

Topic for Discussion!

New style training required to meet challenge –

Discussion document by *Len Watson*

An informative report for discussion and study - This report has been produced in Adobe portable document format (pdf) and can be downloaded and saved. It has been secured to prevent unsolicited changes and published on the net for your benefit and the purpose of sharing information to stimulate interest and invite comment from rescue professionals. Within Adobe Professional 6 or later, the facility exists for notes to be made and placed on the document wherever the reader considers appropriate and can be saved when closing this document. Simply right click the mouse and select the available tool/option you wish to use.

In the interest of sharing information we would ask the reader to consider sharing their views and comments with other rescue professionals. To send, simply follow the instructions and attach your notes file using the Reply icon at the end of this document. We at resQmed will respect your confidence and will only ever release information on our study site with your permission.

For further information on the Note facility, click on the note icon – 

CONTENTS (Active Index)

- Introduction
- Smart safety systems
- Safety system design in relation to vehicle types
- Common Vehicle Types
- Extrication evolutions for specific crash categories
- Risk control measures and risk critical information
- Training Implications
- Vehicle type and set up for practical training
- Specific session briefs
- Electronic information centres
- New style training for vehicle extrication rescue
- Dear Rescuer
- Len Watson Profile
- Further reading

New style training required to meet challenge

By Len Watson

Introduction

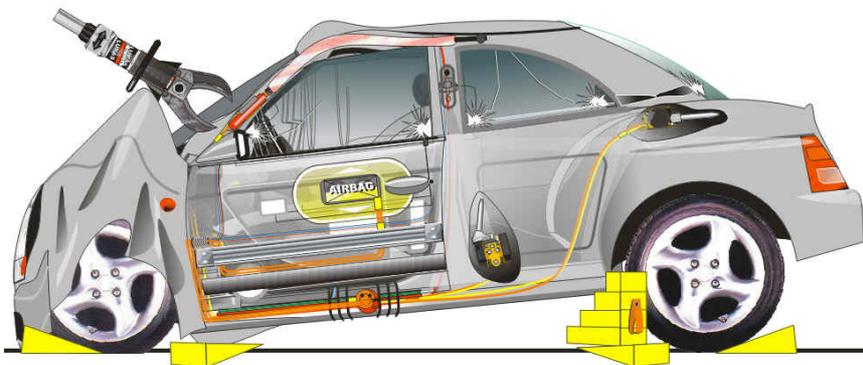
Vehicle entrapment extrication rescue has become a highly skilled operation virtually overnight. The introduction of smart SRS in model year (MY) 2005 vehicles has altered the goal posts considerably. Now confronted with intelligent systems that can remain intact after an impact, either because the seat was unoccupied or the seatbelt was not worn, rescuers face additional threats. Although the motor industry confidently states that it is only necessary to switch off the ignition to isolate all systems, it is with trepidation that rescuers realise that systems can still be compromised during and even after the extrication process.

Smart safety systems

Most 2005 vehicles have three separate passive safety systems. Frontal plane SRS airbags and pretensioners and separate lateral plane side systems for offside and near side passenger protection. Take nothing you hear at face value as these systems are complicated, they can be integrated and have a host of additional configurations. *For more in-depth study information go to www.resgmed.com/SRSLogicSm.pdf.* After a collision one or more systems are likely to remain intact and individual modules will not deploy where individual pre-set thresholds are not met.

Battery location can be anywhere and on many occasions will not be accessible to disconnect. Performing extrication with an energised vehicle is fast becoming more commonplace. This is even more prevalent when we realise that the switching off the ignition does not isolate power to doors and this increases the risk of short circuit dimensionally where doors and the centre post needs to be removed or cut away. Consider, to short circuit one module could short circuit all modules on the same system. To short circuit wiring to or from sensors and / or to door or seat mounted airbags could possibly deploy the whole SIP system including the air curtain or head protection bolster on that side of the vehicle.

Information from the motor industry infers that this is not likely to happen and that they have taken every precaution. Maybe so, but the reality remains that these systems have deployed when compromised during the performance of certain very necessary extrication evolutions. Although the frequency is low at present, as the vehicle population with smart systems increases we can expect an increase in post accident deployment unless the risk is managed adequately.



Roof removal - The head protection cylinder and EPG side glazing will add significantly to the time frame in removing the roof's structure. Short circuit or static could possibly deploy all SIPs modules on the same system and cutting the HPS/IC cyclinder could give rise to a projectile hazard.

Safety system design in relation to vehicle types

With new smart system technology, risk assessment requires a fundamental understanding of how the system works and how it could possibly be compromised by the extrication evolution being performed. System design and its incorporation within each vehicle type will differ considerably e.g. The layout for SIPS in a 4 door car will be significantly different in a 2 door coupe or sports car. In fact when we view a list of the different vehicle types we begin to realise all the different designs necessary to meet all the vehicle configuration.

