


Topic for Discussion!

So you know where the airbags are - What then?

Discussion document by *Len Watson*

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So you know where the airbags are - What then?

By Len Watson

Introduction

The traffic crash where a person is trapped and requires to be extricated from their predicament has become all too accepted today. Whether they are trapped by deformity in the vehicle's structure or by their injuries, the expectation is that the emergency services will speedily arrive and efficiently cut them free of the wreckage.

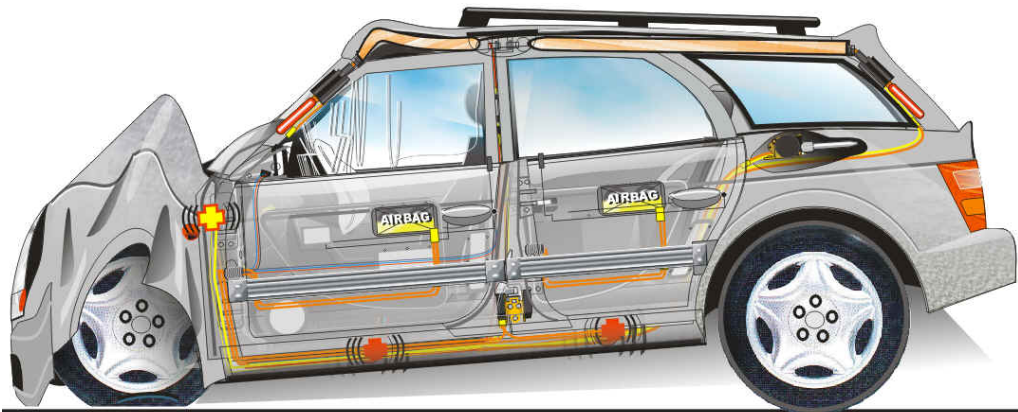
We all know that it is not as simple as that, for as experience grows and we begin to get to grips with this type of rescue, we find that almost monthly it grows more complicated.

In reality we must appreciate that in spite of an abundance of new safety features, the car user fatality and critical injury rate is on the increase, particularly drivers. That's right! Even though we see a very significant decrease in the serious injury rate, we are left with the stark fact that more occupants are being critically injured and dying in vehicle crashes.

There are several reasons for this but there is one that we as rescuers must consider. That is, the effects that new vehicle technology and in-built safety systems are having on vehicle extrication rescue, both in terms of hydraulic rescue tool performance and extrication proficiency and efficiency.

Risk Assessment

It is now mandatory to risk assess the vehicle before we perform extrication. The 'pry before you cut' policy adds noticeably to the timeframe. To survey the interior, strip pillars and posts and inspect the installation slots for the inclusion of SRS/SIPS/IC etc, and to put the appropriate risk control measures in place, does take time. Even if you were to have a mapping system specific to the vehicle that informs us of the exact position of all safety modules, including sensors along with a wiring diagram, it is still essential to visualise these systems in the areas you are about to cut, spread, ram or crush. Also worthy of consideration, in the world of optional extras, no mapping system can be expected to give the individual customers' preferences where optional extras are fitted to standard models.



Risk management system -

Specific safety system mapping showing diagram of SIPS system

What then ?

Now ask yourself, “even if you avail yourself of all this information, what do you do next? This question becomes more important where the battery cannot be got at to disconnect it. You may be lucky with the newer vehicle, where to switch off the ignition de-powers the safety systems. Unfortunately this is not always so as the vehicle may have ‘key-less’ go and the trapped driver has the transponder in his hip pocket. Moreover we must be aware that switching off the ignition still leaves power-on to all courtesy lights and control switches mounted in the doors, and of course the alarm system if it has a back-up power supply.



Door mounted control systems

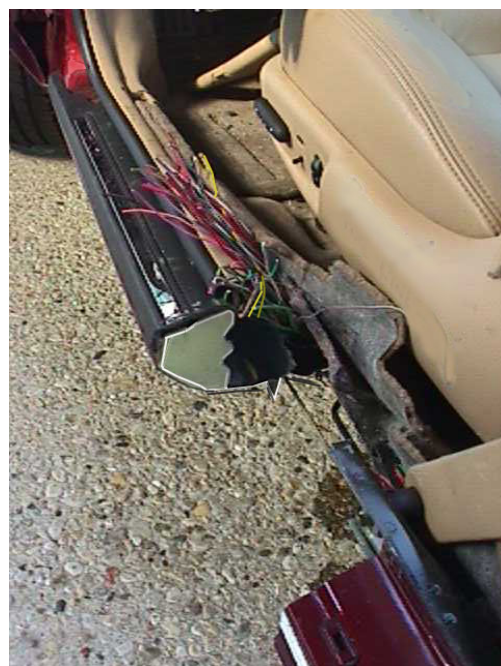
Forcing a door open at the door-lock carries no associated risk. However forcing or removing the door at the hinges does. Where a vehicle is equipped with electronic door airbags, stretching/breaking/cutting wiring can lead to short circuit or static accumulation.

