Aerodynamic Enhancements (Part 2)

Our industry is fortunate that a major investigation into next-generation aerodynamic developments is occurring at Monash University. Because Australia relies on long-distance multi-combination trucks that typically travel at 100 km/h, there is tremendous potential to reduce aerodynamic drag and thereby improve fuel economy.

About half of Australia's interstate heavy-vehicle fuel usage goes into aerodynamic drag. Last month's article discussed passive aerodynamic improvements that were on display at last year's Hannover truck show. The state-of-the-art passive aerodynamic treatments such as rounded leading edges, side skirts and well-adjusted deflectors will improve fuel economy by about four per cent compared to a standard semi-trailer. Can Australia do better than this? This is what the research of the Mechanical Engineering Department at Monash University is directed at.

The Monash project is about 'third-generation heavy-vehicle aerodynamic drag reducing devices'. That is, devices intended to reduce or prevent development of turbulence by specialty deflectors, directed jets, vortex generators or active devices which act a bit like speakers. The project is making use of Monash University's 1.4 MW wind tunnel, which is a ¾ open jet facility with a nozzle area of 10.9 m2.

Monash Mechanical Engineering has built a 1/3 scale model of a semi-trailer. The prime-mover model is based upon a Kenworth 108. The trailer is a van with a model refrigeration unit at the front. Trailer side skirts have been included although they can be removed or modified for research purposes. The first stage of the project is to benchmark the drag and investigate the effects of specific features. The single-most important feature is to round the leading edges of the trailer. Other significant features in order of importance are:

- Rounded leading edges on the trailer;
- Cabin roof fairings/ sleeper roof deflector shaping;
- Aerodynamic shaping of the refrigeration unit.
- Deep trailer skirts;
- Cabin side extenders;
- 15o rear boat tail;
- Trailer rear wheel covers;
- Shaping of the front air dam;
- Reduction in the size of the under run barrier at the rear of the trailer.

Soon the project will consider fine-tuning of feature shapes and then third-generation features will be investigated. ARTSA and Kenworth Trucks are the industry partners with Monash University in this important project. MaxiTrans previously contributed. The project is being supported by the Australian Government via an ARC grant, which is leveraged by the industry contribution.

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There are about ten people working on the project covering research students, supervisors and technicians.

It is very important that Australia develops expertise in aerodynamics because we have some much to gain. Reduction in greenhouse gas emissions will be an important social obligation on our industry into the future. Fortunately, improved fuel economy can more than pay for the costs of aerodynamic improvements.

Australia is the world leader when it comes to the development and application of multi-combination and specialist heavy vehicles. We are developers and not just technology takers. It is important that our industry has the knowledge to optimise its vehicle designs. The Monash University Industry Project will provide the knowledge and the trained people to do this. I will keep you informed as this important project proceeds.

Peter Hart
Chairman