

Vehicle Standards Bulletin 14

**NATIONAL CODE OF PRACTICE
for
LIGHT VEHICLE CONSTRUCTION
and
MODIFICATION**

INTRODUCTION

1st February 2006

This page left intentionally blank

INTRODUCT ION

	Page
1 Scope	4
2 Vehicle Definitions	5
2.1 Production Vehicle	5
2.2 Modified Production Vehicle	5
2.3 Individual Constructed Vehicle	6
2.4 Street Rods	6
3 Using the Code	7
3.1 National Recognition	7
3.2 Code Designation	7
3.3 Approval Codes	7
3.4 Checklists	7
3.5 Limited Application to Light Commercial Vehicles	8
3.6 Administration	8
3.7 Written-off and Imported Vehicles	8
3.8 Minor Modifications to Production Vehicles that do not require prior Approval	9
4 Explanation of Terms	10
5 Warning to Users	11
6 List of Codes	12

1 SCOPE

All state and territory governments in Australia have regulations that govern vehicle modifications. The regulations require vehicles to be roadworthy and to remain compliant with all applicable Australian Design Rules (ADRs). The regulations also require a vehicle, or any modification or attachment to a vehicle, to be in a condition that is not likely to injure the driver or any other road users including pedestrians.

This national code of practice (titled, *National Code of Practice for Light Vehicle Construction and Modification* (NCOP)) outlines the minimum design, construction, installation and performance requirements for modifications to light vehicles, for building individually constructed vehicles (ICVs) and for the certification of certain imported vehicles. Compliance with the NCOP requirements will ensure that work undertaken satisfies the regulatory requirements of jurisdictions.

For the purpose of this code of practice, a light vehicle is defined as a motor vehicle with a Gross Vehicle Mass of 4.5 tonnes or less. This does not preclude the use of this code of practice for other categories of vehicles, where appropriate.

The requirements for some light vehicle modifications such as chassis extensions and installation of wheelchair loaders are contained in Vehicle Standards Bulletin 6, *Heavy Vehicle Modifications – National Code of Practice* (VSB6).

To simplify the modification approval process Sub-Section 3.8 provides a list of modifications that may be performed without reference to a registering authority, except where there is a change in the vehicle's description on the register - e.g. a change in engine number or vehicle colour. These modifications are not dealt with any further in the code.

The NCOP also contains requirements for modifications that may be carried out without the requirement for certification and these are detailed in each Section of the Code under the heading – *Modifications without Certification*. (Whilst these modifications do not require certification, the difference between these modifications and those listed in Sub-Section 3.8, is the level of complexity. To this end, the relevant Sections of the NCOP provide advice on how these modifications should be performed.)

The main thrust of the NCOP is to provide detailed requirements for modifications, conversions and construction that require certification and these are detailed in each relevant Section of the NCOP under the heading - *Certified Modifications*.

The administrative requirements for certification of light vehicle modification or construction are the responsibility of State and Territory jurisdictions and are separate from this Code of Practice.

2 VEHICLE DEFINITIONS

The requirements for modification or construction of light vehicles under the NCOP refer to the following four vehicle definitions:

2.1 PRODUCTION VEHICLE

Production Vehicle is a vehicle manufactured and marketed in volume for normal road use. Production vehicles manufactured after January 1969 for use in Australia will normally be fitted with a Compliance Plate or Personal Import Plate.

2.2 MODIFIED PRODUCTION VEHICLE

A *Modified Production Vehicle* is a production vehicle that has one of the following kinds of modification:

<p>Minor modifications to Production Vehicles</p>	<p>These are minor modifications carried out on <i>Production Vehicles</i> and are generally accepted by jurisdictions as requiring no approvals or examination unless their execution is likely to cause an injury or nuisance to the driver, passengers or other road users, (e.g. a standard radio which is ceiling mounted in a position which is likely to cause the driver serious head injuries in a minor crash.)</p>
<p>Common modifications to Production Vehicles</p>	<p>These represent the majority of <i>Production Vehicle</i> modifications. These modifications are not excessive and do not generally affect the safety of the <i>Completed Vehicle</i> to any great extent if they are carried out sensibly.</p>
<p>Significant modifications to Production Vehicles, which result in, Completed Vehicles that are recognisable as the original parent vehicle.</p>	<p>The modifications involve major alterations to the vehicle body, engine, drive train or chassis but the vehicle retains its original identity and VIN. The <i>Production Vehicle</i> body, monocoque or chassis may be modified but each major component, whether modified or not, remains recognisable. These modifications have the potential to seriously affect the safety of the <i>Completed Vehicle</i> and may affect the <i>Completed Vehicle's</i> strength, structural integrity and road handling characteristics.</p>
<p>Extensive modifications to Production Vehicles to the point where the original vehicle/s is/are unrecognisable.</p>	<p>The modifications involve major alterations such as the combination of one or more major sections/components of various <i>Production Vehicles</i>. It may be difficult to determine the <i>Completed Vehicle's</i> original identity and VIN or a choice of vehicle identities may result, e.g. in the case of vehicle made up of two vehicles – some jurisdictions will retain the VIN of the chassis whilst others will retain the VIN of the body).</p> <p>These modifications have the potential to seriously affect the safety of the <i>Completed Vehicle</i> and may affect the <i>Completed Vehicle's</i> strength, structural integrity and road handling characteristics.</p>

