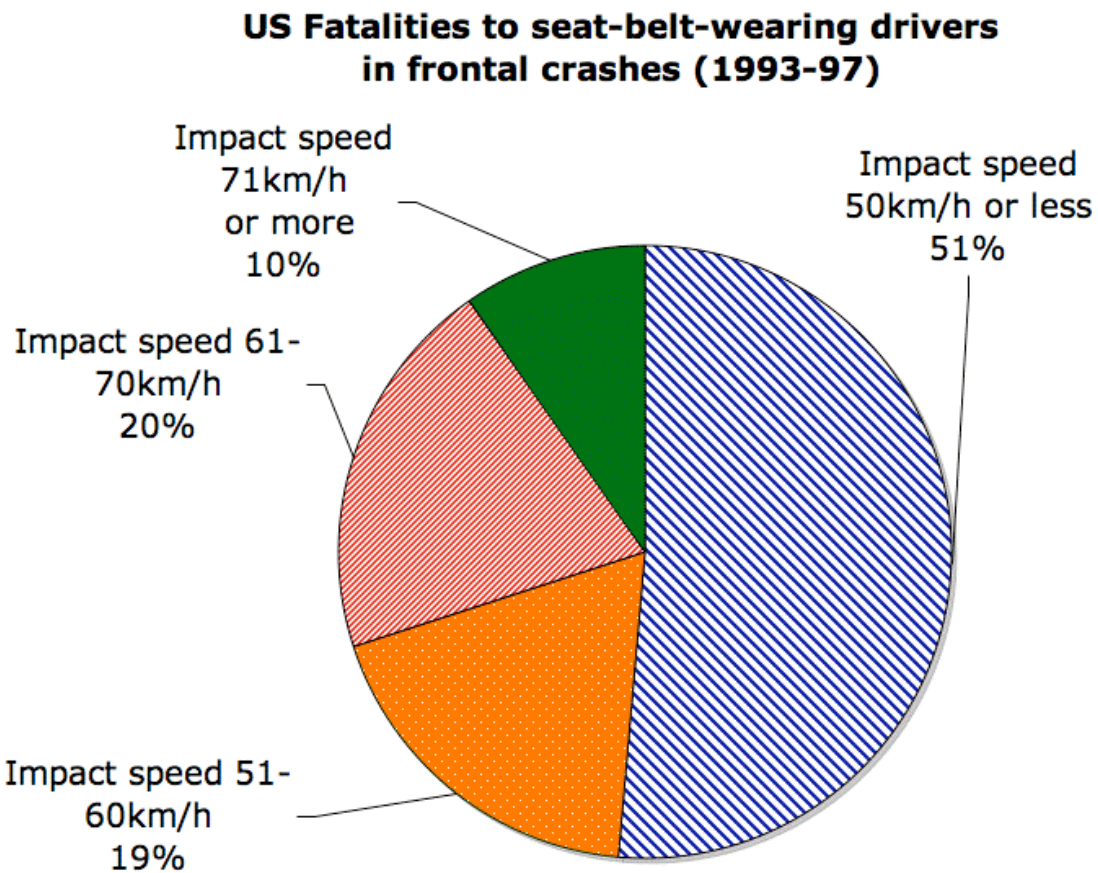


## Question: Half of all fatal car accidents occur at or below what impact speed?

The answer is a surprisingly low 50km/h!

The US government carries out detailed crash reconstructions of a sample of fatal crashes in order to better understand the factors that led to the crash and the resulting injuries. By analysing the data for seat-belt wearing drivers killed in frontal crashes between 1993 and 1997 they found that half of all fatalities occurred at an impact speed (or "delta V") of 50km/h or less.



Data provided by US National Highway Traffic Safety Administration

Graph prepared by Michael Paine

Caption: Impact speeds for US crashes

While it is true that a crash at high speed is more likely to have a fatal outcome, there are many more crashes at the lower speeds and there are just as many fatal crashes below 50km/h as above this impact speed.

