

2 – 4 December 2019

Venue: VACC, Level 7, 464 StKilda Road, Melbourne



# Certification, Engineering & Modifications

## HEAVY VEHICLE TRAINING

### COURSE OUTLINE

The course is in three parts, each of which can be separately enrolled.

Date	Course	Details
2 December	<b>CERTIFICATION</b>	Certification procedures, permit vehicles, SP vehicles, IAP, RVCS, Legal issues Road Vehicle Standards Act, RAV, RAWs, Heavy vehicles sector explained
3 December	<b>ENGINEERING</b>	Brakes, engines, axles, suspension, steering, electrical systems, tyres and performance, PBS, chassis design
4 December	<b>MODIFICATIONS AND REPLACEMENT PARTS</b>	VSB overview, body attachments, brake modifications, mechanical couplings, towbars, vehicle mounted lifting systems, engine and transmission substitution, common failure modes, vehicle safety

### WHO SHOULD ATTEND

Workshop managers, fleet operation managers, vehicle engineers, components suppliers and manufacturers, vehicle modifiers, insurance investigators, inspectors. The course will be informative for anyone with a professional interest in heavy truck and trailer safety and mechanical performance.

### COURSE COSTS

<b>ARTSA, CVIAA, CVIAV and VACC members:</b>	2 & 3 December = \$550 (inc gst) bWVSK
	4 December = \$275 (inc gst) (no charge for afternoon)
<b>Non-members:</b>	2 and 3 December = \$770 (inc gst) bWVSK
	4 December = \$385 (inc gst) (no charge for afternoon)

Participants can elect to attend on any or all of the three days.

To attend, complete the registration form or enrol on-line via [www.artsa.com.au/training](http://www.artsa.com.au/training)

For all enquiries, contact ARTSA Executive Officer Greg Rowe on [exec@artsa.com.au](mailto:exec@artsa.com.au) or phone 0407 825 132

## Monday 2nd December 2019

# PART 1 HEAVY VEHICLE CERTIFICATION

<b>8:30 am</b>	<b>Outline and Introductions</b>
<b>8:45am</b>	<b>Overview of Heavy Vehicle Certification Procedures</b> State v Federal responsibilities, NHVR, in-service v new, public road v private-road. Importation requirements and procedures. (Licensee, special, RAWs, personal). Registration types and categories. Permit and special-purpose vehicle types. Special purpose vehicle registrations. Evaluation vehicle registrations. Plant vehicles and dangerous goods vehicles. NEVDIS & registration procedures, VIN reporting requirements
<b>9:15am</b>	<b>Permit Vehicles - Certification Aspects</b> Axle mass limits in Australia. Road access approval process. Overview description of the PBS scheme. The roles of consultants, assessors & certifiers in PBS. PBS take-up levels. NHVR application and approval procedures. Timelines. Special-purpose vehicle approvals within the NHVR framework and also within the work safety domain.
<b>9:45 am</b>	<b>Special Purpose Vehicle Requirements</b> Work Safe certification framework. Australian Standards. Prescribed and non-prescribed vehicles. Standards applicable to in-service vehicles that are not derived from the ADRs. Design approvals issued by work safety authorities.
<b>10:15am</b>	<b>Intelligent Access Project and the TCA</b> Intelligent Access Project – overview of requirements in the various jurisdictions. Equipment approvals. Role of the TCA. Equipment certified by TCA.
<b>10.30am</b>	<b>Break</b>
<b>11:00 am</b>	<b>The character and value of the Australian heavy vehicle fleet</b> Vehicle registration codes. Vehicle totals in each registration category. New registration levels. Retirement levels. Leading suppliers. Value of the industry. Value of local manufacturing. Geographical factors. Vehicle and body types.
<b>11:30 am</b>	<b>Industry Trends</b> Country of origin trends. Geographical ownership trends. Vehicle type trends. Registration code trends. State of ownership trends. Technology trends. Size and value of the heavy vehicle industry. Technology outlook
<b>12.30pm</b>	<b>Lunch</b>
<b>1:30 pm</b>	<b>The Road Vehicle Certification System (RVCS)</b> Type approval schemes v individual vehicle approval schemes. Purpose and Structure of the RVCS. RVCS Website as a resource. UN ECE, EU Directive and GTR rules. RVCS vehicle categories (NB1, NB2, NC, TC, TD, MD4, ME). Special approvals. RVCS approval types (full, low volume, secondary, RAWs). L, D, S, P, A and T numbers. Second-Stage of Manufacture approvals. Introduction to Informed Filler and custom SE & SF forms. Administrative Circulars. COP and TFI Audits. Compliance plate supply and cost.

Informed filler forms How to compose an application for a compliance plate application.

