Engineer application and assessment

Assessment of different categories

There are 7 technical certification categories in the heavy vehicle specialist certification system. NZTA assesses and qualifies 4 of them, and the other 3 are assessed by external organisations, with final approval the responsibility of NZTA.

The categories assessed by NZTA

The categories assessed by NZTA are:

- load anchorages
- towing connections
- chassis modification
- swept path and vehicle dynamics.

The categories assessed by external organisations are:

- log bolster attachments
- brake modifications
- static rollover threshold.

For categories assessed by NZTA, there is a pass requirement of 70% or higher for the load anchorages, towing connections and chassis modification classes. A stand down period may be imposed if an applicant fails the assessment with the following results:

- If the applicant scores 20% or less in their first attempt in either the legal or technical assessment, recommendation is that the applicant have a six month stand down from the date of the exam result being released before reapplying.
- If the applicant scored 50% or less in either 2nd attempt in either the legal or technical assessment, recommendation is that the applicant have a six month stand down from the date of the exam result being released before reapplying.
- If the applicant fails a third attempt in either the legal or technical assessment, recommendation is that they have a twelve month stand down from the date of the exam result being released before reapplying.

For categories assessed by external organisations, applicants must be successful in all assessments before they can apply to NZTA to be appointed as a heavy vehicle specialist inspector.

- For information on brakes assessment please contact Doug Latto of Transport & Mechanical Consulting Ltd at: **douglatto@gmail.com**
- For information on SRT assessment please contact John de Pont at Transport Engineering Research New Zealand Ltd (TERNZ) at: **j.depont@ternz.co.nz**
- For information on log bolster attachment certification please contact Bruce Nairn of the Log Transport Safety Council at: **tgmservices@xtra.co.nz**

When you apply, please include evidence of the course(s) you've passed with your application.

Engineering certifier requirements

All HV engineering certifiers must:

- have a minimum qualification of NZCE (mechanical, civil or aviation) or approved equivalent (minimum Level 6 Diploma, except where specialist knowledge and experience is deemed acceptable by NZTA). In special circumstances and upon application a Level 5 Diploma may be considered. Overseas qualifications must be referred to the New Zealand Qualifications Authority (NZQA), who will determine the New Zealand equivalent, if available.
- have knowledge of the requirements specified in:
  - the **VIRM: Heavy vehicle specialist certification**
  - the relevant parts of the **Land Transport Act 1998**
  - the **Land Transport Rule: Vehicle Standards Compliance 2002**
  - other relevant **Land Transport Rules**.

Applicants for appointment as HV engineering certifiers will be assessed on their understanding of design principles for their category and their knowledge of the general and New Zealand requirements for heavy vehicles.

Load anchorage engineering certifiers (HVEA)

Scope

All anchorages for securing loads to vehicles, excluding logging bolsters. Certifiers shall use the latest version of any standard except where permitted otherwise in the Rule.

Experience requirements

Relevant work experience in the design or fabrication of load anchorages. Working knowledge of the following documents:

1. **Land Transport Rule: Heavy Vehicles 2004** and its amendments
2. Welding in the transport industry (see **Technical bulletin 13**)
3. NZS 5444: Load Anchorage Points for Heavy Vehicles
4. NZS 5413: Stock Crates
5. AS/NZS 1554: Structural Steel Welding (parts 1 and 4 as appropriate)
6. AS/NZS 1665: Welding of Aluminium structures
7. AS 3990: Mechanical Equipment – Steelwork (supersedes AS 1250)
8. ISO 1161: Series 1 Freight Containers – Corner Fittings – Specification
9. AS/NZS 2980: Qualification Tests for Metal Arc Welders
10. AS/NZS 4380:Cargo restraint systems – Webbing load restraint systems.

Towing connections engineering certifier (HVET)

Scope

All towing connections between vehicles. This includes fifth wheels, fifth-wheel kingpins, towbars, drawbeams and drawbars.

Experience requirements

Relevant work experience in the design or fabrication of towing connections. Working knowledge of the following documents:

1. **Land Transport Rule: Heavy Vehicles 2004** and its amendments
2. Welding in the transport industry (see **Technical bulletin 13**)

