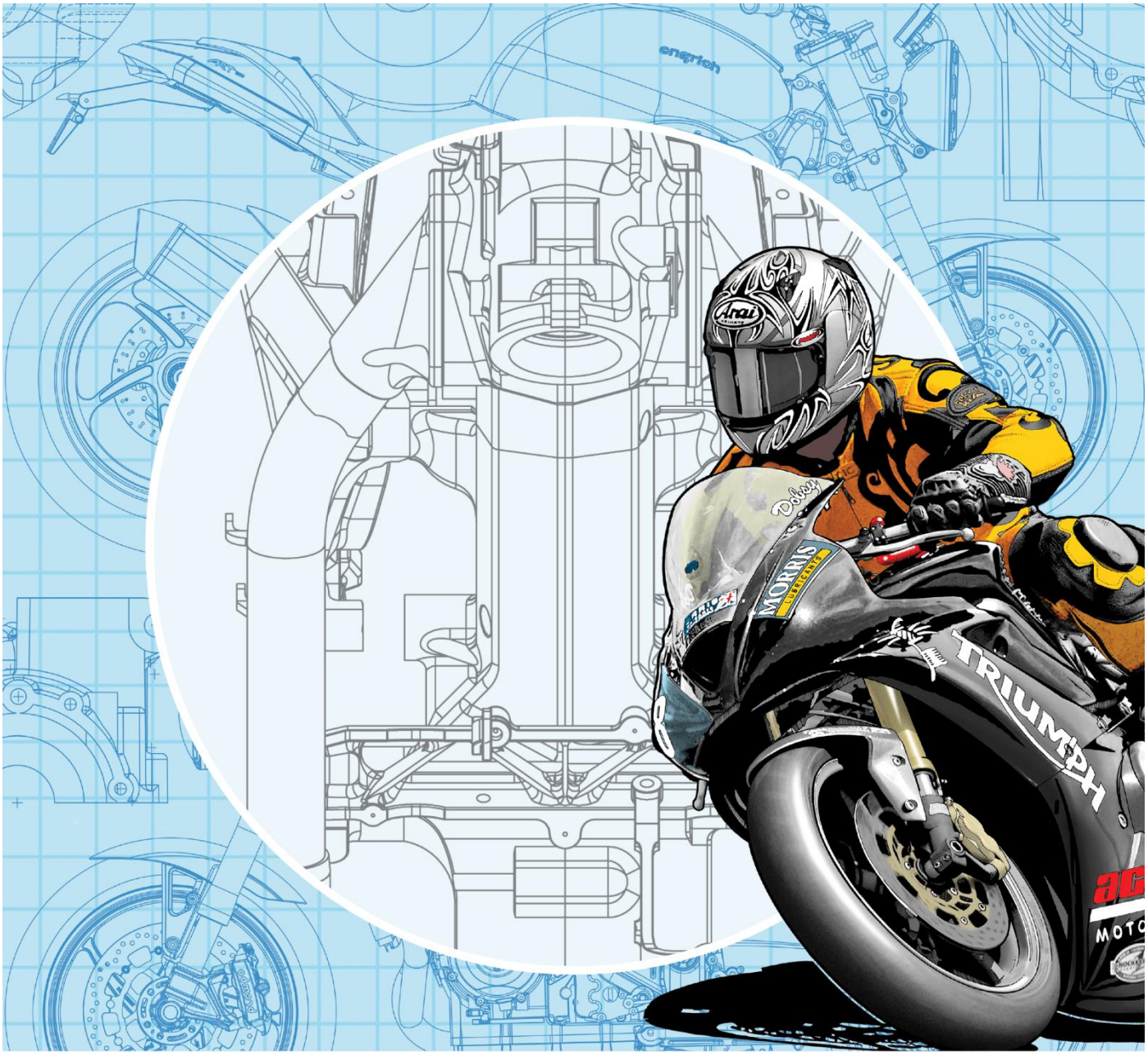
Low Volume Vehicle Technical Association (inc)