<b>3pm</b>	<b>Break</b>
<b>3:30 pm</b>	<b>Legal Responsibilities</b> National Heavy Vehicle Law and Regulations. State variations. Role of WA and NT with the NHVR. COR Responsibilities arising from recent changes to the NHVL. Insurance risks. Replacement Parts Standards. Recalls obligations.
<b>4:00 pm</b>	<b>The Coming Road Vehicle Standards Act and its Implications</b> Proposed regulation changes. Proposed changes to import rules. RAWs scheme changes as applicable to heavy vehicles. Second Stage of Manufacture changes. RAV database.
<b>4:15 pm</b>	<b>The Performance-Based Standards Scheme</b> PBS as an alternative certification. PBS governance and administration. Outline of technical standards. Ownership of designs. Application procedures. Certification procedures. Road access procedures. Characterisation of the PBS fleet. Proposed reforms to the PBS scheme.
<b>5pm</b>	<b>Close</b>

## Tuesday 3th December 2019

# PART 2 HEAVY VEHICLE ENGINEERING

<b>8:30 am</b>	<b>Outline and Introductions</b>
<b>9.00 am</b>	<b>Heavy Vehicle Brake Systems</b> Types of brake systems on heavy vehicles. Foundation brake systems. Drum v Disc. Brake fade. Air brake system features. Split system protections. Emergency brakes. Spring brakes. European v North American brake systems. Failure protections. ADR 35 & 38 requirements. Compatibility requirements. ECE Regulation 13 requirements v FMVSS 121 requirements. Brake failure claims. Australian stopping performance standards.
<b>9.45 am</b>	<b>Adaptive Braking Systems</b> ADR 35 & 38 requirements. Vehicle Stability Control components. Types of interventions, adaptive brake distribution, voltages and earthing requirements, autonomous braking, steering and lane assist, intervention monitoring. VSC performance on combination vehicles. Towing vehicle detection of VSC on towed vehicles. USA, North American and Japanese rules requirements for VSC / ESC, AEB and lane departure warnings. VSC on combination vehicles.
<b>10:30am</b>	<b>Break</b>
<b>11:00 am</b>	<b>Engine &amp; Transmission Developments</b> Diesel engine technologies, engine failure modes, engine emissions and fuel economy developments, hybrid drives, turbochargers, engine brakes, retarders, CAN bus broadcasts, engine controller data storage, incident storage, RSL tamper response, virtual technician developments, engine telematics,...

<b>11:45 am</b>	<b>Axles, Suspensions &amp; Steering</b> Vehicle dynamic modes, chassis vibration modes, wheel alignment measures, camber, caster, Ackerman angles, axle bending, suspension responses, suspension braking reactions, shock absorber performance, driver vibration levels, road friendly suspensions,...
<b>12.30pm</b>	<b>Lunch</b>
<b>1:30 pm</b>	<b>Vehicle Electrical Systems</b> 12V and 24V systems. Starter system resistance. Alternator characteristics. Electrical protections. Voltage distribution. Earthing. Starter motor current levels and resistance requirements. Automotive components. CAN bus physical layer. Private and public CAN buses. SAE 1939 and ISO 11898 CAN bus protocols. OBD connectors. Black box fault finding technique. Electrical failure modes. Workshop instruments and measurements. Electric hybrid technology overview.
<b>2:15pm</b>	<b>Tyres and their Characteristics</b> Tyre performance characteristics and classifications. Tyre standards. Tyre testing. tyre ratings, tyre wear modes, tyre slip curves, variation with inflation pressure, tyre lateral stiffness and centring moments, Variation of parameters with inflation pressure. Variation of braking distances and road-handling performance with tyre type and parameters. Load and inflation limits of tyres in Australia. Central Tyre Inflation systems.
<b>3pm</b>	<b>Break</b>
<b>3:30 pm</b>	<b>Chassis Strength Design &amp; Failure Modes</b> Chassis ladder design. Vibration modes of vehicles. Acceptable design practice for chassis rail modifications. Reinforcements. Bending moment diagrams and stress calculations. Rivetted constructions, Acceptable factors of safety. Failure modes of metals and plastics. The 'Art' of Engineering Design.
<b>4:15 pm</b>	<b>Computer-Aided Design and Analysis for heavy vehicle assessments.</b> Introduction to CAD. Standard and advanced level programs. Demonstrations Introduction to CAE stress analysis modelling. Auto and manual meshing. Model constraints. Material specification. Linear and non-linear elements / codes. Application of CAE stress analysis to drawbars.
<b>5:00 pm</b>	<b>Close</b>

