

## Technical Support Team for Unusually Complex Modifications

### Introduction:

In more recent years, the nature of some vehicle modifications has - due to changes in technology and the resultant increasingly complex systems that are now available - become extremely challenging for anyone tasked with the responsibility of determining whether or not such modifications are safe.

LVVTA has become involved in assisting LVV Certifiers sometimes when they have been presented with some unusually complex modifications to assess, and what has become clear during these assessments is that - because of the extremely diverse and complex nature of the components and systems being used today - there are many occasions when a given modification, or series of modifications, is well beyond the skill-sets of any one individual person, regardless of how accomplished or experienced the person may be.



*A Technical Support Team will include industry experts and LVV Certifiers with specialised skills to cover all of the areas involved.*

### Examples of unusually complex modifications:

There are many types of modification being carried out today (both here in New Zealand and on vehicles which are imported from overseas) which are so complex, that they fall outside of the knowledge base of any one person. One example of a very complex series of modifications that LVVTA became involved in during 2014 was a brand new Holden Barina car which was fitted with a hydraulically and electronically-controlled 'tiller' or 'joystick' steering system for a driver with severe physical disabilities.

This system meant that the vehicle was controlled entirely without the use of a steering wheel, and with no direct mechanical connection between the tiller control and the wheels. The skill-sets needed to assess this vehicle included a very high-level disability equipment expert, a hydraulic systems expert, an electronics systems expert, and an all-round scratch-built vehicle designer/fabricator.

Attempting to certify this vehicle would place an entirely unreasonable burden on the shoulders of any individual LVV Certifier, and it would be totally unreasonable for LVVTA or a Government agency to expect

any one individual LVV Certifier to take responsibility for vehicles with extremely high-level modifications like this when presented for LVV certification.

### **Limitations of the normal TAC approval process:**

A further complication in relation to the high-end modifications incorporated within the Holden Barina is that during the Technical Advisory Committee's (TAC) review process of it, the TAC members acknowledged that the level of complexity associated with the modifications on the Barina went far beyond that which they could confidently approve based solely on a document-based application. The TAC members also recognised that some aspects of the modifications present on the Barina may be outside of their combined area of expertise, and that a person – or persons – with a very specialised area of knowledge would be needed for some aspects of the vehicle.

### **'Technical Support Team' concept developed:**

LVVTA has looked at ways of resolving this conundrum; - to reduce the burden on an individual LVV Certifier, to provide 'coal-face' assistance to the TAC, and to ensure that unusually complex modifications receive the necessary level of assessment needed, even if that means a number of people with different skill-sets are involved, who in total, make up the required level of knowledge or skill to deal with the vehicle in question.

With the potential risks associated with some of this high-end modification work, it is important that a high level of confidence that a system is safe and compliant exists for the vehicle users, other road users, LVVTA, and the NZ Transport Agency.

The answer to this situation lies in the establishment of a 'Technical Support Team', which, effectively, is a team of people with the necessary specialist knowledge and expertise to cover every aspect of a given complex modification. The technical experts would be selected by LVVTA in consultation with the members of the TAC, and the process of carrying out the LVV certification inspection would be managed by LVVTA.

### **Development of Technical Support Team inspection process:**

The new Technical Support Team inspection process was developed, coordinated and trialled by LVVTA technical staff using the Holden Barina Tiller steering system as a trial run. The inspection team consisted of three automotive industry specialists, each with particular strengths in relation to the modifications. The specialists were carefully selected by LVVTA technical staff, and agreed by the TAC, with the selections made based on the person's specific areas of expertise; - a hydraulic systems specialist, a disability adaptive control systems specialist, and a 1D-category LVV Certifier with broad high-level knowledge of steering systems and fabrication.

This mix of people and skills provided an excellent combination of knowledge and experience from which to provide a meaningful and thorough assessment, and ensured that a comprehensive and well-rounded inspection and discussion of the various aspects of the vehicle modification could take place. Once completed, the results of the assessment were compiled and developed into a formal response back to the TAC, who was then able to form an overall opinion on the modifications, and provide meaningful feedback and guidance to LVVTA technical staff on the best way to move forward with the certification.

### **Application of Technical Support Team inspection process:**

The 'Technical Support Team' inspection process must be applied in any instance where the modifications incorporate an unusually high level of complexity, which would be loosely defined as being any situation where the level of diversity and complexity associated with the modifications mean that it would be unreasonable for one LVV Certifier to take overall responsibility for the certification, or where the level of

diversity and complexity of the modifications means that it is outside the area of expertise of either the LVV Certifier, or the TAC.