Common Vehicle Types –

- 2/3 door hatchback
- 2 door car/coupe
- 2 door convertible
- 2 door sports car
- 4/5 door hatchback
- 4 door car
- 4 door estate car
- MPV multi purpose vehicle/people carrier
- 4x4 off roader / jeep
- 4x4 truck/pick up



Side Removal - The possibility exists for short circuit or static to deploy all modules on the same system, especially where the vehicle remains energised. Inadvertent cutting can liberate Sodium Azide/Sodium nitrate – For more information go to www.resqmed.com/SRSlogicBm.pdf

Extrication evolutions for specific crash categories

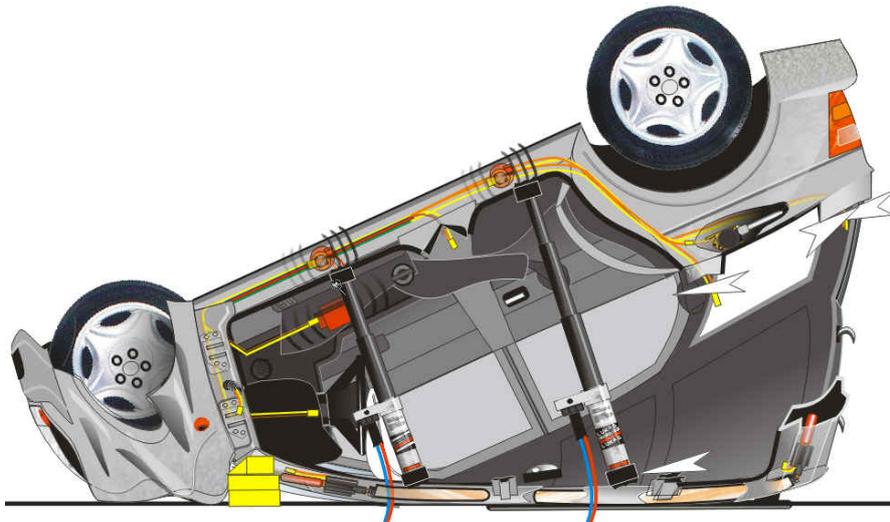
The crash category in relation to the vehicle type and end position of the vehicle will invariably dictate the extrication strategy. For example, there are strategic differences in how we tackle a vehicle upright on roadway as opposed to a vehicle that has come to rest on its side or on its roof. Although more subtle to recognise, head-on impact damage, front ¼ oblique deformity and side-on impacts may dictate that the accident jammed doors be forced from the door-lock or the hinges. Greater intrusion in the windscreen pillar may require it to be cut-away close to the dash area. Again where the road-wheel and suspension geometry are driven into the footwell area additional emphasis will have to be given to this area of entrapment etc, etc.

In real terms extrication evolutions do carry the risk of compromising undeployed SRS. With multi-generator airbag inflators now working on a weight classification system which is built into the front seatbase cushion, rescuers can now face the risk of a deployed airbag where one or more inflators still remain undeployed. Be under no illusion, where the possibility of short circuit or static exists, deployment cannot be ruled out. Cutting, crushing and spreading will stretch and bare electrical wiring and may lead to short circuit or static accumulation. Wherever risk can be recognised it is necessary to manage it. Perhaps the greatest risk of all arises where the potential is

not recognised. As it is not likely to be incorporated within the fire department's training program, it becomes particularly poignant where the information is already available and is in the public domain.

Risk control measures and risk critical information

What needs to be passed on in training is the recognition of potential risk, risk control measures to manage the situation and risk critical information that can be associated with certain actions. How we decipher potential risk without a collection and sharing of information facility and the correct people in place to analyse, reconstruct and equate outcomes is a major issue. One such study program that already exists is www.resqmed.com/Study.htm where a collection of information is available at www.resQmed.com/AirbagAwarenessResearch.htm. Ron Shaw's web site www.extrication.com is also very informative.



The 'Clam' – Side removal along with strategic cutting and ramming. *In the majority of cases the battery will not be accessible to disconnect and extrication will have to be performed on the energised vehicle.*

Training implications

Glub training that merely warns that a safe distance, the 500mm, 250mm and 150mm rule, be maintained away from bag deployment paths without a proper explanation and a suitable in-depth understanding that caters for efficient and safer working practices, creates confusion and inconsistencies. Consider the path in which airbags deploy and add to that a variety of combinations. E.g. a thoracic door mounted airbag will deploy inwards 150mm and upwards 500mm and add to that the vehicle may have come to rest on its roof. It is not a simple matter of keeping a safe distance. Where undeployed SIPS include door or seat mounted airbags and an air curtain, it would intimate, and I may say wrongly, that casualty care becomes secondary to maintaining a safe working distance. Again, courting disaster by placing 'hard protection' between the tool and the casualty when it infringes the airbag deployment path, is probably the most common cause for concern. There are many more areas appropriate to each vehicle type that need addressing, far too many to contemplate here.

