

Harshwardhan Gupta's Design Tips-17

Machine Safety-2

Automobiles are machines that all of us use every day. However, often we do not think of them as machines. It is instructive to know that in Italian, *macchina* means a car; and in exacting German, it's not flight LH-152 that lands at Frankfurt, it's the *maschine* (the aircraft) on flight LH-152 that lands at Frankfurt! So, *Signore e Signori*, lets talk about safety in your *macchina*:

India has the highest rate of casualties per vehicle-km in the World. Today it far surpasses our industrial casualty figures – hence this article:

1. Do you know that your car's door-lock is a safety device before it is a security device? Almost all of today's cars have their door locks designed (by foreigners) so that they don't let the door burst open in a crash, thus the passenger space resists buckling, and saves lives of the occupants. If they are not locked, they fly open, and this protective shell collapses, literally squeezing out passengers' lives. The many glamorized auto-&-bike TV programs make no mention of this. Even user's manuals do not tell you this. Such a simple action can save hundreds of lives. But no one cares, not even the insurance companies or the Loss Prevention organizations. Nobody even researches this simple matter – what percentage of car crash deaths is due to unlocked doors bursting open?
2. Ditto with seat-belts! So many people don't even know how to put them on! In so many cars, you keep fumbling for the seat-belt's well-hidden bottom latch. Different seat-belts, even in the same car, lock at widely different pull speeds. Majority customers don't know and don't care. The RTO's or the Police don't care either. In UK, I have ridden in cars that won't even start till all doors, boot and hood are locked and all occupied seats' seat-belts are on. The wiring for this is ridiculously simple, but this is not available in India.
3. Same with crash helmets. All are made to a fixed size! If your head is bigger or smaller or the wrong shape, and your crash helmet doesn't fit well, that's your headache. ISI doesn't specify sizes, nor defines a comfortable fit over long periods. Then we have the misdirected Champions of Individual Freedom clamoring for repeal of the Helmet Rule, and succeeding too – probably because even the best of helmets are so horribly uncomfortable to so many!
4. Major auto manufacturers have themselves been resisting the introduction of power steering in medium and large trucks, citing flimsy reasons. That alone would prevent many large vehicles going out of control on curves or in tight traffic situations. Many small cars that do not need power steering are offered with it as a luxury add-on!
5. Wheel alignment for trucks, (I am yet to see a truck on an alignment machine) wheel balancing, radial and tubeless tyres for trucks, truck cabs on secondary suspension for less fatigue – all contributing to better safety, are all alien concepts in India.
6. Air-bags are offered only on luxury sedans! You can't buy them for smaller cars. No move yet to make them compulsory.
7. Speed-breakers are neither properly painted, nor are as per standards! No templates available to check them.
8. Most of today's cars have a low front, and a common accident is a car going under a truck's high rear-end (front and sides too), and the car's top and passengers' heads getting severed. A couple of states now require an anti-tailgating bar behind the truck, but most you see are sloppily fabricated contraptions just to avoid the cops, not scientific designs at all - truck-body building being a cottage industry! No special chassis are designed for tankers, lowering their center of gravity to make them less prone to rolling over.
9. Bus-body builders, especially for state-owned

buses, merrily cut corners by raising the bottom edge of the bus's sides, thus making the gap between the road and the bus's side-skirt high enough for pedestrians, passengers getting off, and two-wheelers to get rolled under the killing wheels.