As can be seen in the picture, a late model vehicle can have a substantial amount of wiring running into the door via the ducting to the multi plug connectors. Take your pick. Select the wiring to the door's airbag and cut it separately to prevent any possibility of deployment. Of course this is not practical.



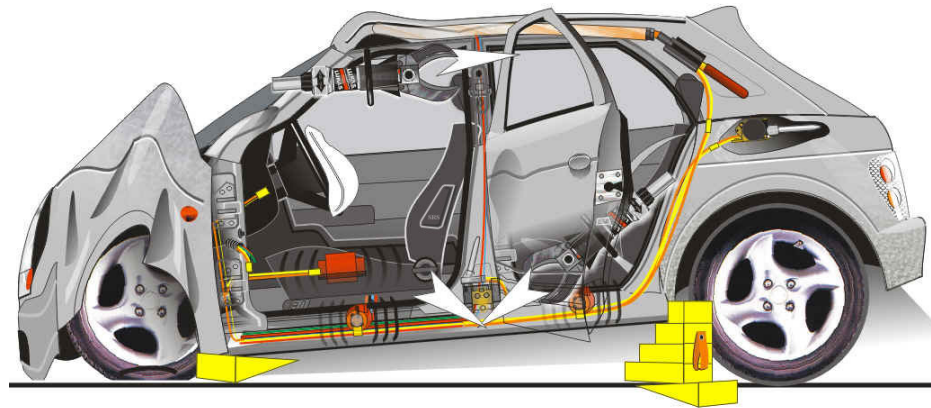
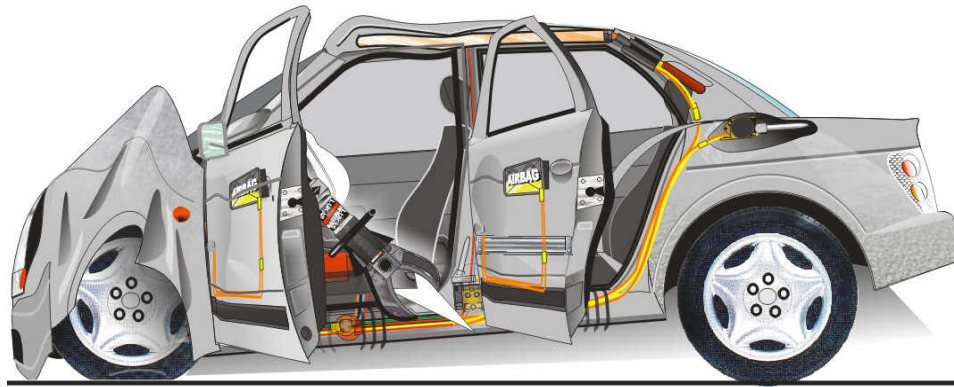
Be under no illusion, to short circuit SIPS wiring can deploy all undeployed modules on the same system – door airbags, inflation curtain and, on some cars, pretensioners – *For further information on SRS smart systems visit – www.resqmed.com/SRSlogicSm.pdf*

Invariably the vehicle's wiring loom runs along the inside of the sill covered by the carpet and trim. The wiring loom also runs to interior lights, rear door controls and airbag/s, fuel pump and to rear lights. As for the front door, switching off the ignition may only kill power to the SIPS system and fuel pump. Seat controls etc and rear lighting can be on a separate circuit to the ignition switch.



The removal of the centre post complete with the rear door will carry similar risks to the removal of the front door. Cutting the base of the centre post can also lead to static/short circuit and deploy all undeployed modules on the same system.

You may think that to remove the rear door and then cut away the centre post above the bottom door hinge will avoid this risk. Think again; not where there is a door mounted airbag as wiring has to be cut to remove the door.



Even where doors do not have door-mounted airbags the same risk can apply to electronic seat mounted systems. In fact the risk can be greater where the injured casualty occupies the seat. Consider where the SIPS circuit runs to and that in some cars pretensioners are configured to deploy in a side-on impact as well, which means that they are also wired into the SIPS system.

Planning for modern extrication training

Well – where do we go from here? If crash rescue capability is to move forward attitudes have to change. The old well served adage ‘KISS’ (keep it safe and simple) has to go. Risk management is not simple. For risk mitigation to work it has to address what is real, otherwise we are only playing lip service to it and accidents are far more likely to happen. Moreover, where does the casualty sit in all of this. They are the ones who are most vulnerable, unprotected and most at risk.