Helping New Zealanders Build & Modify Safe Vehicles

New Zealand Motorcycle Construction Manual

Chapter 5
Frame Modification & Construction

Version 1 | Effective from 1 January 2026



Chapter 5
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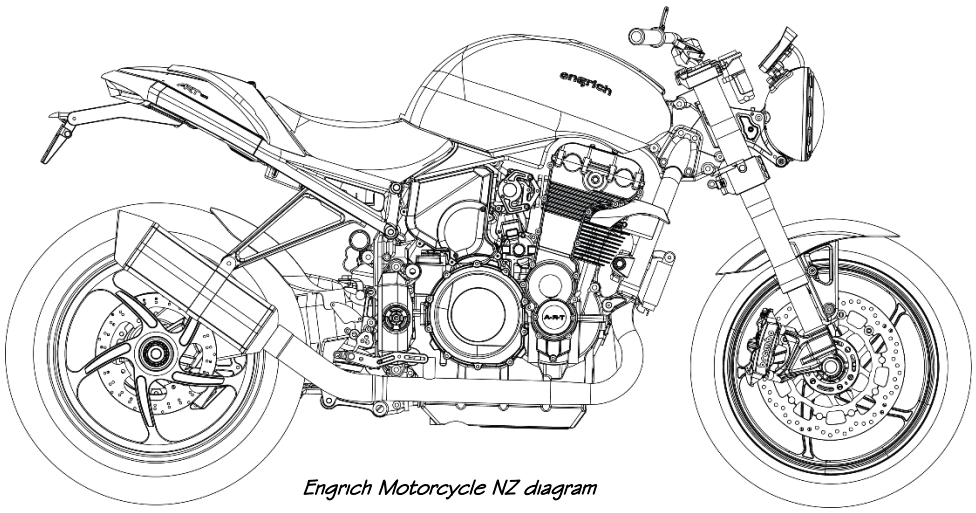

Engrich Motorcycle NZ diagram

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

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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.

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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 145-15: Frame 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

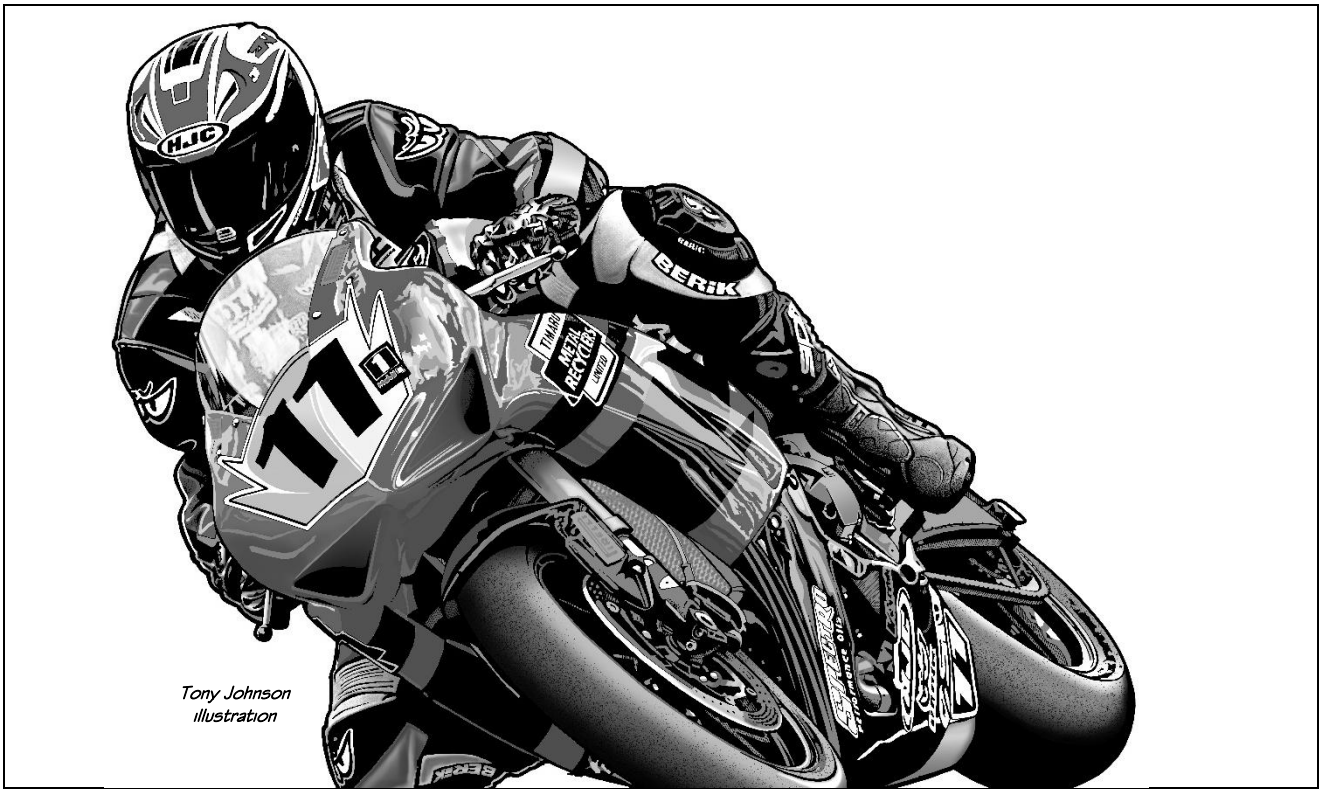
LVVTA acknowledges the following contributors for their assistance in the development of this chapter:

- 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 5 Contents



CHAPTER 5: FRAME MODIFICATION & CONSTRUCTION

Introduction

The purpose of this chapter is to specify sound practical engineering principles and procedures relating to the modification and construction of motorcycle frames.

The frame is the foundation of a well-modified or constructed motorcycle, as it supports all the major mechanical components, and keeps those components in their correct relative positions while the motorcycle is subjected to the many stresses and loads imposed by accelerating, braking, cornering - and of course, our New Zealand roads. Note that the requirements in this chapter do not apply to an unmodified production motorcycle frame.

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

5.0 Requirements Applicable to all Motorcycles

5.0.1

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.

5.0.1

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.

5.0.2

A steering system on a motorcycle, and associated systems and components that could directly or indirectly affect the directional control of the motorcycle, must:

(a) be sound and in good condition and must provide the motorcycle with safe, efficient, convenient, and sensitive control; and

(b) be strong, durable and fit for its purpose.

5.0.2

These are the applicable general safety requirements from the *Land Transport Rule 32003/1 Steering Systems* (slightly amended for clarity), which are required as part of this chapter, and are reproduced here in the interest of convenience.

5.0.3

A braking system on a motorcycle must:

(a) operate in a controlled and progressive manner; and

(b) provide stable and efficient braking without adverse effect on the directional control of the motorcycle; and

(c) be easily adjustable to compensate for wear and must be maintained in good condition and efficient working order.

5.0.3

These are the applicable general safety requirements from the *Land Transport Rule 32014 Light Vehicle Brakes* (slightly amended for clarity), which are required as part of this chapter, and are reproduced here in the interest of convenience.

Frame Requirements

5.1 Frame Design

5.1.1

The design of a frame in a motorcycle must either:

(a) follow generally accepted time-proven design and construction methods and material specifications applicable to motorcycles; or

(b) have been approved in writing using the Build Approval process specified in *MCM Chapter 4: Build Approval Process* by the Technical Advisory Committee of LVVTA.

5.1.1

See the Useful Information section at the end of this chapter for information on frame types and material specifications.

5.1.2

The section and wall thickness of material used for the construction of a frame in a motorcycle must be suitable for the size, weight, and performance potential of the motorcycle.

5.1.2

Drawn-over-mandrel (DOM) tubing is commonly used when constructing a custom tubular motorcycle frame.

5.1.3

Tubing used for the construction of a frame in a motorcycle must be bent using a mandrel, in order to:

(a) achieve smooth and consistent bends; and

(b) prevent a loss of strength as a result of the bending process.

5.1.3

Without using a mandrel, 'kinks' and 'stress-risers' can occur, which can have the effect of substantially reducing the strength of the material.

5.1.4

A join in tubing sections used in the construction of a frame in a motorcycle must incorporate a method of:

(a) overlapping reinforcement, rather than by relying on just a butt-join; and

(b) preventing ingress of dirt or water into the frame, in order to prevent creation of a corrosion site.

A motorcycle frame constructed or modified before 1 January 2026 is not required to comply with 5.1.4, provided that after thorough inspection, no twisting, bending, bowing, fatigue cracking, fracturing, or corrosion is evident. Specific investigation must be carried out, with removal of paint if necessary to assist the inspection process.