3. NZS 5446: Heavy vehicle towing connections – Drawbeams and drawbars
4. NZS 5450: Specification for Coupling Devices for Articulated Vehicles – Fifth Wheel Assemblies
5. NZS 5451: Specification for Coupling Devices for Articulated Vehicles – Fifth Wheel Kingpins
6. AS/NZS 4968, Heavy-vehicles – Mechanical coupling between articulated vehicle combinations
7. AS 2174, Articulated vehicles – Mechanical coupling between prime movers and semitrailers
8. AS 3990: 1993, Mechanical Equipment – Steelwork
9. AS/NZS 1554: Structural Steel Welding (parts 1 and 4 as appropriate)
10. AS/NZS 1665: Welding of Aluminium structures
11. AS/NZS 2980: Qualification Tests for Metal Arc Welders
12. NZS 5467: Code of Practice for Light Trailers
13. ISO 1102: Commercial Road Vehicles – Mechanical Connections between Towing Vehicles and Trailers–50mm Drawbar Couplings
14. AS 1110: ISO Metric Hexagon Precision Bolts and Screws
15. AS/NZS 4291.1: Mechanical properties of fasteners
16. AS 2213: 50mm Pin-Type Couplings and Drawbar Eyes for Trailers
17. BS 5400: Part 10, Code of Practice for Fatigue
18. BS 7608: Code of Practice for Fatigue Design and Assessment of Steel Structures.

Chassis modification and repair engineering certifier (HVEC)

Scope

Chassis modification includes rollover strength for PSVs, steering conversions, chassis modifications and repairs, design of new chassis and ratings, mounting of cranes and other equipment, modifications and repairs to drive trains and axles, and seatbelt anchorage design.

Experience requirements

Relevant work experience in the design, modification and fabrication of vehicles and vehicle components. Working knowledge of the following documents:

1. **Land Transport Rule: Vehicle Standards Compliance 2002** and its amendments
2. **Land Transport Rule: Heavy Vehicles 2004** and its amendments
3. Welding in the transport industry (see **Technical bulletin 13**)
4. AS/NZS 1554: Structural Steel Welding (parts 1 and 4 as appropriate)
5. AS/NZS 1665: Welding of Aluminium structures
6. AS/NZS 2980: Qualification Tests for Metal Arc Welders
7. AS 3990: 1993, Mechanical Equipment – Steelwork
8. Ladder frame chassis design guide (joint MoT/IRL document)
9. BS 5400: 1980, Part 10, Code of Practice for Fatigue
10. BS 7608: 1993 Code of Practice for Fatigue, Design and Assessment of Steel Structures
11. AS 1110: ISO Metric Hexagon Precision Bolts and Screws
12. AS/NZS 4291.1: Mechanical properties of fasteners
13. Low Volume Vehicle Code.

Brake engineering certifier (HVEK)

Scope

All heavy vehicle brake system design and modification.

Experience requirements

Relevant work experience in the design and modification of braking systems. Passed Heavy Vehicle Brake course and exam as approved by NZTA. Working knowledge of the following documents:

- **Land Transport Rule: Heavy Vehicles Brakes 2006** and its amendments, including Schedule 5
- **Land Transport Rule: Vehicle Standards Compliance 2002** and its amendments
- Access to the New Zealand brake calculator or an approved proprietary device.

Bolster attachment engineering certifier (HVEL)

Scope

All logging bolster attachments, modifications and repairs.

Experience requirements

The certifier must:

1. be an appointed HVEC certifier with sufficient (three years or more) experience in the transport industry in manufacturing, supervision, quality control or drafting in a similar area
2. have passed the log bolster attachment course and exam set by the Log Transport Safety Council
3. have a working knowledge of **Land Transport Rule: Heavy Vehicles 2004** and its amendments
4. have a working knowledge of Log Transport Safety Council: Log Bolster Attachment Code.
5. have a working knowledge of Welding in the transport industry (see **Technical bulletin 13**)
6. have a working knowledge of AS/NZS 1554: Structural Steel Welding (parts 1 and 4 as appropriate)
7. have a working knowledge of AS/NZS 1665: Welding of Aluminium structures
8. have a working knowledge of AS/NZS 2980: Qualification Tests for Metal Arc Welders
9. have a working knowledge of AS 3990: 1993, Mechanical Equipment – Steelwork
10. have a working knowledge of BS 5400: 1980, Part 10, Code of Practice for Fatigue
11. have a working knowledge of BS 7608: 1993 Code of Practice for Fatigue, Design and Assessment of Steel Structures
12. have a working knowledge of AS 1110: ISO Metric Hexagon Precision Bolts and Screws
13. have a working knowledge of AS/NZS 4291.1: Mechanical properties of fasteners.

Static rollover threshold engineering certifier (HVSx)

Scope

Measure and input vehicle data into a computer program to establish a stability angle. There are currently three different certification categories for SRT calculation

- SRT level 1
- SRT level 2
- SRT level 3.

Experience and requirements

For those wishing to qualify as an NZTA-approved and appointed inspectors there are two tests:

- basic for level 1 inspectors and
- advanced for level 2 inspectors.