Rescue preparedness needs an overhaul. Training departments are moving in this direction but are struggling to move things forward. Where do they acquire the relevant information and how do they risk evaluate it?

The real movers and shakers took the bull by the horns some time back and have moved in unison with new developments. Others have been left behind and now find themselves at a cross-roads. They are not in a position to or indeed have the know-how to evaluate the new information that is available. Some still bury their heads and as part of their training program continue to teach students to disconnect the battery, even though they are fully aware that on some occasions this option will not be available. They also proffer not to cut or disconnect safety system wiring even though they know that systems will have to be compromised during the extrication. In fact it goes far beyond that.

Even though the battery has been disconnected and the capacitor fully drained we know that systems can be deployed by short circuit and static accumulation. Where the vehicle is disassembled and wiring to modules cut through, door, roof and seat modules are left deprived of the fail safe component in their respective connector plugs. What if the recovery agent or accident investigation officer gets hurt? What happens to these parts when they are relegated to the scrap yard? How can they be de-polluted safely, particularly where duty of care is not passed on?

Vehicle construction, new technology and components

Today's rescuer need to be better informed. To teach basic vehicle construction does not 'cut it' especially in view of all the different vehicle types that travel on our roads. Each vehicle type, e.g. 4 door car or 2/3 door hatchback, can have a number of different safety system configurations. Moreover MPV people-carriers and 4x4 SUV's can have very different set ups.

New motor systems such as bi-fuel and dual fuel LPG and CNG and Hybrid vehicles all need addressing. It is now essential to know your vehicle types and have sufficient foundation to be able to risk assess and discuss extrication procedure in terms of vehicle type, components and safety systems. How else can the rescuer implement the various extrication options safely and efficiently, especially for 'rapid extrication'?

Crash categorization and extrication

When a vehicle crashes the crash type and mechanisms of deformity, and the position it ends up, will reflect the casualty/ies injuries and dictate the extrication strategy in relation to vehicle type. The head-on as opposed to a side-on impact will dictate the way doors are forcibly opened i.e at the door lock or at the hinges.

Whether the vehicle ends up on its side or on its roof has very different implications. With these categories the vehicle type can add dimensional problems especially the MPV fitted with dual inflation curtains to both sides.

I trust you are getting the gist as to the importance good foundation training for extrication preparedness holds for the rescuer. At present these systems are out there and we know full well, that as the current range of new developments become the norm in the vehicle population, rescuers and casualties alike will be increasingly at risk

What do you think?

Should rescuers be more aware as to any likely repercussion of their actions? Whose responsibility should it be to furnish rescuers with proper risk assessed options for the various extrication evolutions –

- Your training department ?
- Your research and development department >
- The motor industry ?
- Authors and rescue consultants ?
- Yourself ?

Before you attempt to answer any of these questions I would point out that 'Duty of care' is an issue here, and some motor companies have compiled 'Rescue Guidelines' in an attempt to redress the imbalance they have created. May I therefore steer you towards my 'Rescue News Letter 3' where we discuss the Mercedes publications. (www.resqmed.com/news_letter3.htm)

Dear Rescuer

The professional rescuers' views are most important to the development of rescue, especially poignant and constructive comments. You may wish to create a list of pertinent questions that we can submit to our readership at large. I look forward to reading your communications and will add your comments under the heading 'Debate' –

<mailto:resqmed@enterprise.net?subject=Standards for Extrication Rescue>

Debate, Questions and Answers

Awaiting your input

Profile – Len Watson

[CLICK HERE](#)

Further reading

- ResQmed's free study site – www.resqmed.com/Study.htm
- Building Extrication Standards – www.resqmed.com/BuildingExtricationStandards.pdf
- Vehicle Rescue and Extrication - Ron Moore - ISBN 0 8016 3351 6 – Visit www.firehouse.com
- Vehicle Entrapment Rescue and Pre-Hospital trauma Care – *ABM Wilmink, L M Watson, G S Samra, A W W Wilson - published Injury 1996. For a free download of the complete document go to –* www.resqmed.com/VehExResTraumaCare.pdf
- Vehicle Extrication - S Kidd & J Czajkowski - ISBN 0 87814 915 5 –
- Vehicle Extrication – A Practical Guide – Brian G Anderson – pennwellstores.yahoo.net/vehexpracqui1.html
- The Principles of Extrication – IFSTA – ISBN 0 87939 086 7
- RTC extrication RESCUE: resQmed 2005: ISBN 978 0 9550551 7 1 – http://www.resqmed.com/RTC_extrication_rescue.htm
- New Developments – New Vehicle Technology: resQmed 2005: ISBN 978 0 9550551 0 2 www.resQmed.com/New_Vehicle_Technology.htm