5.1.4(a)

A sleeve, fitted either internally or externally, is a common method of achieving the required reinforcement. An LVV Certifier will need to be able to see that inner sleeves have been used on butt-jointed frame sections.

5.2 Weight Distribution

5.2.1

The design of a frame in a motorcycle must be such that the proportion of the completed motorcycle's total mass over the front wheel is either:

(a) between 30% and 70% of the motorcycle's total laden weight; or

(b) an alternative proportion has been approved in writing for the particular design and application using the Build Approval process specified in *MCM Chapter 4: Build Approval Process*, by the Technical Advisory Committee of LVVTA.

5.2.2

Heavy components attached to the frame of a motorcycle must be positioned so as to maintain the lowest centre of gravity as can be practicably achieved.

5.2.2

Heavy items, such as batteries in an electrically powered motorcycle, should not be positioned high up on the frame, for example, in place of the fuel tank.

5.3 Frame Attachment Points

5.3.1

A frame in a motorcycle must incorporate, either within its design, or by the addition of mounts or brackets, an adequate attachment system for all components and systems which attach to the frame.

5.3.2

When mounting components to a motorcycle frame necessitates bolting through a tubular section, the fastener must pass through a tubular steel reinforcing crush-tube that:

(a) is manufactured of a material with a wall thickness of not less than 3 mm; and

5.3.2

A crush-tube prevents crushing and collapsing of the tubular section, which in turn prevents the fastening system from loosening.

See the '*Cross-member, bracket, and component attachment*' section of *CCM Chapter 5: Chassis Modification & Construction* for diagrams which will aid an understanding of the correct process.

(b) is of an inside diameter that provides a close tolerance fit for the fastener; and

(c) is inserted within the tubular section through a hole that provides a close tolerance fit for the reinforcing crush-tube, on the face opposite to that which the component is positioned against; and

(d) is fully welded to the face of the tubular section opposite to that which the component is positioned against.

5.3.3

Where hoses or wiring pass through a tubular section of frame on a motorcycle, the entry and exit holes in the frame must incorporate adequate reinforcing within the frame section to prevent any loss of strength.

5.3.3

Reinforcing can include a section of tube welded inside the hole, or sleeving welded around the outside of the frame at the hole location.

5.4 Engine Mounting & Drive-train Attachment

5.4.1

The engine and drive-train fitted to a motorcycle must be attached to the frame in accordance with the requirements specified in *MCM Chapter 9: Engine & Drive-train.*

5.5 Condition

5.5.1

All areas within a production frame of a motorcycle that have been modified, and all areas of a custom frame in a motorcycle, must:

(a) be protected against corrosion; and

(b) not have any rust, corrosion, cracking, or any other kind of damage, to the extent that the frame may be weakened as a result.

Head-stock & Hard-tail Requirements

5.6 Head-stocks

5.6.1

A head-stock on a motorcycle frame that is other than the head-stock fitted to the frame by the motorcycle frame manufacturer, must be:

(a) in the case of a custom motorcycle frame, a machined-steel part made from a material designed to be welded; or

(b) in the case of a modified production motorcycle frame, either:

(i) a machined-steel part made from a material designed to be welded; or

(ii) an OEM motorcycle head-stock manufactured using either a casting or forging process, provided that the requirements of 5.9.3 are met.

A motorcycle frame constructed or modified before 1 January 2026 is not required to comply with 5.6.1, provided that after thorough inspection, no fatigue cracking or fracturing is evident. Specific investigation must be carried out, with removal of paint if necessary to assist the inspection process.

5.6.1(b)(ii)

Welding of a cast or forged OE head-stock is not permitted, unless the very strict processes specified in *LVVTA Information Sheet 01-2018 Welding Process for Cast or Forged Components* are followed.

5.7 Hard-tail Rear Ends

5.7.1

The frame of a motorcycle which incorporates a hard-tail rear end, must, together with the hard-tail rear end section itself, be designed to withstand the increased shock loads imposed on the frame and hard-tail section resulting from a lack of suspension compliance.

5.7.1

Hard-tail shock loads will be transferred throughout the whole frame, and in particular the hard-tail section, so the frame and hard-tail section must both be considered.

5.7.2

Components fitted to a motorcycle frame which incorporates a hard-tail rear end, including the rear hub, bearing, and wheel, must be suitable for the increased shock loads of a hard-tail rear end resulting from a lack of suspension compliance.