Some examples of typical situations where an LVV Certifier must contact LVVTA include those modifications listed below:

- Hydraulically operated tiller/joystick steering or braking controller
- Drive-by-wire electronic tiller/joystick steering or braking controller
- Drive-from-wheelchair lowered floor vehicle with composite or unusual materials used in construction
- A vehicle which is having the 'Series-production Modification Pre-approval Process' applied (refer to *Information Sheet 01-2014 - Series-production Modification Pre-approval Process* for details)
- Complex high-voltage electric or hydrogen-generating power-trains
- Any vehicle which either the LVVTA Technical Working Group or the LVVTA Technical Advisory Committee deem the application of this process necessary

The above modification examples **must** have this process applied. If similar modifications are identified or if the LVV Certifier or modifier is unsure whether the modification falls into this category, they must contact the LVVTA technical staff at the Wellington office for advice.

The introduction of this Technical Support Team inspection process will provide the LVV Certifier, LVVTA technical staff and the LVVTA Technical Advisory Committee (TAC) with the confidence that all complex, unusual or innovative modifications are both safe and compliant, whilst ensuring that innovative and new modifications are not restricted or inhibited in any way. This process will also help to ensure against a situation where an LVV Certifier is forced to work in isolation, placing themselves in the unreasonable position of having to deal with overly-complex vehicle design issues on their own.

### **Implementation of this process:**

The 'trigger point' for the application of this process must come from the LVV Certifier who is initially approached to undertake the LVV certification inspection process, and he should contact a member of the LVVTA technical team, who will then implement and manage the Technical Support Team inspection process, working all the way through the process with the initiating LVV Certifier.

Any LVV Certifier becoming involved with a vehicle which requires, or may require this process, must, from the date of the release of this information sheet, notify the modifier and LVVTA technical staff at the earliest possible opportunity.

### **Costs:**

Due to the process covering modifications across the whole country, there will often be additional costs generated over and above the cost of the normal LVV Certification process applied by the initiating LVV Certifier. It is possible, if not likely, that selected inspection team members will need to travel from different parts of the country, meaning car mileage, parking costs, flights, taxis, time, and accommodation costs. All of these costs must be met by the modifier or vehicle owner. These costs will need to be factored into the cost of the certification process, and this factoring should be notified early on, preferably at the time of quoting for the certification inspection, to prevent any nasty surprises at the time of the LVV certification inspection.

It is important therefore, that the vehicle owner and modifier are both made aware of this mandatory process as soon as practicable.

- All costs incurred in the application of this Technical Support Team inspection process are the sole responsibility of the vehicle owner and/or modifier. LVVTA does not agree to cover any direct or indirect costs, other than those specifically detailed below.
- All direct costs to LVVTA must be met, e.g. flights, mileage, parking, and accommodation, upon production of valid receipts.
- LVVTA will supply a Technical Officer's time in order to apply and manage this process, provided that the vehicle owner and/or modifier works with LVVTA within a spirit of cooperation and willingness.
- TAC application fees will be applied at the 'Component Type Approval' rate, the details of which are contained in LVVTA Information Sheet # 11-2012 - *LVVTA Approval Application Guide*.
- All Technical Support Team members' direct costs must be met. e.g. flights, mileage, parking, and accommodation upon production of valid receipts.
- All Technical Support Team members' time must be paid for on the basis of a fair and reasonable hourly rate.
- At its discretion, LVVTA may assist this billing process by providing an itemised all-inclusive invoice to the vehicle owner and/or modifier at the completion of the process. TAC approvals and LVV Certification plates will not be issued until such time as all invoiced costs for this service have been met in full.

### **Timeframes:**

Additional time must be allowed to facilitate this Technical Support Team inspection process when it is necessary to involve a Technical Support Team inspection as part of an overall LVV certification process. Whilst every effort will be made by LVVTA to ensure that this process is completed in a timely manner, there will always be many factors that are beyond LVVTA's control which may affect or otherwise delay the outcome. Because of these factors, it is not always possible for LVVTA to make any accurate estimations of a completion date. It is expected however that if this process is implemented early on in the modification process, there should be minimal delays experienced.

To allow the best chance of bringing this process to the attention of vehicle modifiers, and therefore eliminating lengthy delays, LVV Certifiers should make this information sheet available to all key people they have contact with who are involved in very complex modification work, including (for disability vehicle work) occupational therapists, and people involved in funding such modification work.

### **Finally:**

For any assistance in the use of this Information Sheet please contact an LVVTA technical team member at the LVVTA office on (04) 238-4343.