LOW VOLUME VEHICLE TECHNICAL ASSOCIATION Inc

Drive-shaft Safety-loop Requirement Clarification

Introduction:

The purpose of this drive-shaft safety loop information sheet is to provide information about the requirements and specifications for drive-shaft safety loops, currently only found in the NZ Hobby Car Technical Manual; and to provide some clarity on other aspects of drive-shaft safety loop requirements. This information will be added to the Engine & Drive-train Conversions Standard in due course, but until this happens, this information sheet provides all required information for LVV certification purpose, and must be applied in addition to the Engine & Drive-train Form-set whenever the Engine & Drive-train Standard is used.

Requirements:

Existing requirements:

Below is the text that has been copied out of section 5.22 of the NZ Hobby Car Technical Manual, which provides more detail than the current version of the Engine & Drive-train Conversions Standard.

5.22.1

A drive-shaft safety-loop must be fitted to a low volume vehicle with an open drive-line, in the case of either:

(a) any custom chassis in a rear-drive front-engine low volume vehicle; or

(b) any modified production chassis in a rear-drive front engine low volume vehicle, where:

(i) the vehicle has had an engine conversion that has resulted in a significant increase in power or torque; or

(ii) the vehicle has had its factory-fitted engine significantly modified, such that a significant increase in power or torque has resulted; or

(iii) the drive-shaft fitted to the vehicle has been modified by welding.

5.22.2

A drive-shaft safety loop fitted to a modified production or custom chassis in a low volume vehicle must:

(a) be mounted within 150 mm (6") rearward of the front drive-shaft universal; and

(b) provide a full 360-degree enclosure of the drive-shaft; and

(c) be manufactured from a material specification of not less than:

(i) in the case of flat-section material, 50 mm x 5 mm (2" x 13/64"); or

(ii) in the case of tubular-section material, 22 mm x 3.

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Agreed amended requirement:

Section 5.22.2 item (a) – it has been agreed that the existing requirement for the drive-shaft safety loop(s) to be mounted within 150mm (6'') rearward of the front drive-shaft universal is too restrictive, because some vehicles do not have a suitable mounting point within this 150mm range. The TAC has agreed that this will be changed within the Hobby Car Technical Manual at the next amendment opportunity to 250mm (9.8''). In the interim, LVV Certifiers may apply this new agreed requirement, effective immediately.

There is one proviso however, and that is in cases where a drive-shaft is very short, in which case the loop must be positioned far enough forward to be effective, and to prevent the shaft from contacting the vehicle floor, or the road surface. In the case of very short drive-shafts, 250 mm may not prove effective, so this must be considered in each case.

Paragraph 5.22.2 of the HCTM will be changed in due course, but the agreed change may be applied immediately.

Additional Clarifications:

Definition of significant increase in power or torque:

A significant increase in power or torque in a low volume vehicle is considered to be over 50% of the vehicle's factory power output. This is supported by section 2.4(2)(b) of the braking standard which requires that any scratch-built vehicle or modified production low volume vehicle which has attained an increase in engine power output from the original vehicle manufacturer's specifications of over 50% requires a 5 cycle brake test.

The exception to this 50% threshold is a vehicle which has had a turbocharger, supercharger or nitrous system fitted; – due to the potential for further performance increase with a forced induction system, such vehicles must have a driveshaft safety loop fitted even if it can be shown to have resulted in less than 50% increase.

A useful tool for checking factory power outputs is the 'Wikipedia' website.

Non UJ-style couplings:

Don't forget that all joints, regardless of their construction type, must be treated in the same way as universal joints when determining whether a drive-shaft safety loop is required. This includes non UJ-style couplings.

Four wheel drive & all-wheel drive vehicles:

Four wheel drive & all wheel drive vehicles should be treated in the same way as rear-wheel-drive vehicles, except that no drive-shaft safety loops are required on a front drive-shaft. There may however be some unusual situations arise where a front drive-shaft is able to make contact with the road surface or critical mechanical components; – such vehicles should be dealt with by the LVV Certifier on a case-by-case basis, remembering that the LVVTA Technical Team are also available to assist with any such issues.

Turbo and Supercharged vehicles:

The addition of a turbocharger, supercharger, or nitrous system to any vehicle undergoing LVV certification automatically requires that a drive-shaft safety loop is fitted. This is due to the potential for further performance increase with a forced induction system. Such vehicles must have a drive-shaft safety loop fitted even if it can be shown to have had a less than 50% increase.

Drive-shaft safety-loops incorporated within a chassis:

Where a chassis member or section is to be used as a substitute for a separate safety loop, it must be equal to or greater strength than the minimum specifications for a drive-shaft safety loop. The chassis member or section must also be within the specifications detailed for a driveshaft safety loop in relation to each front driveshaft universal, and must provide 360 degree protection.

FS010 Engine & Drive-train Conversions Form-set correction:

In the current FS010 Engine & Drive-train Conversions Form-set, item 1a states; *"Vehicle has had engine and drive-train change to those of an OE model variant, and all components are total bolt-in with no heating, cutting, bending or welding, in which case the inspection process starts (provided all attachment and fastening systems meet normal requirements) at item # 40"*.

The result of this, if applied to the letter, is that item # 32 (drive-shaft safety loops) is missed during the inspection. This was a mistake during the development of the form-set, and the intention was not for some engine & drive-train conversions or modifications (resulting in significant power increases) to avoid the requirement for a drive-shaft safety loop.

The FS010 form-set will be amended in due course, however until this occurs, please ensure that item # 32 is applied and assessed in every case.

If any assistance in the use of this Information Sheet is needed, please contact an LVVTA Technical Team member at the Wellington LVVTA office.

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