

VEHICLE EXTRICATION - Dynamic Risk Assessment

By Len Watson

Late model vehicles can incorporate many new innovations and safety features that can present a danger to rescuers and casualties where 'extrication' proves necessary. When inspecting the vehicle, look for any tell-tale stickers, signs, marks and indicators that warn of their inclusion and take note of their position.



Illustration courtesy of - MVC extrication *PathFinder*

Initial vehicle assessment

Look for these indicators:-

- **Motive power** - Petrol/Diesel/Gas/Electric/Hybrid
- **Ignition type** - Key/Keyless-go/Ready-go
- **Fuel filler cap** - Its position will assist you in locating the fuel tank. Also look for LPG/CNG filler and stickers.
- **Fuel tank location** - If the fuel tank is not under-slung under the seat-squab/floorplan or luggage compartment, it is likely to be positioned on either side of the trunk/boot space.
- **Engine configuration** - Straight/in-line or side-on/Transverse
- **Glazing type** - Toughened/Laminated/Plexiglass/Polycarbonate
- **Airbag and pretensioner indicators** - Look for anagrams and motifs/moldings- SRS, SIR Airbag, SIPS, IC, HPS and ROPS and convoluted rubber moldings to buckle pretensioners
- **Gas struts** - You can anticipate their inclusion in the tailgate and engine compartment
- **Seat adjustments and other indicators** – Electric and manual adjustments, position memory, active massage, seat mounted pretensioners and airbags

Identifying these indicators will help considerably when assessing critical risk information and understanding risk critical implications. When planning strategy and performing extrication evolutions, a methodical plan will greatly assist in identifying the risk posed by the vehicle's electric and fuel system, SRS, SIPS and locking systems (*for further information visit www.resqmed.com/SRSLogicSm.pdf*). Seat construction, adjustments and in-built SRS/SIPS, door design incorporating airbags and strengthening bars etc., will all have a direct bearing on extrication strategy. Vehicles incorporating new design technology and safety systems require preplanned risk control methods and dynamically risk assessed operating procedures essential to safe working practices.

Pry before you cut:

The policy of 'Pry before you cut': stripping the trim to pillars and posts to reveal the installation slots so that the exact position of SRS, SIPS and, where practical, sensors can be identified, is being universally adopted throughout the fire rescue service. When performing any extrication strategy it has now become mandatory to view and risk assess prior to conducting any evolution that could possibly alter the integrity of any system that could cause injury.

Risk recognition is vital and logic to address and manage risk requires a workable plan to identify, control and reduce all foreseeable risks. Measures to control or reduce the elements of risk are therefore essential.

Where the battery cannot be disconnected, rescuers are going to have to work alongside live systems. As the motor industry as a whole has failed to address the issue of 'Rescue with compromised or live systems', rescuers have to make their own judgement calls and initiate suitable option measures – These measures include:-

Precautionary measures:

- **Avoidance** – *Instructions (DO NOT cut or crush, drill or knock against, or place hard protection between bag deployment path and the casualty).*
- **Warnings** – *Safety calls (Stand clear SRS/SIPS/IC or HPS and ROPS deployment paths). **Maintain the 150, 250 and 500mm (6,10 and 20") rule.***
- **Protection** – *Dust masks and hard protection*
- **Disconnection** – *SIPS connector plug and module disconnection*
- **Isolate/Cut**– *Use wire cutters to cut SRS wiring and a strategic safety cut to isolate pyrotechnic lines.*
- **Safety cuts** - *Cuts to air curtains and head protection bolster fabric.*
- **Extrication options** – *Various evolution strategies to reduce possible hazardous outcomes.*

Risk critical information

Recognising the importance of certain information, which can be considered 'risk critical', is an absolute necessity. Possible hazardous outcomes, especially as a result of rescuers' action must be a known quantity and, wherever possible, risk managed. It is therefore essential that all rescuers be made aware of all risk critical information and their risk control measures.

For the control measures already mentioned to be initiated and adhered to, there must be a high degree of acceptance amongst rescuers that the perceived risk is real until proven otherwise.

Evolution options

When performing specific evolutions, the various extrication options and likely perceived risk/s must be quantifiable and, because of the varied nature of MVA rescue, the ultimate decision must remain with the Incident Commander.

Available 'Options' for respective evolutions, allow a degree of flexibility and can offer the solution to an otherwise high-risk situation, but be aware; there is a time implication.

Evolution options amount to the performance of a technique or evolution using the 'Precautionary measures' outlined below. e.g. When removing a roof structure incorporating electronic inflation curtains we can employ several options to control, reduce or avoid perceived risk. After risk identification is performed and appropriate risk control measures implemented, conduct –

EXAMPLE:

Option 1 – Perform roof removal taking the following precautionary measures -

- **Avoidance**
- **Warnings**
- **Protection**

***RISK - Liberation of window housing and sharp edges to roof pillars. Possible deployment of SIPS and pretensioner/s (Short-circuit). Liberation/Deployment of propellant through inadvertent cutting**

Option 2 - Perform roof removal taking the following precautionary measures in addition to Option 1 -

- **Disconnection**
- **Isolate/Cut** – for further information, see www.resqmed.com/VehExDRA.pdf

***RISK - Liberation of window housing and sharp edges to roof pillars. Possible deployment of SIPS and pretensioner/s (Static discharge). Liberation/Deployment of propellant through inadvertent cutting**

Option 3 - Perform roof removal taking the following precautionary measures in addition to Option 1 & 2 -

- **Safety cuts** – Conduct safety cuts to the Inflation Curtain or head protection bolster and conduct Option 1 or 2

RISK - In the event of deployment (PAD), subsequent hot gas release from strategic cut to side channel from the IC or HP inflation module.

