Automotive aerodynamics
special edition

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Automotive Aerodynamics Special Edition
Passmore, Howell, Dominy

It is over a century since the importance of car body shape and the resulting wind resistance was identified and almost as long since Jaray applied the concept of streamlining to car design. While there was a period in the 1930’s when road vehicle aerodynamics was of considerable interest the current focus on aerodynamics can be traced back to the late 1960’s and was intensified by the fuel crisis of the early 1970’s. A growing concern for the impact of the road vehicle on the environment over the past 25 years, culminating in the most recent attempts to generate realistic fuel consumption testing and the potential catastrophic fines for exceeding pollution limits has resulted in an unprecedented interest in road vehicle aerodynamics.

The input from aerodynamics to the vehicle development process has grown in recent years, resulting in larger aerodynamics departments within car manufacturers and there has been a commensurate growth in the activities of the academic communities with an interest in vehicle aerodynamics.

While the core activities of the aerodynamic development engineer are essentially unchanged with most of the effort concentrated on reducing drag without compromising high speed stability or degrading thermal performance as much attention is now paid to the refinement issues which improve driver comfort by minimising wind noise and reducing soiling.

Modern aerodynamic development techniques have allowed the creation of production cars with drag coefficients that could only be realised in the past with specialist concept cars and one-off prototypes. Further development brings diminishing returns which has driven the need for much greater understanding of the flow structures involved.

There has been much wasted effort over the years debating the merits of CFD versus the wind tunnel. It is now increasingly apparent that these are complementary tools and the aerodynamicist should employ both experimental and virtual techniques.

These developments are reflected in this special edition, which combines inputs from OEMs, suppliers and academic institutions. While many recent advances in our understanding of car aerodynamics are included it highlights that this is an ongoing process and there are significant opportunities for future progress.