Hard-tail rear ends are usually of a triangular design, to assist in withstanding the unusually high shock loads.

Other Requirements

5.8 Fasteners

5.8.1

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

5.9 Welding

5.9.1

A component attachment bracket welded to the frame tubes within a motorcycle must be welded in such a way as to:

(a) reduce the effect of the stress concentration point; and

(b) ensure that a site for corrosion is not created between the bracket and the tube.

5.9.1(b)

A continuous weld around the bracket is a common way of avoiding a corrosion site.

5.9.2

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

5.9.3

A motorcycle head-stock which was manufactured using either a casting or a forging process must not be welded into a motorcycle frame, unless all applicable requirements of *LVVTA Information Sheet 01-2018 Welding Process for Cast or Forged Components* are met.

5.10 Steering System Modifications

5.10.1

A motorcycle that has undergone frame modification or construction which may affect the performance of the steering system, must comply with the applicable requirements specified in *MCM Chapter 7: Steering Systems.*

5.11 Braking System Modifications

5.11.1

A motorcycle that has undergone frame modification or construction which may affect the performance of the braking system, must comply with the applicable requirements specified in *MCM Chapter 8: Braking Systems.*

Exclusions

No exclusions apply to this chapter.

Useful Information

Frame Design Principles

The strength and rigidity of a motorcycle frame is dependent on the accuracy of the tube joints and the welding that has been carried out. The failure of one welded joint can seriously affect the overall strength of a frame.

Because the material typically used in the construction of a frame is so small and light, special attention must be paid to the attachment of components that can transmit high loads back to the frame, such as the steering head-stock, swing-arm, and braking components. Gussets are sometimes required to assist in spreading the loads being transmitted throughout the greatest possible area of frame, rather than having the load concentrated on one small area.

Whilst the torsional rigidity for a frame is not specified within the technical requirements, it is essential that any flexing that may occur is such that it will not lead to cracking of the frame, brackets, or welds, and will not adversely affect front and rear steering geometry.

It's important to involve an LVV Certifier at the first instance when constructing a motorcycle frame – they'll be able to provide guidance on construction methods, and they'll need to see that things like inner sleeves have been used on butt-jointed sections of frame. The best way to do this is with progress inspections throughout the construction of the frame.

Frame Design Types

There are many different types of frame design that can be found on production motorcycles. Over the last century, performance and weight-saving demands have meant that motorcycle frames have evolved from a basic diamond-shaped tubular design based on a bicycle to a myriad of sophisticated layouts, using exotic materials and race-bred construction methods, like one-piece cast alloy and in some cases carbon-fibre frames.

Designs can also vary greatly depending on the intended use of the motorcycle – for example, an offroad scrambler-style motorcycle has a very different intended use (and therefore construction method) to a MotoGP-homologation superbike.

To follow is a basic explanation of the most common frame construction types:

- Backbone:

  This is a motorcycle frame with one main link between the steering head and rear swing-arm pivot, usually steel tube or square section, sometimes referred to as the 'spine'. The engine attaches directly to (and hangs from) the spine or centre post, with a down-tube at the front. These frames are usually found on low-performance motorcycles, like the Suzuki GN series.

- Single or double (half-duplex) cradle:

  This is similar to a backbone-style frame, but rather than attaching directly to the backbone, the engine is supported by a tubular cradle, which then attaches to the down-tube and frame. The engine and transmission sit inside the cradle, which is predominantly rectangular or diamond-shaped, and can be either one centrally placed cradle unit attached to the down-tube and backbone, or two parallel cradles placed to the left and right of the vertical centreline, depending on the size of the engine and cylinder arrangement.

  Single cradle frames can be found on most off-road motorcycles, while double-cradle type frames are often used for older sports-touring bikes, like the Honda CB1000.

- Full-duplex cradle:

  This is similar to a double-cradle frame, but without a front down-tube – the two tubular engine cradle frames make up the motorcycle frame structure, and support the steering head and rear swing-arm pivot. This type of frame construction was pioneered by Norton, where it was known as the 'featherbed'. Some designs of full-duplex still incorporate a spine below the fuel tank, but others rely entirely on the two cradles to make up the frame structure.