Inept training will lead to risks being taken. Proper risk control measures enforced at the correct moment in time will allow the potential risk to be controlled and managed as the evolution progresses.

Vehicle type and set up for practical training.

End of life vehicles are generating at a rate of 2.2 million yearly in the UK alone and are, on average, 13.5 years old. First generation SRS systems are now appearing in

scrap vehicles. In its wisdom Health and Safety has directed that all SRS be deployed or removed before EOL vehicles are delivered for rescue training. The onus has been firmly placed with scrap technician operatives and will ultimately reflect in the price paid for these vehicles.

However the real issue would appear to be 'how are we going to train our rescuers in dynamic risk assessment for extrication management'? Not just for vehicles that are on average some 13 years old but for all vehicles up to MY 2006.

The firefighters knowledge of vehicle construction has to be sufficient to understand the specific SRS design for the various vehicle types. Although battery location and disconnection has been mandatory for some time, training departments must realise that on many occasions the battery will not be accessible to disconnected. Rescue on energised vehicles must be addressed

Risk control measures for cutting, spreading, crushing and forced metal movement within the vicinity of undeployed safety systems, electrical sources, boron steel, fuel systems and hybrid vehicles must be a known quantity. Not only must all vehicle types be taken into account, impact damage will also have some bearing on risk assessment. Also, all the following evolutions in relation to vehicle spec must be risk assessed –

- Glass management
 - Tempered
 - Laminated
 - EPG (extra protective glass)
 - Polycarbonate
- Roof removal
 - Roof flap back
 - Roof flap forward
 - Roof flap to side
 - Complete roof removal
- Door forcing and removal - Conventional, sliding, hatchback and rear opening (4door pillar-less)
 - Forcing from door-lock
 - Forced removal from hinges
- Side removal
 - 4 door car
 - 2 door car
 - MPV / delivery van
- Dash relocation
 - Dash roll
 - Dash lift
 - Steering wheel relocation
- Forced seat adjustment and removal
 - Front seat
 - Rear seat
- Roof fold down (vehicle on its side)
 - 4 door car
 - 2 door car
 - 2 – 4 door hatchback
 - 4 door estate car
 - MPV people carrier

- Strategic cutting and ramming (Vehicle on its roof)
 - 4 door car
 - 2 door car
 - 2 – 4 door hatchback
 - 4 door estate car
 - MPV people carrier

In addition, it is reasonable to assume that blood and sharps decontamination must be considered as essential practice. Similarly 'Ready go' and 'keyless go' and 'duty of care' hand-over to the accident investigation officer (AIO) and recovery agent, has to be part of our health and safety policy.

Specific session briefs

These evolutions will need specific session briefs so that appropriate risk control measures for the different vehicle types and impact deformity can be passed on in training. Risk critical information for certain actions must also be furnished and, where appropriate, made available to the AIO and recovery agent, particularly where they handle dismantled parts. Consider, it may not be crash deformity that leaves the undeployed SRS module compromised.

Electronic information centres

The volume and exactness of this information really requires an electronic storage facility, an information centre to store and access vital data quickly and one that can be used for self study, reference, training and at the roadside. An explanation of one such information centre - 'MVA extrication PathFinder' - can be accessed at www.resqmed.com/PathfinderExplained.pdf and a free sample is available from resQmed on +44 (0)1787479605

New style training for vehicle extrication rescue

The notion that removing SRS modules from end-of-life (EOL) vehicles, before they can be used for 'hands-on' training, may not reduce but rather increase the risk of rescuer injury and litigation. Firefighters will face undeployed and sometimes compromised systems on the street and, where training avoids these issues, they will be in the invidious position of 'suck it and see'. This undoubtedly could lead to H & S improvement notices and, where casualties are further injured, they could also seek redress through the courts.

ResQmed runs Master Classes that offers Trainers vital background information, vehicle dynamic risk assessment and a working logic for solutions and risk assessed options. Other classes instruct Trainers how to prepare EOL vehicles and manage extrication evolutions for RTC instruction on current and new model vehicles with both deployed and undeployed SRS, even where the vehicle's battery cannot be disconnected – For further info go to www.resqmed.com/MasterClasses.htm

Far from removing SRS, instruction is given on how to safely manage these systems for all relevant extrication evolutions. 'Real' training of this nature is vital as Rescuers are, and will continue to be, called upon to perform vehicle extrications where the vehicle's electrics cannot be de-energised.

If the current method of RTC training is not altered to encompass risk-assessed options and appropriate control measures, the greatest risk will obviously remain pointed at the already injured casualty. Old style training can no longer sit easily alongside 'duty of care' and 'best value', nor can it be considered competency based as it now falls within the realms of incompetency.

Dear Rescuer

When you have read this document I would very much like to hear your comments. You may wish to give this document a rating between 1 – 10 (Poor 1, to excellent 10). 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 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 Wilmlink, 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/vehexpracgui1.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