2.3 INDIVIDUALLY CONSTRUCTED VEHICLE

An *Individually Constructed Vehicle* (ICV) is a vehicle that is not a *Production Vehicle* or a *Modified Production Vehicle*.

An ICV is produced as a 'one-off' vehicle. If more than three ICVs are manufactured by a person in a 12-month period, this NCOP does not apply and these vehicles are then subject to the certification procedures administered by the Department of Transport and Regional Services under the *Motor Vehicle Standards Act*.

An ICV may be composed of parts from one or more *Production Vehicles*. The parts do not need to be new.

Examples of ICVs include 'kit cars' such as Cobra and Lotus 7 replicas that have been assembled in accordance with the production limitations mentioned above.

An ICV should comply with the ADRs applicable to its date of manufacture. Each Registering Authority will determine the date of manufacture of an ICV. It is important that prospective builders discuss this issue with the appropriate jurisdiction before commencing a project.

Alternative methods of demonstrating ADR compliance for ICVs are also acceptable. Registering Authorities may grant exemptions from compliance with ADRs that require vehicle crash testing.

An ICV is considered to be a new vehicle for registration purposes and therefore will always require the issue of a new VIN.

An ICV, being a new design, need not comply with the requirements of the Modification Approval Codes that relate to modifications of existing *Production Vehicles* - for example, the ratio of engine size to vehicle weight requirements of Code LA- *Engine* do not apply.

2.4 STREET RODS

A *Street Rod* is a vehicle manufactured in accordance with the *National Guidelines for the Construction and Modification of Street Rods in Australia*.

Street Rods are extensively modified pre-1949 model light vehicles or are replicas of such vehicles and may be subject to special Registration conditions.

The street rod guidelines may be downloaded from the Department of Transport and Regional Services (DOTARS) website at www.dotars.gov.au. Vehicles built outside of the street rod guidelines must comply with the relevant ICV requirements as specified in this document.

NOTE: As the States and Territories administer these Guidelines, any queries concerning the Guidelines must be directed to the appropriate department within your jurisdiction – please do not contact DOTARS for street rod construction or registration queries.

3 USING THE CODE

3.1 NATIONAL RECOGNITION

There are two principal codes of practice that are nationally recognised in Australia that provide advice for the construction and modification of road vehicles.

This NCOP and Vehicle Standards Bulletin *Heavy Vehicle Modifications - National Code of Practice N^o6*, commonly referred to as “VSB6”.

Under the NCOP lie two sets of guidelines that are also nationally recognised:

- *National Guidelines for the Construction and Modification of Street Rods in Australia.*
- *National Guidelines for Individually Constructed LE1 Motor Tricycles (Other than Goods Vehicles) in Australia.*

3.2 CODE DESIGNATION

In this NCOP, the designation of all approval codes follows that of the equivalent VSB6 codes, except for the addition of the prefix “L” signifying their application to light vehicles.

The NCOP is divided into a number of sections, each of which pertains to a particular category of vehicle modification, which in turn are designated a primary code. The section *Engine* for example, has a primary code designation “LA”. Individual codes concerning specific modification types are distinguished by the addition of a numerical identifier. For example, the *Performance Engine Installation* modification approval code is designated “LA2”.

3.3 APPROVAL CODES

The NCOP employs two types of approval codes, one for approval of the **design** of a vehicle or modification, the other for approval of the actual **modification** or **construction**. This enables the installation or fabrication of a conversion designed and approved by an engineer (e.g. *Brake System Conversion - Design* LG1) to be approved by another person under the appropriate modification or construction code (e.g. *Brake System Conversion* LG2). Therefore, it is often necessary for a vehicle construction or modification to have a number of approval codes.

3.4 CHECKLISTS

For each design, modification or construction approval code there is at least one checklist. This is to help ensure that the design and all the work are of a satisfactory standard and all relevant factors are considered.

As stated above in Item 3.3, some modifications will require two checklists – one for the design and another for the modification itself. This approach allows for the design of a modification to be carried out by someone other than the person/organisation who performs the modification. For example an engineer may design a left hand drive conversion under code LS1 and have it approved by the registration authority. This design may then be subsequently used by a number of modifiers.

