Task Force on Vehicle Weights & Dimensions

Transport Canada – ecoTECHNOLOGY for Vehicles Program: 6x2 drive-train technical evaluation

December 2016

RDIMS #12541992

Canada

About Transport Canada's ecoTECHNOLOGY for Vehicles Program

- The ecoTECHNOLOGY for Vehicles (eTV) Program is a Government of Canada program that tests and evaluates the **safety** and **environmental** performance of advanced light-duty vehicle (LDV) and heavy-duty vehicle (HDV) technologies. Focus of the program is on **near-term commercial technologies** that are anticipated to enter the Canadian market over the next 10-15 years.

- Program results are being used by Canada to help:
  - inform the development of future vehicle environmental regulations;
  - guide the proactive development of new or revised safety regulations, standards, codes and guidelines; and,
  - support the development of non-regulatory industry codes and standards that anchor the market and industry efforts to integrate new vehicle technologies.

- **With regards to heavy-duty vehicles (HDVs), the eTV program's testing priorities are focussed on addressing knowledge gaps, particularly where new innovations have potential environmental, safety, infrastructure, and efficiency implications on the trucking sector, including vehicle weights and dimensions regulations.**

- In January 2016, eTV established a technical working group to examine 6x2 axle technology for HDVs.
- Working-group kick-off meeting was held in Ottawa on January 28, 2016.

Other Information

Technical working group is comprised of:

- Provincial and territorial weights & dimensions regulators
- Transport Canada – ecoTECHNOLOGY for Vehicles
- Environment and Climate Change Canada
- Trucking Associations
- *Includes consultation OEM and suppliers*

- The working group provides technical guidance and support to:

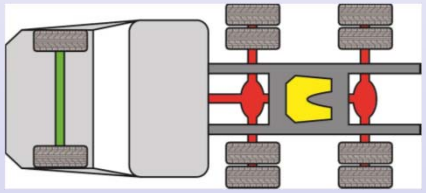
  - Develop testing and evaluation approaches
  - Coordinate testing activities and provide logistical support
  - Peer review technical documents, prior to dissemination

Background Information

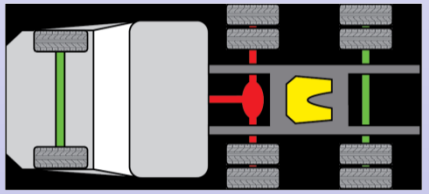
- Traditional highway tractors employ a 6x4 drive configuration which uses a non-powered steer axle and two powered rear axles.
- Recent innovations have resulted in the availability of 6x2 configurations from most major OEMs in North America.
- Vehicle dynamic performance is not well characterized in Canadian conditions, e.g. winter.
- Also, load shifting could temporarily increase individual axle loads to levels that are higher than the current allowable limits, which has potential implications on infrastructure.

Benefits	Potential Considerations
• fuel economy • reduced emissions • reduced maintenance • mass reduction	• tire wear • traction • infrastructure

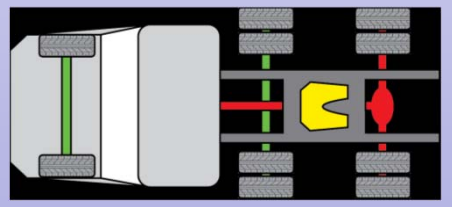
6x2 Configurations



Typical 6x4 arrangement



6x2 tag tandem architecture



6x2 pusher tag architecture

Planned Approach

The eTV Program technical assessment program, which has six planned phases.

Phase 1 – Technical Literature Review – Completed August 2016

Review available OEM technical documents, peer-reviewed publications, consult OEMs and suppliers, and other available material to characterize 6x2 technologies including:

- 6x2 operational performance;
- Overview of different architectures.
- High-level test plan (vehicle dynamics)
- Will be published online - January 2016 (www.tc.gc.ca/eTV)

Phase 2 - Test Plan Development – Completed September 2016

Established test plan to assess:

- **Environment**: Greenhouse gas and other regulated emissions (Dyno/PEMS)
- **Dynamics**: Vehicle dynamics modeling and testing, e.g.:
  - Traction from a dead-stop; high speed stability; cornering and braking (with various loads and traction conditions);
  - Traction control system interactions
- **Performance**: Characterization of load sharing/load equalization properties;
- **Pavement**: Assessment of infrastructure implications, with a particular focus on thin asphalt.

Proposed Test Plan

Phase 3 - Full Scale Vehicle Testing (January 2017 – December 2017)

Full scale vehicle testing will occur at:

- NRC's Automotive and Surface Transportation campus in Ottawa.
- TC's Motor Vehicle Test Centre in Blainville, QC.
- ECCC's Emissions Measurement Facility in Ottawa.

Phase 4 – Infrastructure Modelling (April 2017 – December 2017)

- Susan Tigue, Ph.D., Infra-Tech Solutions Inc, leading the development of a SoW.
- Contract award, execution and final report anticipated by December 2017.

Phase 5 – Peer Review & Final Report

- Work group will peer review and publish the final report in Winter 2017-18.

Ryan Klomp
Transport Canada, Place de Ville, Tower C,
Ottawa, Ont. K1A 0N5
Tel: (613) 513-7012
ryan.klomp@tc.gc.ca