Courses and assessments are run by TERNZ and cover:

- background to the SRT and its inclusion in the dimension and mass rule
- performance standards for stability and relationships to crash risk

- derivation and validation of the SRT calculator
- use of basic features
- advanced topics in load distribution and positioning
- advanced topics in suspension performance and input requirements
- the Transport Agency *Vehicle inspection requirements manual: Heavy vehicle specialist certification*.

Level 1 certifiers use the SRT calculator software but are limited to simpler cases. For certification purposes a level 1 certifier may use all the features of the calculator except Load category 'Other', which requires the calculation of the payload centre of gravity and the 'user defined' suspension options, which requires the obtaining and interpretation of suspension parameters.

Level 2 certifiers also use the SRT calculator software but have all options available.

Level 3 certifiers may be approved by NZTA to use alternative methods of determining SRT. These could include tilt table testing or computer simulation.

Within the framework of the two levels of certification, there are four parties that may be involved in gathering the data for SRT certification, namely:

1. Operator: may provide tare axle weight data and may nominate load type (Uniform density/ Mixed freight/ Other) on which the certification is to be based except where this is defined by NZTA.

2. Level 1 SRT inspectors: typically these are individuals who have passed the level 1 SRT training but have not been authorised by NZTA to be certifiers.

3. HVS1 certifiers: typically these are individuals who have passed the level 1 SRT training and have been appointed by NZTA to act as certifiers under the NZTA *Notice of appointment*.

4. HVS2 certifiers: typically individuals who have passed both the level 1 and level 2 SRT training and have been appointed by NZTA to act as certifiers.

Information and measured vehicle data may be shared between the last three parties as indicated in the diagram below. In this diagram S1 refers to Level 1 SRT inspectors, while HVS1 and HVS2 refers to the certifiers. The arrows indicate allowable paths of information and data transfer. Thus a Level 1 certifier, HVS1, may receive vehicle data that has been obtained by a Level 1 SRT inspector and use these data to undertake a level 1 certification without personally inspecting the vehicle and making the measurements. However, the HVS1 certifier is ultimately responsible for the accuracy of the SRT certificate issued and must ensure that the S1 inspector is appropriately qualified and competent.

Although the allowable data transfers do permit the transfer of information from HVS1 certifiers to HVS2 certifiers, this can only be within the scope of the HVS1's demonstrated level of competence. Thus a level 2 certification which requires an HVS2 certifier will also require that the vehicle is inspected by an HVS2 certifier.

When the certifier issues an SRT certificate he must also issue an LT400 to accompany it.

For some vehicles, the SRT certification process will lead to some vehicle or suspension modifications being undertaken in order to improve the vehicle's stability and allow it to maintain its load carrying capacity while achieving the required SRT. These vehicle modifications will generally require certification by an NZTA approved certifying engineer and will require the issuing of an LT400 detailing the modifications made. Although the certification of the vehicle modifications and the SRT certification may be undertaken by the same engineer certifier, if he is appropriately qualified, two separate LT400s are required, one for the vehicle modifications and one for the SRT.

HVSC matrix

Swept path and vehicle dynamics (HVPx)

These categories confirm swept path and dynamic vehicle performance by calculation using approved software or by physical testing. There are two different certification categories:

- HVP1 – Swept Path Certification
- HVP2 – Dynamic Vehicle Performance (PBS)

To be appointed HVP1, you must:

- Be an appointed HVEC certifier with sufficient experience (1 year) in the transport industry in manufacturing, supervision, quality control or drafting in a similar area
- Have access to and be able to prove competence operating appropriate computer software (such software to be advised to NZTA who will review its suitability) and/or the ability to carry out appropriate physical testing
- Prove competence operating computer software by carrying out a test calculation
- Have working knowledge of **Land Transport Rule: Vehicle Dimensions and Mass 2016** and its amendments
- Have a working knowledge of **VIRM: HVSC, 7-4 swept path requirements**

In addition to the above, additional requirements to be appointed HVP2, you must:

- be an appointed HVEC and HVP1 certifier with sufficient experience (3 years) in the transport industry in manufacturing, supervision, quality control or drafting in a similar area
- Pass an assessment set by NZTA
- For HVP2 have a working knowledge of **VIRM: HVSC, 7-5 Dynamic Performance**

Note: Approved applicants will be limited to either physical testing or software testing, depending on what they confirm during the appointment process. A change or addition to software requires another test calculation to be approved.

Appointment

Once you have been accepted following the interview and have fulfilled any conditions imposed upon you including a period of mentoring, you will be appointed as an IO/VI in the appropriate category. The duration of the mentoring will be determined by its effectiveness which will be assessed at three-monthly intervals. We will provide you information on how to order your LT400s, and issue you with a notice detailing your NZTA ID and a certificate of appointment.

Syllabus

Please see the **Heavy vehicle specialist certification syllabus** for information on the documents, rules and regulations an engineer inspector needs to be familiar with for assessment.