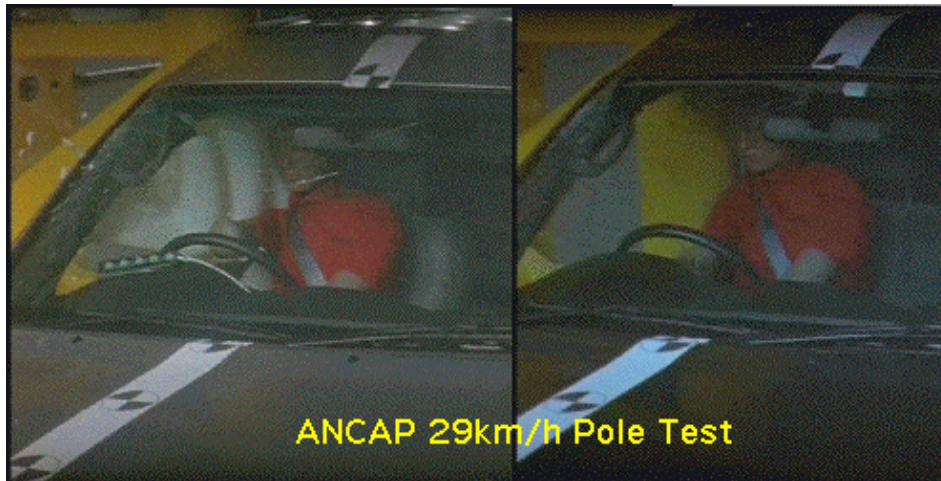
The current Australian car fleet is not too different from the US fleet of the mid-1990s and Australian crashes can be expected to be similar to the US experience.

In the mid-1990s the NSW Roads and Traffic Authority carried out a series of full-frontal crash tests using the same model of vehicle at increasing speeds. The pictures (and dummy injury measurements) confirm that an impact speed of 60km/h is a very severe crash. Higher speeds result in collapse of the passenger compartment and a grave risk of life-threatening injury. Even the most crashworthy vehicles available today are unable to safely protect occupants at frontal impact speeds greater than 70km/h.



Caption: Snapshots from NSW RTA video "Physics of car crashes"

For side impact crashes the median impact speed for a fatality is much less than 50km/h because there is less "crumple space" between the intruding object and the occupant. Crash tests that simulate a vehicle sliding sideways into a pole at 29km/h show that a fatal head injury is extremely likely unless there is an inflatable curtain, or similar device, between the occupant and the pole.



Caption: Snapshots from Australasian New Car Assessment Program crash tests of a four-wheel-drive with and without inflatable curtains. Without the curtain the head impact with the pole is life-threatening.

So it is clear from detailed crash investigations and crash tests that comparatively low speeds can kill.

A recent article in The Age newspaper shows how people can be confused by road accident statistics. In Australia these statistics can only reliably report the speed limit applying on the road where the accident occurred. Very few in-depth crash investigations that reliably estimate impact speed are carried out. Tim Colebath from the Age read the Australian Bureau of Statistics 2007 Yearbook and wrote, on 25 January):

"Speed kills. Almost half the fatal crashes on Australian roads take place at speeds of 100km/h or more, with under a third occurring at 60km/h or less".

I have not read that Yearbook but it seems he is referring to the speed limit rather than the speed of impact. The Australian Transport Safety Bureau publishes data on fatal road accidents. It reports that in the two years 2005-2006 45% of fatal crashes occurred on roads with a speed limit of 100km/h or more and 32% occurred on roads with a speed limit of 60km/h or less.

So Mr Colebath should have chosen his words more carefully.

Exceeding the speed limit - whether it be 50km/h or 110km/h - greatly increases the risk of being involved in a serious accident. The risk doubles for each 5km/h over the speed limit. Recent US research estimates that in at least one third of

fatal accident one or more of the vehicles was speeding. In most cases these accidents could have been avoided or made less severe if the vehicles had obeyed the speed limit. This is in agreement with NSW RTA estimates that 40% of accidents are speed-related.

Travelling at 60km/h in a modern car feels safe - but that is an illusion. An impact at this speed has a very high risk of severe or fatal injuries. This is due to Newton's laws of physics - which, unlike speed limits, cannot be broken - and the frailty of the human body.

Michael Paine is a vehicle safety engineer from Sydney. Since 1996 he has assessed and rated crash tested vehicles for the Australasian New Car Assessment Program. He has also given presentations on speed and crashes at road safety conference and government inquiries.

More at

<http://users.tpg.com.au/users/mpaine/speed.html>