Playing it safe

CRUNCH TIME - if the ends of the car don't crumple to absorb the force of impact, then the force is transferred directly onto the occupants. It's like the difference between falling onto a mattress or falling onto concrete.

Road accidents can't ever be entirely prevented. They are as inevitable as the storms of winter. All we can do is to reduce the frequency of accidents, and perhaps prevent some of the deaths and injuries.

Accidents often start out as driver error, but how they end up may depend on the ability of the car to avoid a crash, and to withstand a crash once it has begun.

There are three main factors that decide whether you live or die on the road: your age, education and vehicle.

Both very young and very old drivers are a high risk. Your amount of education has a huge effect on how you drive. Not only are uneducated people less aware of the world and how it works, but they tend to live by instinct; instinct is a very good servant and a very poor master.

Uneducated people also tend to see life as something that happens to them rather than something that they can control. As a result, uneducated people often don't see cause and effect. For example, uneducated people are far less likely to wear seatbelts than educated people.

Systems That Help Prevent Accidents

Your choice of vehicle also has a huge effect on whether you have an accident and whether you survive if you do. Systems like Electronic Stability Control can reduce your chances of dying by more than 50%. Other systems – such as Anti-Skid Braking – don't appear to make a difference, despite all the hype.

Anti–Skid Braking

When you slam on the brakes in the wet, the car tends to skid because the wheels stop moving and simply slide over the road. Anti-Skid Braking (ABS) uses a computer to check whether each of the car's wheels has stopped turning. If it has, the computer releases the brakes on that wheel just enough to help stop the skid. Tests have shown that ABS stops cars quicker and safer in the wet.

However, there's a world of difference between test tracks and everyday roads. The American Insurance Institute for Highway Safety had the following to say:

"Although ABS performs well on the test track, there is no evidence [that it] made significant reductions in the number of on-the-road crashes. A 1994 Highway Loss Data Institute (HLDI) study and a subsequent 1995 study compared insurance claims for groups of otherwise identical cars with and without ABS, found no differences in the overall frequency or cost of crashes..."

Because ABS should make the most difference on wet and slippery roads, researchers also studied insurance claims experience in 29 northern American states during winter months. Even there they found no difference in the frequency of insurance claims for vehicles with and without anti-lock brakes. A 1997 Institute study and a 2001 update reported no difference in the overall fatal crash involvement of cars with and without ABS. Federal studies of ABS are consistent with Institute and HLDI findings. According to one federal report, 'the overall, net effect of antilock brakes' on both police-reported crashes and fatal crashes 'was close to zero'.

No one knows for sure why the test performance of ABS has not translated into a significant reduction in real-world crashes. A possible reason is that the average motorist rarely experiences total loss of vehicle control, which antilocks are designed to prevent. There is also evidence that many car owners do not know how to use antilock brakes effectively. An Institute survey of drivers with ABS-equipped cars found that more than 50 percent in North Carolina and 40 percent in Wisconsin incorrectly thought they should pump the brakes. Another possibility is that some motorists may drive less cautiously because they believe anti-lock brakes allow them to brake better.

One possible reason for the failure of ABS to lower the road toll is that it affects the brakes only, leaving a human to make a number of critical (and sometimes wrong) decisions. Electronic Stability Control can help with this problem •

Electronic Stability Control

also known as

- Active Skid and Traction Control
- Dynamic Stability Control
- Dynamic Stability & Traction Control
- Electronic Stability Program
- Electronic Stabilisation Program
- Porsche Stability Management
- StabiliTrak
- Vehicle Dynamic Control
- Vehicle Dynamics Control System
- Vehicle Skid Control

Vehicles fitted with Electronic Stability Control (ESC) have less than half as many single-vehicle accidents as conventional vehicles, according to a recent American study.

The study, by the American Insurance Institute for Highway Safety, analysed the crash rates of passenger cars and offroaders fitted with Electronic Stability Control and concluded that Electronic Stability Control reduced fatal single-vehicle crash risk by about 56%.

A single-vehicle crash is when a vehicle loses control and either rolls over or hits something like a tree.

Electronic Stability Control uses sensors to detect when a vehicle is straying from the intended direction of the driver. Sophisticated electronics then take over the brakes and engine to bring the vehicle back under control.

Electronic Stability Control is fitted standard to most luxury cars and late model luxury four-wheel drives such as the Range Rover and also to an increasing number of popular passenger vehicles (see list below).

New car buyers should place a high priority on vehicles with Electronic Stability Control. For many motorists, stability control appears to offer one of the biggest leaps forward in safety since the airbag.

Electronic Stability Control is also very important on four-wheel drives, which are notorious for losing control, often with fatal consequences.

