LOG TRANSPORT SAFETY COUNCIL

Off-highway Vehicles

Version 2: May 2012

Intention

The documentation of "Off-highway Vehicle Operating Specifications" was undertaken at the request of Occupational Safety and Health.

The intended use of these off-highway vehicle operating specifications is to document the operating envelope of vehicles working off-highway with reference to current practices and substantiated by theoretical research. It is envisaged that all new off-highway vehicles will be manufactured to the design envelope documented here, and that all existing units operating will adjust their operating limits to meet the recommendations.

These specifications have been written to formalise the operating specifications that have been used and understood by operators for many years. Some of the performance standards have been placed to enhance the safety performance of the vehicles and to ensure that incremental changes are not introduced without reference to the research undertaken to date.

In the event that a particular operation is to work outside of these specifications, consultation and agreement should be sought with Occupational Safety and Health and should be supported with evidence that work place standards are not being compromised. The intent is not to stifle innovation, or limit the possibilities of increasing any performance though this document.

Off-highway Roads

The off-highway network is described as private forest roads that allow travel through forest estates without having to use public roads. Where source and destination are linked by an off-highway road it provides a significant strategic advantage in lowering the overall transport costs.

The operation of this transportation mode relies upon the maintenance of the internal forest network as a private road and does not have to restrict itself to the limitations of the payload and vehicle dimensions that occur on the public road network.

The following operating requirements will apply to all vehicles operating on the off---highway network.

Exclusions.

Articulated dumpers converted to log or stem trucks, and thinning forwarders operating in closed circuit operations and not using in forest routes with other road users, (i.e. the public). Please refer to the section on these units.

Standard Operating Requirements

- Operate the vehicle in accordance with the Land Transport Act, with the exemption of over width, height, length, and weight and the reference to braking performance and SRT values.
- Each vehicle shall:

  ⇛ Hold and display a current Certificate of Road Worthiness.

  ⇛ Be fitted with an industry standard cab protection frame, which meets the Official NZ Truck Loading Code, or the OSH approved code of practice for Safety and Health in Forest Operations.

⇛ Comply with any other regulation or code that applies to log transport.

⇛ Be loaded in accordance with the Official NZ Truck Loading Code.

- The average axle weight on any vehicle, or vehicle combination, shall not exceed 13.5 tonnes (excluding steer axle) and no individual axle weight shall exceed 15 tonnes.
- The overall width of the vehicle including its load shall not exceed 3.3 m.
- The vehicle shall:

⇛ Be rated for the maximum load the unit shall carry, and documentation shall be displayed or carried in the vehicle at all times.

⇛ Be operated within the manufactures rated Gross Vehicle Mass (GVM), and Gross Combination Mass (GCM).

⇛ Be operated in such a manner that the component manufacturers ratings are not exceeded.

⇛ Have an auxiliary braking device

⇛ Meet or exceed a Static Roll Threshold of 0.30 gravity for equipment in current operation, and meeting .32 gravity for any new unit manufactured and hold compliance certificates for inspection if required.

⇛ Be operated by a person holding a class 5 driver's license, and will operate a log book.

⇛ Carry the relevant fire equipment and extinguishers required by the forest owner.

⇛ Have all load anchorage points certified to comply with NZS 5444, the Log Bolster Code.

⇒ Have operating rear trailer lights including tail lights, stop lights and turning indicator lights.

⇒ Have installed a VHF radio with local communication channels.

Braking Requirements.

The braking requirements were reviewed in a TERNZ report published in 2011. A key issue is the use of auxiliary braking to avoid over-heating the service brakes. This requires sound driving practice. Specifically:

- For all descents longer than one km, drivers should choose their descent speed so that vehicle maintains a steady speed using only auxiliary braking with, at most, minimal occasional applications of the service brakes.
- If the initial choice of speed is too high (i.e. service brake application is required to stop the vehicle speeding up), the driver should immediately apply the service brakes firmly before selecting a lower gear and if necessary bring the vehicle to a complete stop before recommencing the descent.
- On any grade of any length, where the driver has missed a gear change and the engine braking is ineffective, the driver should also immediately apply the service brakes firmly and, if necessary, bring the vehicle to a complete stop before recommencing the descent in a lower gear.

The vehicle requirements are:

- Each vehicle (or vehicle combination's), service brakes must meet a minimum retardation of 0.4 gravity at the rated GCM, or the maximum GVM or GCM the vehicle is being operated at, whichever is the lesser.

- Service brakes must be operating on all wheels, with the exception of the very old purpose-built off-highway trucks where brakes were not fitted to the steer axle
- Have auxiliary braking device capable of producing a minimum retardation force of 4.0 BHP per tonne of the GCM the vehicle combination is operating at
- Park brakes, (spring operated) must be fitted on 50% or greater of the vehicle axles and meet a minimum retardation of 0.2g
- The testing of service and park brakes will be by either a loaded brake test or complete a certified brake test, using foundation brakes only. This test is to be at the lesser of, the manufacturers' ratings, or the maximum GVM/GCM the vehicle is operating at. This test is to part of the "Certificate of Roadworthiness" test.