- Perimeter:

  In this frame type, two parallel 'spars' made of pressed steel or cast/forged alloy connect the steering head to the rear swing-arm pivot, which wrap around the engine. This provides much greater rigidity than a backbone frame arrangement, as it reduces the amount of material and joins (and thus potential for flex) between the steering head and swing-arm pivot. Another bonus is that this design can provide a lower centre of gravity than a traditional backbone design, as the frame structure is placed lower in the motorcycle.

  The two spars are usually much heavier in construction than a traditional tubular frame, and this frame design is favoured for high-performance sports bikes like the Honda CBR/RR, Kawasaki Ninja, and Suzuki GSX-R ranges.

- Trellis:

  This is similar to a perimeter frame, but the two spars are constructed of multiple interlinked steel tubes set out in a lattice formation rather than of a one-piece pressed or cast material. This design retains most of the benefits of a perimeter frame with the added bonus of a reduction in weight, but is more complex to manufacture.

  A trellis frame can be found on various sports and racing bikes, such as the Ducati Monster and Panigale ranges, and various iterations of the KTM Duke.

There are, of course, hybrid designs that feature aspects of more than one of the above frame types, and others (such as monocoque construction) that are not mentioned. The designs above are, however, the most predominantly used frame types for production motorcycles.

Material Specifications for a Custom Frame

Because of the myriad of different construction methods and styles of motorcycle, it is difficult to create a one-size-fits-all tubing specification matrix for construction of a custom motorcycle frame. There are too many variables for this to be possible – the type of material required can depend on the construction method of the frame in question, the weight of the completed motorcycle, the size of engine and the amount of power it will make, and the intended end use of the motorcycle.

The best guide a builder can use to determine type of material required for a frame is to look at a mass-produced motorcycle of comparable power, weight, and frame construction, and base the material specifications required on this. For example, when building a frame for a light, café-racer style motorcycle, a comparable mass-production bike could be a Honda CB400.

Obviously, if alterations are being made to an OE frame where increased stresses are expected (for example, changing to a hard-tail rear end, or fitment of a heavier engine), increased bracing and an increase in the size of materials will need to be factored into the build.

Terms & Definitions for Chapter 5

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.
Backbone	is the main horizontal tube that connects the steering head to the rear swing-arm cradle, also known as the 'spine'.
Build Approval	means the approval process specified in the *CCM* or *MCM Chapter 4: Build Approval Process*.
Butt-joint	is a method of attaching two components together via welding, where there is no overlap between the surfaces and the weld is run along the edge of the component.
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*.
Cradle	in a motorcycle context, denotes a tubular mounting system for the engine and drive-train, where these parts are encircled within the cradle.
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.
Down-tube	refers to the main vertical frame tube positioned forward of the engine, which descends from the steering head and connects to the horizontal backbone tube.
Drawn-over-mandrel	sometimes abbreviated to 'DOM', means a method of forming sections of steel material, such as rectangular hollow section and round tubing, over a mandrel.

Engine mounts	means the devices that fasten the engine onto the frame.
Gearbox	means the mechanical assembly used to convert engine speed to road speed through the use of a number of different gear ratios.
Gross vehicle mass	sometimes abbreviated to 'GVM', means the maximum legal weight at which a vehicle can be operated, including the vehicle's tare, and its payload.
Hard-tail	means an assembly which solidly connects the rear axle to the frame, with the associated removal of the rear suspension system.
Head-stock	is a cylindrical component which attaches to the frame, and allows the front end assembly to rotate side to side, enabling the rider to steer the motorcycle.
Laden weight	means the weight in any combination of possible loading, from a lightweight rider up to the motorcycle's GVM limit.
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	(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 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 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 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*.

Mandrel	is a tool against which material, such as sections of tubing, can be shaped to form the desired component, such as a frame section.
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.
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*.
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*.
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.
Stress-risers	means a sharp edge or acute change of shape which could cause concentrated stress on a component or section of material when a load is applied.
Swing-arm	means the rear suspension arm of a motorcycle, which attaches to the frame at its forward end, and locates the rear wheel.
LVVTA TAC	(LVVTA Technical Advisory Committee) is an LVVTA-appointed panel of industry expert-level technical specialists, established to provide LVVTA with a very high level of technical support and direction on all technical matters relevant to the LVV certification system.