Findings of the American study

A 2006 study by the American Insurance Institute for Highway Safety (IIHS) concluded that ESC reduces the likelihood of all fatal crashes by 43%, fatal single-vehicle crashes by 56%, and fatal single-vehicle rollovers by 77-80%.

However, it's worth noting that ESC is at its most effective on wet and icy roads. Most studies on Electronic Stability Control have been conducted in America and Europe, where crashes due to vehicles sliding out of control on icy roads is a common occurence. On drier roads, ESC appears to be far less effective.

ESC should still be on your safety shopping list, but you should regard it as a supplement to good driving, rather than a miracle cure.

What manufacturers call Electronic Stability Control

Not all ESC systems are identical. The hardware is similar, but there are variations in the way systems activate when a driver begins to lose control.

In an ideal world, all the manufacturers would describe Electronic Stability Control as Electronic Stability Control. However, many manufacturers give it a different name in order to distinguish their brand from others. Below is a list of manufacturers that use Electronic Stability Control, and what they call it.

Maker	model	what they call ESC
Aston Martin	all current	Automatic Stability Control (ASC)
Audi	all current	Electronic Stability Program (ESP)
BMW	all current	Dynamic Stability Control (DSC)
Chrysler	some	Electronic Stability Program (ESP)
Citroën	some	Automatic Stability Control (ASC)
Ford	some	Dynamic Stability Control (DSC) / Electronic Stability Program (ESP)
Great Wall	not available	
Holden	some	Electronic Stability Program (ESP)
Honda	some	Electronic Stability Control (ESC)
Hummer	some	StabiliTrak
Hyundai	all current expensive current models	Electronic Stability Program (ESP)
Jaguar	all current	Dynamic Stability Control (DSC)
Kia	all current expensive current models	Electronic Stability Program (ESP)
Land Rover	all current	Dynamic Stability Control (DSC)
Lexus	all current	Vehicle Skid Control (VSC)
Mahindra	not available	
Mazda	some	Dynamic Stability Control (DSC)
Mercedes-Benz	all current	Electronic Stability Program (ESP)
Mini	all current	Dynamic Stability Control (DSC)
Mitsubishi	some	Active Skid and Traction Control
Nissan	some	Vehicle Dynamic Control (VDC)
Peugeot	some	Automatic Stability Control (ASC)
Porsche	all current	Porsche Stability Management (PSM)
Proton	not available on most current	Vehicle stability control (VSC)
Renault	some	Automatic Stability Control (ASC)
Rolls-Royce	all current	Automatic Stability Control (ASC)
Saab	all current	Electronic Stability Program (ESP)
Subaru	all current	Vehicle Dynamics Control System (VDCS)
Toyota	some	Vehicle Skid Control (VSC)
Volkswagen	some	Electronic Stabilisation Program (ESP)
Volvo	all current	Dynamic Stability & Traction Control (DSTC)

Daytime Running Lights

A car with its headlights on is easier to spot than a car with its headlights off. It's that simple. World Health Organisation statistics show that vehicles using daytime running lights (lights that are designed to be seen by oncoming cars) have a crash rate 10-15% lower than those that do not.

Many accidents occur because the vehicle was not seen. In the rain, mist or low light conditions, lights help identify the presence of moving cars.

It's easy for an auto electrician to wire up your car to make the headlights switch onto low beam as soon as you turn the key, then switch off again automatically when you turn off the key. Daytime running lights don't have to be headlights. There are plenty of bolt-on daytime running lights available from auto electricians and car accessory shops.

The evidence that vehicles are safer with their lights on is overwhelming. The European Commission has ruled that all new cars operating in the EU must have daytime running lights from February 2011.

A report by Chris Coxon, the former head of the Australian ANCAP crashtest programme, concluded:

"There is clear evidence that a policy requiring daytime headlight use would result in a significant reduction in the road toll... [at] a minor cost to the motorist."

You can't control the idiots you may meet on the road, but you can help protect yourself by being more visible to other motorists •

Reversing Cameras

Every year, many children are killed or injured by vehicles reversing over them. This sort of accident happens most frequently in large, unsupervised families, but it also happens in small, supervised families, where the child was simply in the wrong place at the wrong time.

The problem is simple: the driver of most modern cars can't see what's directly below the rear window of the vehicle. You could easily park a pram behind many vehicles and miss seeing it in the mirrors. Offroaders and people-carriers are the worst offenders, but few vehicles offer really good rear vision for the area directly below the rear window.

Parking sensors help: they beep as the driver reverses towards an object, but parking sensors simply tell the driver something is behind him, not what and where. Often parking sensors beep at things like tree branches and kerbstones during parallel parking, making it difficult for the driver work out what's going on out of sight.