Vehicle Maintenance

- All vehicles are to be maintained on an ongoing basis to meet the "Standard Operating Requirements".
- All faults or breakage shall be repaired as they occur.
- All welding is to be in accordance with AS/NZS 1554 and welding operators qualified to NZS 4711 in the appropriate position and as detailed in "Welding in the Transport Industry"
- An off-highway Vehicle Repair Certificate (appendix 1) shall be completed and signed by the repairer organisation. The certificate will be held on file for viewing on request.
- No equipment or component will be replaced with items of a lessor capacity or rating unless there is a corresponding re-certification that takes into account the rated capacity of the new component.

- Repairers will have regard to specification requirements of the original design and manufacturer requirements where practical.

Vehicle and Component Rating.

- Rating can be undertaken either by an LTSA Certified Engineer or an LTSA approved Manufacturer.
- All new off-highway vehicles shall be rated on commissioning.
- All existing off-highway vehicles must be rated.
- All trailers and dollies are to be physically and permanently identified with a unique fleet number or vehicle number.

All new vehicles shall:

- Be rated for the work they are undertaking including GVM and GCM.
- Have component ratings for drawbars and draw beams, tow couplings and manufactured components fitted by someone other than the original manufacturer.
- Have load anchorage points complying with NZS 5444, the Log Bolster Code.
- All new vehicles are to have attached a plate stating
  - ⇛ The serial number and year of manufacture
  - ⇛ The Manufacturer name
  - ⇛ The year of manufacture or replacement of the draw beam/drawbar

Existing equipment (where the original manufacturer and year of manufacturer is not able to be determined), shall be inspected by an LTSA certified engineer, or an LTSA approved manufacturer. This equipment shall have a plate attached stating:

⇛ The date of inspection

⇛ The name of the Certifying Engineer

⇛ The year of replacement of the draw beam/drawbar

Stems Units. (Excluding Converted Articulated Dump Trucks and Forwarders)

A stems unit is described as a truck and trailer unit. It is used for carting lengths of trees from stump to first break point within the 14 to 37 metre length range. These tree lengths are called stems. Such trucks are specifically manufactured for off-highway loads. They operate on formed forest roads and interact with other road traffic.

The operation of Stem Trucks has been documented in the LIRO report on full stem cartage published in 1994. The dimensional requirements for these vehicles were reviewed in a TERNZ report published in 2011.

- Maximum weights must not exceed the manufacturer's GVM and GCM ratings or loaded in such a manner that individual component ratings are exceeded.
- The distance between the bolsters shall not exceed 19m measured from the centre of the front bolster to the centre of the rear bolster.
- Maximum overhang of 19 metres, (when measured from the centre of the rear bolster to the end of the stem), and stems are to be loaded to ensure the load does not drag on the ground when the vehicle is travelling on level ground.
- Load is to be contained within the line of the bolster stanchions
- Identification of stem ends with a minimum of three stems painted using fluorescent paint.
- Double amber flashing lights, or similar, to be visible by oncoming traffic

- Operating trailer lights
- It is recommended that wide track axles with a width across the tyres of 2.7m be used

Off-highway Double and Single units

- Maximum weights must not exceed the manufacturer's rated GVM or GCM, or operated in such a manner that individual component ratings are not exceeded.
- Single amber flashing light, or similar, to be visible by oncoming traffic.
- Operate trailer lights.
- It is recommended that wide track axles with a width across the tyres of 2.7m be used.
- The use of on highway tractor units operating with off-highway trailers is not recommended.

On Highway Units Operating Off-highway

- An on highway truck will already have the unit and components certified to operate on the public highway.
- Maximum weights must not exceed the manufacturer's rated GVM or GCM, or operated in such a manner that the individual component ratings are exceeded.

Converted Articulated Dump Trucks, Forwarders and their trailers

This type of vehicle operates typically in a different working environment than that of the Stem trucks and off-highway units.

The Converted Articulated dump truck is either a Bailey bridge, of jinker configuration and is typically operating in a circuit that is completely closed off to the public or others who are not primarily working in the operation. This is likely to be from a harvesting site, either ground based or cable operation and transporting stems to a super skid type operation. The normal road trucks and

supervisory vehicles would only come in contact at the super skid site. This operation is normally in a controlled environment within private land.

Units shall:

- Have purpose built logging equipment fitted to the chassis and if operating with a trailer, the trailer will be purpose built.
- Have componentry that has a manufacturer's rating.
- Not exceed manufacturer's GVM or GCM
- Not exceed manufacturer's component ratings, i.e. axle ratings.
- Be braked, on both truck and trailer.
- Meet the 0.4g braking requirement.
- Have driving lights.
- Be inspected every 6 months for basic operating requirements which can be similar in nature to VTNZ Agricultural vehicle standards.
- Have an external agency or company mechanics that can undertake the inspection This must be documented and signed by the inspector and a record kept.
- Hold and display a current Certificate of Inspection.
- Meet requirements of the OSH approved code of practice for Safety and Health in Forest Operations.
- Be fitted with an industry standard cab protection frame (cab guard).
- Where Drop Out Stanchion mechanisms are installed, they should be air or hydraulically activated.

References

NZS 5444 Log Bolster Standard

New Zealand Truck Loading Code

D Latto Off-highway Brake Project TERNZ 2003

D Latto Off-highway Brake Project TERNZ 2003

D Latto Off-highway Logging Truck Rollover Stability TERNZ 2003

G Arnold Full Stem Cartage LIRO 1994

J de Pont Review of the Off-Highway Industry Standard Braking Requirements, TERNZ, June 2011

J de Pont Review of the Off-Highway Industry Standard Requirements for Stem Trucks, TERNZ, June 2011