Wednesday 4th December 2019

## PART 3 HEAVY VEHICLE MODIFICATIONS

<b>8:30 am</b>	<b>Outline and Introductions</b>
<b>8.45 am</b>	<b>Body Attachments – VSB Code J</b> Types of mounts. Minimum number of attachments. Locations of attachments with regard to cross members. Hardware requirements – bolt grades, nut retention mechanisms. Load restraint guide. Prescribed force withstand levels.
<b>10.15 am</b>	<b>Brake Modifications - VSB Code G</b> Scope of brake modifications. Brake tests. Trailer SARNs. Certification outside manufacturer's specifications. Certification by calculations. Brake fade considerations. Parking brake and emergency brake performance prediction. Stopping distance calculations. Friction utilization, load transfer, brake equations, aspects of brake balance, tyres and braking, threshold pressure, limitation of braking performance of combinations.
<b>10.30am</b>	<b>Break</b>
<b>11 am</b>	<b>Brake Modifications (continued after break)</b>
<b>11:15 am</b>	<b>Mechanical Couplings and Towbars – VSB Code P</b> D-value, V-value and S-value definitions and calculations. Types of couplings. Strength and endurance requirements. Towbar design principles. Safety chains. Drawbar design principles. Attachment hardware. Fifth wheel and turntable installation requirements. Requirements arising from AS 4968 Parts 1 & 2 and AS4177.
<b>11:45 am</b>	<b>Vehicle Mounted Lifting Systems – VSB Codes R &amp; T</b> Description of systems that are within specification: Mobile cranes, vehicle loading cranes, tailgate lifters, tip truck lifting mechanisms, tilt tray mechanisms, tipping trailers. Requirements arising from AS 4418 Parts 5 (mobile cranes) & 11 (vehicle loading cranes). Tow truck requirements arising from AS 5400.
<b>12.30pm</b>	<b>Lunch</b>

## PART 4 REPLACEMENT PART CONSIDERATIONS FOR MEDIUM AND HEAVY VEHICLES

- 1.30pm**      **The legal differences between a Modification and a Replacement**
- What Replacements are within the scope of the VSBs, and National Heavy Vehicle Law.
- What Replacement part installations are unclear / uncertain / not within published guidelines or laws.
- Classification of replacement parts into Safety/Compliance Critical, Safety/Compliance relevant, Low risk parts.
- Legal requirements on suppliers of replacement parts in Australia. The roles of the VSS (Federal) Regulator, NHVR, State Road Agencies and the ACCC.
- Review of current replacement parts regulations arising under the ADRs (CRNs and SARNS)
- Legal risks for operators arising under the NHVL.
- How do other countries manage the replacement parts challenge ?

- 2:00 pm**      **Panel Discussion with Parts Suppliers and Operators**

- 2:30pm**      **Break**

- 3:00 pm**      **Workshop**
- Workshop involving participants. Break into five groups. Each group to consider the situation involving replacement part use in a specific domain:
- i. Replacement parts use for brake systems
  - ii. Replacement parts use for mechanical couplings
  - iii. Replacement parts use for axles and hubs
  - iv. Replacement parts use for suspensions
  - v. Replacement parts use in steering systems
- Each group is asked to identify legal uncertainties, practical difficulties that arise, safety concerns, resilience concerns and good practice guidance for suppliers.
- 4.00 pm**      **Presentations by each working group and group discussion.**
- 4:45 pm**      **Discussion of key points to be in the meeting Communique.**
- 5pm**          **Close**

In conjunction with:



## TRAINING LEADER

Dr Peter Hart will lead the training with assistance from ARTSA and CVIAA practitioners.

Peter is an electrical engineer with close to 20 years' experience as a forensic examiner and expert witness. He is also an Agent in the Road Vehicle Certification System and a VicRoads engineering signatory.

Peter will be assisted over three three days by a number of specialists across the certification, engineering and modifications field.

Registration can be completed on line at:

[www.artsa.com.au/training](http://www.artsa.com.au/training)

Or by completing and returning the form below

Name \_\_\_\_\_

Organisation \_\_\_\_\_

Address \_\_\_\_\_

Contact email \_\_\_\_\_

Contact phone \_\_\_\_\_

Registration Costs	ARTSA, CVIAA, CVIAV, VACC Members (inc GST)	Non member (inc GST)	Number of tickets	Total
Part 1, 2 December – Certification	\$550	\$770		\$
Part 2, 3 December – Engineering	\$550	\$770		\$
Part 3, 4 December - Modifications	\$275	\$385		\$
All three days	\$1375	\$1925		\$
			Total	\$

**Note:** Members includes financial members of ARTSA, CVIAA, CVIAV, and VACC. Prices are inclusive of GST

### Payment:

Registration requests without payment will not be processed. Faxed registration forms must include full credit card details. Payment in Australian dollars.

I enclose my cheque / money order payable to 'Australian Road Transport Suppliers Association'

### Or charge to:

Mastercard  Visa

Name of Cardholder \_\_\_\_\_

Expiry Date \_\_\_\_/\_\_\_\_/\_\_\_\_

CW No: \_\_\_\_\_

Card No; \_\_\_\_\_

Signature \_\_\_\_\_

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Total Cost; \$ \_\_\_\_\_

**Email:** [exec@artsa.com.au](mailto:exec@artsa.com.au)

**Post:** ARTSA, PO BOX 1076, Glen Waverley 3150

**Enquiries:** [exec@artsa.com.au](mailto:exec@artsa.com.au)

**Cancellations / Substitutes / Refunds:** Cancellations received in writing by 29th October 2018 will receive a full refund less an administration fee of \$75. After this date no refunds will be issued. Registrations are transferable.

**For more details go to: [www.artsa.com.au/training](http://www.artsa.com.au/training) or contact Greg Rowe on 0407 825 132**