motorcycle which incorporates a body modification or construction feature that may affect the motorcycle's glazing or vision, must comply with the applicable requirements specified in *MCM Chapter 15: Glazing & Vision.*

Exclusions

No exclusions apply to this chapter.

Useful Information

Mudguards

A front mudguard could, in some cases, include the frame and aerodynamic fairings of a motorcycle. This is because the steering angle of a bike is generally small enough that these are sufficient to intercept spray and debris thrown rearwards by the front wheel.

This means however that the fairings, frame, engine, and any radiators or coolers present are then in danger of being damaged by stones and other road debris, so the wrap-around 'cycle fenders' that are fitted to most motorcycles are still the best option.

Registration Plate Orientation

How a registration plate is displayed on a motorcycle is something that has historically been open to interpretation. Registration plates, due to their size, are often hard to fit in a way that doesn't mess with the look of the rest of the motorcycle. However, there are legal requirements about mounting a registration plate to a motorcycle in the *Land Transport (Motor Vehicle Registration and Licensing) Regulations 2011*, which specifies: 'In the case of a motorcycle, moped, tractor, or trailer, one plate must be securely affixed in an upright position on the rear of the motorcycle, moped, tractor, or trailer and displayed so that the unique identifier on the plate is easily visible at all times from the rear of the motorcycle, moped, tractor, or trailer.' The 'unique identifier' in the regulation refers to the digits imprinted on the number plate.

Traditionally, registration plates are an enforcement issue rather than a certification issue, meaning their fitment and correct display is enforced by the New Zealand Police rather than a vehicle inspector or LVV Certifier. NZTA has clarified its interpretation of what an 'upright position' means, as 'the right way up so that the letters and numbers can be easily seen and read'. Mounting registration plates vertically is becoming increasingly common, especially on motorcycles, and from a legal perspective this means that the numbers and letters cannot be easily read.

So, while not strictly an in-service or LVV certification issue, mounting the registration plate the right-way up is something that builders and modifiers should try to achieve, to ensure against a roadside infringement by the New Zealand Police, or at warrant of fitness time if it ever becomes enforced at that point.

Terms & Definitions for Chapter 13

Aftermarket	means a component or system made by a manufacturer, other than a high-volume motor vehicle manufacturer, who produces catalogued components or systems on a production-run basis for the mass-market.
CCM	(*NZ Car Construction Manual*) means LVVTA's detailed technical standards, incorporated by reference under the *LVV Code*, which must be met to enable an LVV to comply with applicable requirements. The *CCM* is referred to by the corresponding *LVV Standard*.
Crush-tube	means a section of non-compressible material that is positioned within a cavity, through which a fastener passes, to prevent collapsing of the material surrounding the cavity, and consequential loosening of the fastener.
Custom	means a component or system fabricated by an individual person or small company on a one-off or limited-run basis, and is not intended as a high volume catalogued aftermarket part.
Engine mounts	means the devices that fasten the engine onto the frame.
Fairing	means a covering over the frontal area of a motorcycle to deflect wind across and around the rider, and to reduce drag.
GVM	(Gross Vehicle Mass) means the maximum total weight that a vehicle manufacturer certifies a vehicle, and its payload, for. More detailed information about GVM can be found in *Land Transport Rule: Vehicle Standards Compliance 2002*.

Lean angle	means the angle to which the rider can tilt the motorcycle as part of normal cornering.
L-class	is an NZTA classification, which means, in very simple terms, a two-wheeled motorcycle or three-wheeled motor vehicle with a GVM of under 1000 kg.
LVV	(Low Volume Vehicle) means, in simple terms, LVVs which are modified or scratch-built in small numbers, and includes individually modified or scratch-built LVVs. The full definition of an LVV is contained in the *LVV Code*.
LVV Code	(*Low Volume Vehicle Code* or the *Code*) means an LVVTA document which is incorporated by reference into the *Land Transport Rule: Vehicle Standards Compliance 2002*, and all applicable individual *Land Transport equipment rules*, that provides the legal framework to enable the LVV certification of modified and scratch-built LVVs in New Zealand.
LVV Certifier	(Low Volume Vehicle Certifier) means a person appointed by NZTA under the provisions of *Land Transport Rule: Vehicle Standards Compliance 2002*, to carry out low volume vehicle certification of modified and scratch-built LVVs, as specified by *Part 2* of the *LVV Code*.
LVV Certification	(Low Volume Vehicle Certification) means the process specified by the *LVV Code*, by which the design of an LVV is determined to comply with any applicable requirements, and, in recognition of which, an LVV EDP is affixed.
LVV Certify	(Low Volume Vehicle Certify) means the same as LVV certification.
LVV EDP	(Low Volume Vehicle Electronic Data Plate) is an RFID tag, in use from February 2021, fitted to an LVV upon completion of the LVV certification process, which when scanned by an NFC-capable device, displays details and photographs of the modifications and construction features on the LVV to which it is affixed.
LVV Standards	(*Low Volume Vehicle Standards*) means LVVTA's technical standards, incorporated by reference under the *LVV Code*, that set out the legal requirements which vehicles that are modified and scratch-built vehicles in New Zealand must meet. Each *LVV Standard* refers to a corresponding *CCM chapter* or *MCM chapter* for detailed technical requirements.
LVVTA	(Low Volume Vehicle Technical Association) is an incorporated society comprised of specialist vehicle associations. Established in 1992, its objectives are to represent the interests of vehicle modifiers and builders in New Zealand, and to ensure high safety standards for modified and scratch-built LVVs. The LVVTA owns and administers the *LVV Code*.
Mass-produced (motorcycle)	(also known as production vehicle, or high-volume vehicle) means a vehicle which is manufactured in quantities of more than 500 at any one location in any one year for the mass market.
MCM	(*NZ Motorcycle Construction Manual*) means LVVTA's detailed technical standards, incorporated by reference under the *LVV Code*, which must be met to enable an LVV to comply with applicable requirements. The *MCM* is referred to by the corresponding *LVV Standard*.
Modification	is defined in *Land Transport Rule: Vehicle Standards Compliance 2002* to change a vehicle from its original state by altering, substituting, adding or removing any structure, system, component or equipment, but does not include repair. 'Modified' and 'modification' have corresponding meanings.

Modified Production (LVV)	means, in simple terms, a vehicle which, while modified, maintains a sufficient percentage of body or chassis from one primary mass-produced vehicle that it can still be considered to be that vehicle. The full legal definition of a Modified Production LVV is complex and currently under review, and will be incorporated within the *LVV Code* once revised.
Motorcycle	means a vehicle of Table-A class LA, LB, LC, LD, and LE, as defined in *Land Transport Rule: Vehicle Standards Compliance 2002*.
Mudguard	is a panel, usually shaped around the tyre, which prevents water, dirt, and debris from being thrown up by a motorcycle tyre toward the rider, and toward following traffic, when the motorcycle is ridden over wet or loose surfaces.
NZTA	(New Zealand Transport Agency) is a Crown entity responsible for managing New Zealand's land transport system.
OE	is an abbreviation for 'original equipment', which, in this context, are the parts and equipment used in the assembly process of a mass-produced vehicle.
OEM	is an abbreviation for 'original equipment manufacturer', which, in this context, is a company that produces parts and equipment used in the assembly process of a mass-produced vehicle.
Scratch-built (LVV)	means, in simple terms, an LVV which has been individually constructed from unrelated components, or a mass-produced vehicle which has been modified to such an extent that it can no longer be considered to be a modified mass-produced vehicle. The full legal definition of a scratch-built LVV is currently under review, and will be incorporated within the *LVV Code* once revised.