What all vehicles need, but surprisingly few have when they leave the factory – are reversing cameras, which display what's directly behind the vehicle.

Some cars have reversing cameras as an expensive option, but they are cheaply available online and from car accessory shops, and easily fitted by an averagely talented home handyman. Or you can get them fitted at your local garage.

The huge advantage of retrofit reversing cameras is that you can fit them cheaply to virtually any vehicle. They're lifesavers •

Protecting You Once an Accident Occurs

Larger vehicles tend to be safer than smaller vehicles. Stronger vehicles (that is, vehicles that protect the area where the passengers are sitting) tend to be safer than vehicles with a weak structure. Airbags and seatbelts stop you colliding with the interior of the vehicle or even flying right out of it.

A safe vehicle must have a structure that holds together in an accident, but it must also have 'crumple zones,' at either end of the vehicle. These crumple zones help cushion the force of impact. If you drive a car, say into a lamppost at speed, it's very much like hitting the front of your car with a giant hammer. If your car does not absorb the force of the blow, then the humans inside will.

Therefore, modern cars are designed to crumple front and back to absorb the force of an accident. However, the part where you sit – the passenger compartment, must stay intact in order to protect you.

Size Does Matter

The smaller vehicle is usually the loser.

If you took two modern cars of equal weight and crashed them head-on at equal speed, then the one with the better safety features would probably come out best.

However, in real life, accidents don't always happen between equals. A small, safe modern car is still not as

safe as a large, safe modern car. A small, safe, modern car may not protect you in an accident with a primitive larger vehicle such as an old truck, even though the truck may lack many modern safety features. It's basic physics: a larger vehicle will simply crush a smaller one in a serious accident. However, a small car with good safety features will still protect you far better than a small car without them.

However, larger doesn't always mean safer: many older American pickup trucks simply crumple if they hit anything solid •

This 2001 Ford F-150 completely collapsed during its crashtest. In a collision with a small, light car, the Ford would probably have come out okay, but in a collision with a solid object such as a tree or bridge, the occupants had little chance of survival.

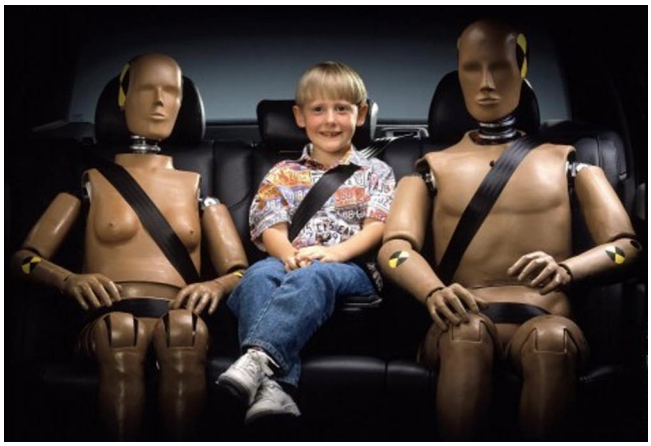
Trucks like the 2001 Ford F-150 one are more likely to collide with a solid object such as a tree or bridge because they don't handle very well and they tend to be driven by people who falsely believe that driving a large pickup truck will protect them from harm.

Seatbelts

There are two collisions in every accident. The first is when the car collides with something or rolls over. The second is when the vehicle stops but the people keep flying, then often collide with the vehicle itself, or with the road outside. Until seatbelts became widespread, it was common for people to die even at very low speed accidents. When the car hit something, the occupants would smash into the car's interior, fly through the windscreen or simply fall out of the doors. Seatbelts helped stop this sort of death and injury.

However, all seatbelts are not created equal, and even these days many cars are sold with seatbelts that may not adequately protect the wearer in an accident. Among the worst are the 'lap-only' type •

Lap-only seatbelts do not restrain people properly, and can cause horrific spinal damage and internal injuries, yet they are still being fitted to some new cars.



Three-point (also known as lap/shoulder and lap/sash) seatbelts save lives. Note that the child in the picture above is in a booster seat, which helps the belt fit properly.

Airbags

Airbags cushion you against the force of an accident. They can also decapitate you if you sit too close without wearing a seatbelt. However, airbags combined with seatbelts have made cars pretty safe places.

Although there are more and more types of specialised airbags, for places such as feet and knees, most airbags protect your body and head from the front and side. Increasingly, airbags and protective soft surfaces are totally surrounding the occupants of modern cars. These airbags work as part of a complex but effective system that enables the occupants of a vehicle to survive accidents that would almost certainly have been fatal even a decade ago.