In these circumstances, the checklist for the modification will demand the inclusion of the design approval reference number. In the left hand drive conversion example given above, the

Introduction

modifier will be required to include the approval reference number issued under the design code (LS1) in the modification checklist (LS2).

In the case of complex modifications, a checklist will be required for each major element of the completed modification. For example, where a passenger vehicle is modified, by extending the wheelbase and removing the roof, four checklists will be required – one each for the roof removal design, the vehicle stretch design, the roof modification and the stretch modification.

In some cases complex modifications may involve other primary code categories. If in the previous example the child restraints anchor points needed to be repositioned, a checklist covering a child restraint installation (LK6) would also be required.

It is therefore important that modifiers acquaint themselves with the entire NCOP so as to minimise the risk of having modifications rejected by the registering authority because of incomplete work.

Checklists are critical to the successful operation of the NCOP. Checklists must be used by both signatories who plate vehicles under a modification scheme and by persons who make individual submissions for approval. Standard practice requires those involved in modification schemes to retain the checklists for audit purposes.

Signatories or companies involved in the modification industry may copy or download checklists without copyright concerns and may “top and tail” the checklists with their logos, providing the published contents of the checklists are not omitted or altered in any way - alternative formatting is acceptable however.

3.5 LIMITED APPLICATION TO LIGHT COMMERCIAL VEHICLES

Some approval codes for “truck-like” modifications are not replicated in this light vehicle NCOP. In such cases VSB6 may be used for approval of modifications to light commercial vehicles or other light vehicles based on a truck chassis subject to discussion with the appropriate Registration Authority.

3.6 ADMINISTRATION

Authorities administer Codes of Practice differently and it is therefore important that the appropriate Registration Authority be contacted for information concerning business rules before commencing any work.

Certain Registration Authorities administer schemes that allow authorised persons or organisations to place a modification approval plate on a modified vehicle. Amongst other things, the plate must have stamped on it the codes applicable to the work carried out signifying that it has been carried out in accordance with this NCOP.

Checklists contained in the NCOP are provided for the convenience of both designers and modifiers. They may be photocopied for use on more than one job. Persons or organisations may also make facsimiles of the checklists, “top and tailed” with the respective organisation’s logos and other relevant information. In both cases, the checklists must be copied in full and no part of the essential content must be modified or omitted.

3.7 WRITTEN-OFF AND IMPORTED VEHICLES

The use of major structural components such as a body or chassis from a written-off or imported vehicle may be prohibited by legislation. It is important that individuals or persons involved in this industry discuss this issue with the appropriate jurisdiction before commencing a project.

3.8 MINOR MODIFICATIONS TO PRODUCTION VEHICLES THAT DO NOT REQUIRE PRIOR APPROVAL

The following modifications may be performed without reference to a registering authority, except where there is a change in the vehicle's description on the register - e.g. engine number or vehicle colour.

Any modification or the fitting of a device must not contravene the requirements of the *Australian Vehicle Standards Rules* or any of the general safety provisions.

Items must also be fitted in accordance with the item manufacturer's instructions or specifications and must comply with accepted engineering standards and practices.

Minor Modifications to Production Vehicle that do not Require Prior Approval

- Additional lighting (e.g. driving lights and fog lamps)
- Aerials that do not obscure drivers view
- Air conditioning
- Air horn of a single tone
- Air shock absorbers provided that the vehicle maintains its original attitude
- Alarm systems
- Rear mounted removable bicycle racks
- Mudguard flares that are flexible
- Gauges internally located on the dash
- Markings, paintings, sign writing, stripes, (prism pattern) film on bodywork that do not reflect excessive light
- Mesh stone shields for windscreen and lamps
- Radios and additional speakers
- Rear vision mirrors
- Roof racks
- Sun-visors (exterior)
- Tow bars
- Wheel chair carriers (roof top type only)

NOTE: The above section does not apply when the modification or the fitting of any device involves structural changes to the original vehicle, encroachment into occupant protection areas or any reduction in the effectiveness of safety related areas. In these cases formal prior approval must be sought.

Repairs or direct replacements are not considered to be modifications and therefore do not require reference to registering authorities.

Under certain specific conditions, other modifications may not require reference to registering authorities. These are detailed in each section of this NCOP.

4 EXPLANATION OF TERMS

ADR (Australian Design Rule)

VSR (Vehicle Standards Rule)

VSB (Vehicle Standards Bulletin)

VIN (Vehicle Identification Number)

PRODUCTION VEHICLE DOM (Date of Manufacture)* – means the date the vehicle is available in Australia in a condition which will enable a '*Compliance Plate*' to be lawfully affixed to the vehicle. This date of manufacture will continue to apply to a **Modified Production Vehicle**.