Casualty V Risk

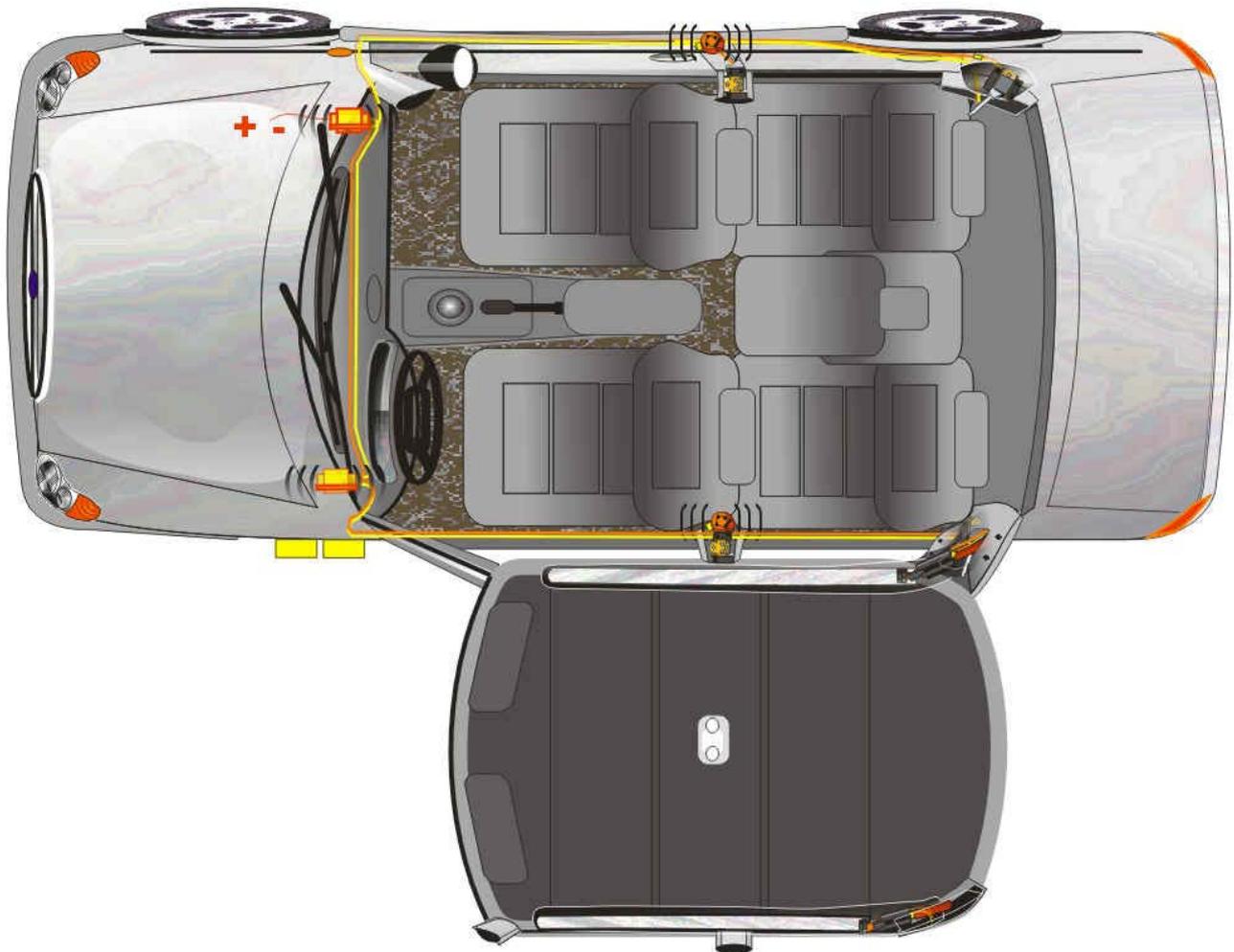
Within fire departments the enigma of casualty versus risk for MVC rescues has, for the most part, been left either unwritten or understated. The nearest we get to a real understanding is when the Paramedic or Doctor says, "We need the casualty out now".

Where an 'Immediate release' or 'Rapid extrication' is called for, it has become accepted practice to either manoeuvre the casualty free or speed up the extrication by releasing any pinning, making the minimal space to lift the casualty from the wreckage.

Rescuers now find themselves with a new, frustrating dilemma in the equation of 'casualty v risk'. Not just the risk that the critical patient faces of having their lower limbs manipulated free or being manoeuvred through a restrictive opening but the risks that can now be associated with certain space making, 'rapid extrication' techniques.

'Rapid extrication' techniques must be a known measure and have to be dynamically risk assessed otherwise, by their very actions, Rescuers are admitting that they are working blind and are ignoring the hazards that may be present.

The Casualty V risk judgement call must be based on 'dynamic risk assessment'. After risk identification has been assessed and appropriate risk control measures put in-place, evolution options have to be performed with suitable 'precautionary measures' implemented.



WARNING

Performing established extrication evolutions on vehicles with a full loading of SRS/SIPS can be extremely complicated, especially where the car ends up on its side or roof and SIPS remain undeployed and the battery cannot be disconnected.

Reference –

Risk control measures and Options drawn from

- Vehicle Extrication – Dynamic Risk Assessment: 2006; resQmed Ltd: ISBN 0 9550551 5 6
- RTC extrication RESCUE: e-Book 2005; L Watson: resQmed Ltd: ISBN 0 9550551 7 2
- 'The MVC extrication PathFinder – Revised 2006; resQmed Ltd
- www.resqmed.com/SRSlogicSm.pdf