Power and agility for exceptional performance

Energy considerations:

Since the total force opposing the vehicle's motion (at constant speed) multiplied by the distance through which the vehicle travels represents the work that the vehicle's engine must perform, the study of mileage (the amount of energy consumed per unit of distance travelled) requires a detailed analysis of the forces that oppose a vehicle's motion. In terms of physics, Force = rate at which the amount of work generated (energy delivered) varies with the distance travelled, or :

$$F = -\frac{dW}{ds} \alpha \text{ Milage}$$

Ideally, a car traveling at a constant velocity on level ground in a vacuum with frictionless wheels could travel at any speed without consuming any energy beyond what is needed to get the car up to speed. Less ideally, any vehicle must expend energy on overcoming road load forces, which consist of aerodynamic drag, tire rolling resistance, and inertial energy that is lost when the vehicle is decelerated by friction brakes

Road load energy, or the energy demanded at the wheels can be calculated by evaluating the vehicle equation of motion over a specific driving cycle. The vehicle powertrain must then provide this minimum energy in order to move the vehicle, and will lose a large amount of additional energy in the process of converting fuel energy into work and transmitting it to the wheels.

The mandatory publication of the fuel consumption by the manufacturer led some to use dubious practices to reach better values in the past. If the test is on a test stand, the vehicle may detect open doors and adapt the engine control. Also when driven according to the test regime, the parameters may adapt automatically. Test laboratories use a "golden car" that is tested in each one to check that each lab produces the same set of measurements for a given drive cycle

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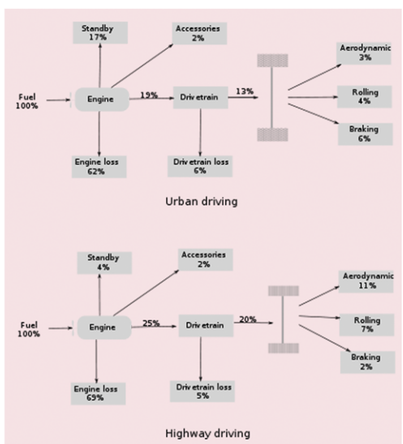

Average engine efficiency

The average thermal efficiency of the internal combustion engine for the overall duty cycle that results from following the driving cycle. Although the peak efficiency of en engine can be as high as 45%, the average efficiency over a duty cycle will usually be much lower.

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