RE-BODIED/RE-CHASSIED PRODUCTION VEHICLE DOM (Date of Manufacture)* – means the date of manufacture of the *dominant* portion of the vehicle accepted by the Registering Authority.

INDIVIDUALLY CONSTRUCTED VEHICLE DOM (Date of Manufacture)* – means the date determined by the appropriate Registering Authority.

CHASSIS* – the basic operating motor vehicle including engine, frame and other essential structural and mechanical parts, but exclusive of body and all appurtenances for the accommodation of driver, property and passengers appliances, or equipment related to other than control.

SIGNATORY – For the purposes of the NCOP engineers and tradespersons involved in the approval process are referred to collectively under the generic term of **Signatory**. The degree of authority or responsibility attributed to subcategories of Signatory may vary slightly in this regard depending on the administrative requirements of each jurisdiction. Persons, who wish to be recognised as signatories, must seek advice from the jurisdiction/s in which they wish to practice.

* (Definitions sourced from the Australian Design Rules).

5 WARNING TO USERS

Users of the NCOP need to ensure that they refer to the most recent version of the relevant Section/s when working on a job or project. The version is identified by the date on the face page of each Section. On the website, each Section has the version date contained in the Section file name for easy identification.

If not already done so, users must also download the *Preface*.

These two Sections provide the necessary background information to assist users in understanding how the NCOP is administered by registration authorities across Australia, on how it is structured, and the meaning of the types of modification codes specified in the NCOP.

Understanding these requirements is important to ensure that the correct processes are followed thereby reducing the likelihood of arguments or having work rejected by authorities.

If in doubt about any issue concerning or contained in the NCOP, users should seek clarification from the appropriate state or territory.

Whilst the NCOP provides assistance with respect to the construction of ICVs and the execution of modifications, it is not to be taken to be a design manual. Determination of component strength, performance, suitability and functionality must be either calculated or determined on a case by case basis by suitably qualified personnel experienced in each matter under consideration.

Please do not contact the Department of Transport and Regional Services (DOTARS) about the NCOP. DOTARS provides the central NCOP download website as a service only.

6 LIST OF CODES

Section

LA ENGINE

- LA1 Equivalent Engine Substitution
- LA2 Performance Engine Installation
- LA3 Supercharger/Turbocharger Installation
- LA4 Engine Modifications

LB TRANSMISSION

- LB1 Transmission Substitution
- LB2 Rear Axle Substitution

LG BRAKES

- LG1 Brake System Conversion (Design)
- LG2 Brake System Conversion

LH BODY & CHASSIS

- LH1 Roof Conversion (Design)
- LH2 Roof Conversion
- LH3 Modified Wheelbase Conversion (Design)
- LH4 Modified Wheelbase Conversion
- LH5 Vehicle Construction (Design)
- LH6 Vehicle Construction
- LH7 Body/Chassis Variants Conversion
- LH8 Not Used
- LH9 Street Rod Construction
- LH10 Not Used
- LH11 Campervan and Motorhome Conversion

Section

LK SEATING & OCCUPANT PROTECTION

- LK1 Seat & Seat Belt Installation
- LK2 Seat & Seat Belt Anchorage (Design)
- LK3-5 Not Used
- LK6 Child Restraint Anchorage Installation
- LK7 Not Used
- LK8 Roll Bar & Roll Cage Installation

LL MOTORCYCLES & THREE WHEELED VEHICLES

- LL7 Seating Capacity Alteration

LM FUEL SYSTEMS

- LM1 Fuel Tank Alteration
- LM2 Liquid Petroleum Gas Installation
- LM3 Compressed Natural Gas Installation

LO VEHICLE STANDARDS COMPLIANCE

- LO1 Australian Design Rule Compliance
- LO2 ICV Passenger Cars and Derivatives
- LO3 Personal Imported Vehicle Compliance
- LO4 ICV Tricycle LEM1
- LO5 ICV Tricycle LEP1
- LO6 Street Rods
- LO7 ICV Motorcycle

LS SUSPENSION & STEERING

- LS1 LHD Vehicle Steering Conversion (Design)
- LS2 LHD Vehicle Steering Conversion
- LS3 Front Suspension and Steering Conversion (Design)
- LS4 Front Suspension and Steering Conversion
- LS5 Rear Suspension Conversion (Design)
- LS6 Rear Suspension Conversion

Section

LS SUSPENSION & STEERING (CONTINUED)

- LS7 High Lift - 50mm to 150mm (Design)
- LS8 High Lift - 50mm to 150mm Modification

LT CERTIFIED TESTS

- LT1 Beaming & Torsion Tests
- LT2 Lane Change Manoeuvring Test
- LT3 Gaseous Emissions Test
- LT4 Noise Test

LV INSTALLATION of ELECTRIC DRIVES in MOTOR VEHICLES

- LV1 Electrical Power Installation