Virtually all new vehicles have driver airbags nowadays. Most have an airbag for the front passenger as well, but a quite a few still lack side airbags. This is a pretty serious ommission: side airbags are almost as important as front airbags when it comes to protecting you in a collision.

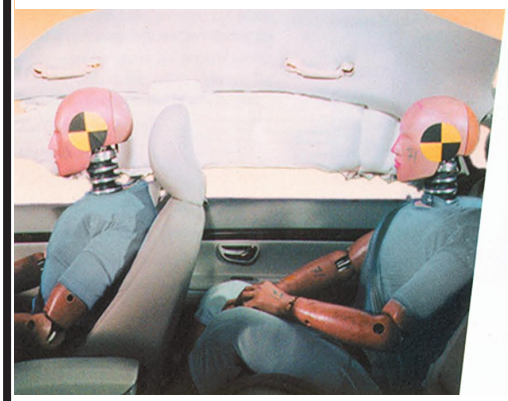
Front, side and knee bags on a Mercedes C-Class

Knee airbags are nice, because they can prevent crippling and painful injuries that might take months to heal. However, when it comes to simple survival, front and side airbags are a desirable minimum.

American researchers found that side airbags with head protection reduce the risk of death for both male and female drivers over a wide span of ages. Significant protective effects were found for drivers of both large and small cars.

There are three main types of side airbags: head curtain, torso & inflatable tube, and torso/head combination (see illustrations below) •

Types of Side Airbags



Head curtain
Head curtains descend from the roof to protect both the front and rear passengers

Torso & inflatable tube
Separate inflatable tubes protect the head & torso

Torso/head combination
These protect the entire side of the body

All the safety you can afford

Offering car buyers more safety features is a bit like offering politicians more power: who's going to say no? There's no theoretical limit to the number of safety features that can be fitted to a car, but they all cost money, and money is often in short supply.

There's currently something of a race between the manufacturers to come up with more and more sophisticated safety systems. Most serve some useful purpose, but some of these sophisticated safety systems – such as seats that vibrate when you inadvertently change lanes – are bordering on gimmickry.

If you're a millionaire, buy the safest car in its class. If you're not, you need to buy a vehicle with the best safety features that you can afford.

If you're buying a European car, or an ageing luxury car, you need to remember that vehicles with complicated safety features don't have a great track record for reliability. Mercedes-Benz, for example, is a world leader in safety technology. However, some of this world-leading safety technology never works properly, some of it breaks down when the vehicle is quite new, and some of it starts breaking down – very expensively – around the time the vehicle leaves warranty.

There's no doubt that new cars tend to have better safety features than older cars. However, many struggling families never buy a new car and simply can't afford anything like the safest vehicle in its class.

If you're buying a vehicle on a budget, stick to the proven basics of road safety:

1) You need a vehicle with a solid structure, with effective crumple zones front and rear.

The only way you can be sure that the vehicle you are looking at has these features is to look at its crashtest. Car salesmen often lie.

2) You need a vehicle with proper, three-point seatbelts for all occupants.

3) You need a vehicle that is fitted (or retrofitted) with daytime running lights.

4) You need a vehicle that is fitted (or retrofitted) with a reversing camera. Ideally, this camera should work at night as well as during the day.

4) Ideally, you need a vehicle fitted with Electronic Stability Control.

5) Ideally, you need a vehicle fitted with dual front airbags, together with side airbags that protect both the heads and bodies of all side occupants •

Crashtests are your friends

Crashtests accurately predict the outcomes of real-life crashes

Drivers of vehicles that earn good ratings in crashtests are far less likely to die in real-life accidents than drivers of vehicles that receive bad ratings in the same tests.

Since 1995, the American Insurance Institute for Highway Safety (IIHS) has been evaluating the safety of passenger vehicles using a frontal offset crashtest (see our crashtest explanation on the opposite page).

After each test, the vehicles were rated 'good', 'acceptable', 'marginal' or 'poor'.

Institute researchers then compared the results for these crashtested vehicles with the real-life crash statistics for the same vehicles. For example, they crashtested a Toyota Corolla in their laboratory and then compared this crashtest result with the outcomes of thousands of actual serious road accidents involving Toyota Corollas. This information was taken from the Fatality Analysis Reporting System, a federal database of all fatal crashes on U.S. roads.

IIHS spokesman Adrian Lund explains: "What we've found is that [crashtests] are very good predictors of fatality risk. Drivers of vehicles rated 'poor' are at significantly greater risk of dying in real-world frontal crashes, compared with drivers of vehicles with better crashtest ratings."