10. Most of our buses are nothing but houses erected on a lorry chassis. On the contrary, the new Swedish-designed Volvo buses (not their imitations) have integral chassis-less one-piece bodies, like a car's, and are designed to protect passengers in a crash. Additionally, if all the passengers are provided with (and asked to) wear aircraft-type seat-belts in these integral buses, they can actually walk out of virtually all crashes. The same crash would reduce a normal bus to a scrap heap, and kill almost all.
11. Many 3-wheeler and van designs are certified to be roadworthy, but no one designs them for or tests their crash-worthiness. No norms for crash-worthiness exist for any vehicle in Mera Bharat Mahaan. A Ralph Nader is yet to be born in India.
12. The basic vehicle designs are tested and certified by authorities, but what about the completely unregulated market of external accessories? Fancy tubular chrome add-ons for your bumpers are outright dangerous for your vehicle plus for whom they ram into. Even a minor crash will not only damage your original designed-for-safety plastic bumper, but will cause invisible damage to the frame, leaving it grossly unsafe in a major crash. Many car and 3-wheeler outer accessories snare pedestrians or two-wheelers, and drag them to their deaths, or simply slash and gore. The metal 'sun-shade' over the Ambassador windscreen, an accessory favored by many government cars, can slash open the skull of anyone who gets into a glancing collision with it. Matching rear-view mirrors mounted just behind the headlights can rip your intestines out at 30 kmph.
13. "Break failed *ho gaya!*" When a bus tumbles down a gorge with 60 passengers because an old embrittled brake-hose burst open or a cheapo banjo seal bulged out of its seat, we write it off as 'break-fail!' "Happens! It is machine only." In the industry, we incessantly talk of preventive maintenance, MTBF, genuine OEM parts, Safety First culture... and then leave our vehicles in the hands of incompetent, badly-trained cheap mak-niks. Well, if you pay peanuts, you only get monkeys! Nevertheless, many Authorized Service Centers employ equally poorly paid but even more incompetent diploma holders in automobile engineering! Auto maintenance is so often a sharp business deal rather than a scientific exercise.
14. Talking of brakes, virtually no 2-wheeler's manual tells you that the *front* brake must be used primarily. When you brake either wheel, the load on, and so the road-grip of the rear wheel decreases, and that on the front wheel increases. Harder the braking – more weight and grip transfer from back to front. So if you brake the *rear* wheel hard, it can easily lock up and skid on the road, leaving you with insufficient gyroscopic balance, thus spilling you on the road within milliseconds. This weight-transfer phenomenon is classic physics, but is absent in all physics textbooks. Unknown to most, cars usually have their brakes designed for 80% braking in front, and 20% in rear. This habit of using the rear brake in 2-wheelers stems from the cockeyed front-pivoted suspension designs of many models, where the front suspension takes a vicious dive if the front brake is applied hard, sometimes cart-wheeling the rider right on his head onto the road in front – so we were told to always use the rear brake.
15. And what about the design of marketing strategies? Watch the auto and bike ads (made by our 'socially responsible' media) again! Virtually all of them tell you the same thing in different ways: Ride ever more rashly with our sexy machine! Go faster, Faster, overtake now, NOW! Enjoy the Adrenalin Rush, the Unbridled Power, the Roaring Speed! Unleash the ferocious beast inside you! Go, Go, Go, shine before the girls! Girls, don't drive, just fall in love with the rashest, most Macho, most reckless! Guys, brake hard at the last moment and put the rear wheels in

a controlled skid (on some TV ads unreadable warnings come and go *flup*, like a flashbulb)... And now the tyre companies and the petro-PSUs too have joined this grotesque waltz – Fit my tyre and race a fighter jet! Fill my fuel and ride the wild buffalo! Why should I drive defensively, when the WHOLE hyperbole-enabled reality-challenged media circus is constantly screaming at me to do exactly the opposite, relentlessly insinuating that defensive drivers are cowards, frightened old men, flaccid nerds, nobodies!

But tell me, why don't they advertise other man-things like oxy-acetylene torches or pneumatic chisels or hand-held power drills or machining centers in the same way? Here: Unleash the power of your main spindle's torque-boosted VelociRaptor 27hp Tri-phaser drive! Zoom from 0 to 8800 rpm in 6 seconds flat! Chew up and spit out that defiant chunk of steel below, maxing out with your multi-edged Shuriken cutter! "You are mad or what? Those are just some kind of machines only. These are veekles, man! You know in ancient time man used to love his horse no? So now it is his car or bike he love same way!" Yeah? Horses are intelligent animals and they don't trample people, even if you goad them to. 'Veekles', however sexy, are deaf, dumb, blind, enormously more powerful, and completely brainless. Why ban tobacco ads when car, bike, tyre and fuel ads promote instant suicide and/or manslaughter!

16. And design of systems to educate + test drivers on safety techniques, road-craft and defensive, considerate driving? Who can bell *this* cat? For love or money, you cannot buy a book or VCD on defensive road-craft on Indian roads. What road-craft? If you ask to overtake a truck from the right, its driver flashes his RIGHT indicator – a 'convention' among truckers – to indicate that you can now pass him from right! More educated drivers flash the left indicator to signal the very same thing! Yet, the same trucker flashes that very right indicator if he is going to turn right and block your overtaking.
17. What about design of nationally standardized, visible, legible, understandable, weather-proof

road-signs? Have design institutes like IDC and NID been commissioned to work on these problems?

18. And design of life-saving systems? Once you are in a crash, people will instantly surround you and enthusiasts among them will tug and pull your broken body out any untrained how, often causing even more injuries. Now, even if an ambulance comes quickly, has it been designed and equipped to extract and rescue road accident victims? How many people die horribly because most emergency rescue systems cannot reach anywhere fast enough? And neither the police nor the paramedics have necessary equipment & training to extricate victims from mangled metal, not even a simple hacksaw! Some primitive tools are indeed carried by the lumbering tow-truck, but it always arrives last. "Fast-aid training is given to all our police peoples and all jeeps carry also. See, fast we do *panchnama* and try take out injured party, crowd peoples also help, only if complete imposeebal then we call control room for *kiran* (tow-truck), then they send it message, then it comes. This is corret proseejar!" But can you even give any meaningful first-aid to that poor gasping, bleeding, dying guy without first quickly and safely extracting him from the mangled wreck? "Ok, ok, yes that may be also importan sometime I think! But never we received complaint like that, why only you come with complaint? Who you?"

As is so common, we consider it our sacred duty to obstinately resist any change for the better. "Go Slow, Work is in Progress" so that we can see India rapidly become a developed nation by 2020 – provided we don't first bleed to death somewhere on the road!

"Guptaji why you are always taking so much tension yaar? At least population is reducing little bit no? Hee, hee!"

Next Month: Problems of high speeds

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