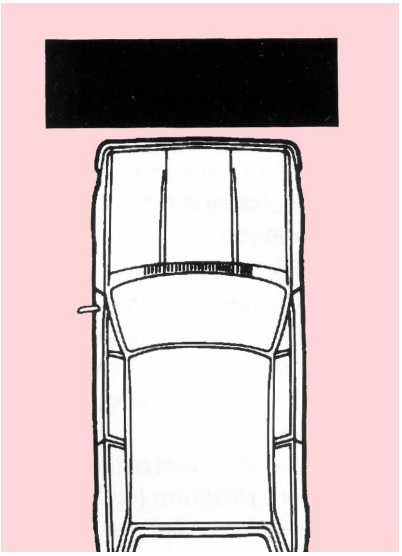
Researchers compared fatality risks in crashes in which two vehicles similar in type hit head on (car to car, pickup to pickup, etc.). After allowing for the differences in vehicle weight, driver age and gender, and other factors, the researchers found that drivers of vehicles with 'good' ratings were about 74% less likely to die than drivers of vehicles rated 'poor'.

The drivers of vehicles rated 'acceptable' or 'marginal' who crashed into drivers of vehicles that were rated 'poor' were about 45% less likely to die than drivers of the vehicles rated as 'poor' •

(For more information, click on the blue link to view our separate online article: Making Sense of Crashtests).

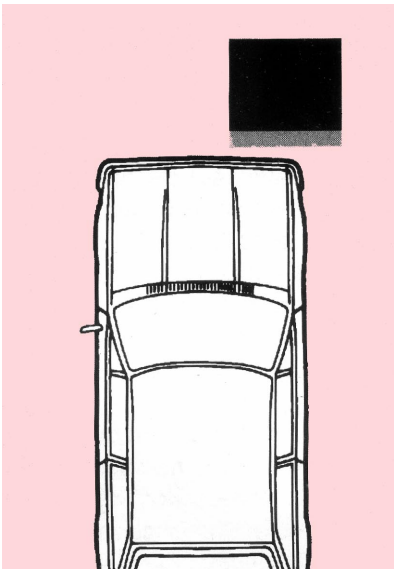
Types of crashtests

Crashtests are a reliable way of choosing a safe car, as long as you remember that you can only compare the results of crashtests of vehicles of a similar weight (within about 200kg of each other).



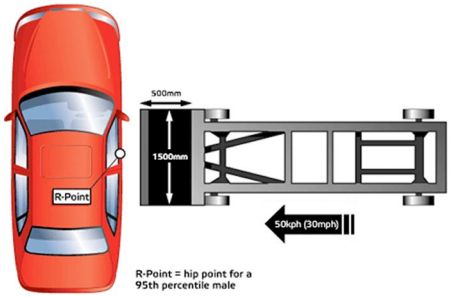
Full-frontal test

Full-frontal tests involve banging a car into a flat wall at a fixed speed. This is a good test of things like seatbelts and airbags, but does not accurately reflect real highway collisions because in most head-ons one part of the front of one vehicle hits one part of the other.



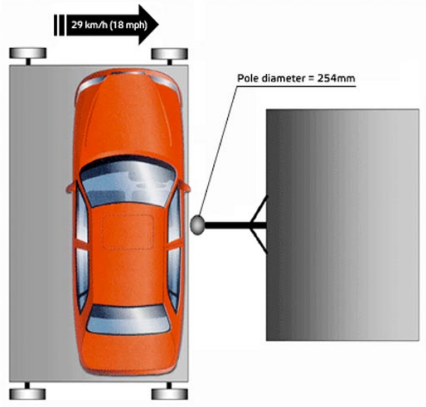
Frontal offset test

Frontal offset tests involve banging a car into a barrier that hits only part of the front of the car. This barrier is padded so that it deforms as a car would. This type of test most accurately portrays real-life head-on collisions.



Side-impact test

The side-impact test simulates a collision like the one above. Testing procedures vary depending on who is conducting the test, but most tests involve firing a specially-designed cart into the side of the vehicle. See the diagram above.



Pole test

Approximately a quarter of all serious-to-fatal injuries happen in side impact collisions. In Germany over half such injuries occur when a car hits a pole or a tree. Side impact airbags help to make this kind of crash survivable. They are also very effective in other types of side impact accidents such as being hit by another vehicle where the bonnet enters the window at head height.

In this new test, the car tested is propelled sideways at 29kp/h (18mph) into a rigid pole. The pole is relatively narrow, so there is major penetration into the side of the car.

Picture credits: IIHS, ANCAP, EuroNCAP Mercedes-Benz, Volvo and others.