NEWSLETTER

Road rescue in 2012 will be a devil of a job!

The Tasmania Fire Service, supported by the Tasmania Police, Ambulance and SES will host the 2012 Australasian Rescue Challenge, titled Road Rescue Challenge Tasmania (RRCT), at Princes Wharf in Hobart in April 2012. For those who have never been to Hobart, Princes Wharf has Constitution Dock on one side, the finish point for the Sydney to Hobart Yacht Race and the world famous Salamanca Market on the other side. This market attracts around 10,000 people every weekend. So if you are planning on bringing your partners, just keep a close eye on the budget!

Being so close to the public will give us some great exposure for the challenge, ARRO and our work in the field of road rescue. With this in mind the host organising committee are planning some great displays and opportunities to promote the emergency services and the challenge as well. We also hope to have some high profile motoring personalities present as well.

Registrations officially closed on 30 November and there have been a good number of teams register for the challenge. However there are still some places left. If you have not registered your team as yet, please do so URGENTLY!

As always the challenge will include an excellent learning symposium for teams and individuals. Building on the experience of the last couple of years, there will be a strong emphasis on the practical, with both tool companies and experienced ARRO and host instructors leading sessions where attendees can participate in practical rescue activities. This year's theme will focus on heavy rescue challenges including rail related incidents.

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SUMMER, DECEMBER 2011

In this issue:

"ARRO – Advancing the science of road rescue"

Road rescue in 2012 will be a devil of a job!

Salamanca Market!

Not only will this be the first time the challenge has been to Tasmania, but the ARRO Challenge Management Team (CMT) will undertake a first as well. Some members of the CMT arrive almost a week ahead of the challenge to commence preparations and ensure all the logistics are in place. This year the entire CMT will be deployed by 25 April, so in finest tradition of the ANZAC spirit; the Aussies and Kiwis of the CMT will attend the Hobart Dawn Service.

Once again our hosts have done a great job identifying a range of accommodation options for different budgets, all of which are in walking distance of the challenge venue and a selection of great eating places. The TFS will also be looking at options to assist with airport transfers, so teams should be able to save some money on transport. For more information and to register for the challenge please visit the challenge web site:

http://www.cdesign.com.au/rrct2012/

From the President …

ARRO President, Steve Rothwell writes…

As 2011 draws to a close it is appropriate to reflect on the year just past, what we achieved and what the future holds for us 'as the peak body in Australasia for the development of knowledge and skills in road rescue' as defined within our Statement of Purpose. Our Strategic Plan, developed and refined over several years identifies a range of key goals and strategies and importantly measures for us to report against. The 2011 annual general meeting conducted in Wellington, NZ provided me with an opportunity to report against these measures where some outstanding successes were recorded, e.g. improved take up of our website, increased membership, increased quantity of well researched and practical technical bulletins and 'e-News' emails circulated to our membership and importantly our standing within the industry increased markedly.

In 2011, we were able to offer an outstanding and combined ARC/WRC hosted by the United Fire Brigades Association of NZ. At this event we introduced the Trauma Challenge concept into the program where it proved to be a great success with complimentary feedback received during the final wrap up. The ARRO Executive are hopeful that over the coming year we will be able to refine the logistical requirements and rules around this concept and be able to run the Trauma Challenge at all ARC's commencing with the 2013 challenge which is programmed to be hosted by the ACT Emergency Services Agency.

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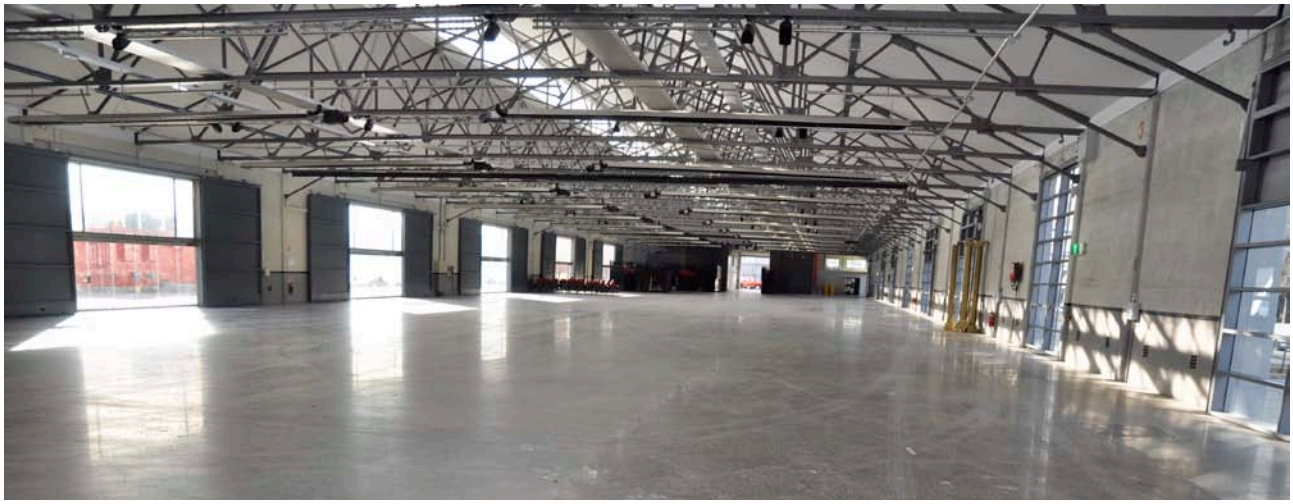

Inside Princes Wharf Shed where RRCT2012 will take place

From the President …

Our symposia and workshops continue to rate highly and continue to improve year after year. The success of these programs and associated learning's must be attributed to the Technical Committee members of Tim Fox, Brad Setch, Dave Stackhouse, Daryl Rush and new team member, Michael Vanderzalm. Special acknowledgement must be given to Darren Zeller who was an active member of the Technical Committee however had to stand aside due to employment changes. The passion and commitment by the Technical Committee members cannot be faltered and the many, many hours of time they contribute to researching, 'road testing' and writing up papers is greatly appreciated by the ARRO membership.

I think all would agree that the market we work within is continually evolving where I only need look back to when I first joined the fire services in the late 1970's to where we are now. Back then attending a road crash was challenging, time consuming but not that complex whereas now with the advent of new car technologies, new construction methods and products, improved and numerous installed safety systems combined with the ability to reach faster speeds all equates to increased complexities at each and every RCR we attend. We therefore need to be contemporary in our thinking, our knowledge, our techniques and our practices and this is the void that ARRO attempts to fill within the industry. We can't do it without your help, so please share your experiences (good and bad), share your research and share your suggestions with the ARRO Technical Committee and they in turn will share it with our individual and agency members.

Can I also ask all ARRO members to continually promote the ideals of ARRO and seek new members to the organisation. Increasing our membership strengthens our standing and importantly brings new ideas, new skills and new knowledge into the fold.

In closing, I would like to thank our sponsors; Chubb/Holmatro and Packexe for their support throughout 2011 and we look forward to our friendship continuing in 2012 and beyond. As you will read elsewhere, due to changes overseas Gore will be ending their sponsorship with us at the end of February 2012, but they have been great supporters of ARRO.

Finally, we cannot do enough to recognise the industry leading support of Holden to the cause of ARRO. How many lives have been saved through the learnings gained by participation in in challenges and the opportunity to work on new vehicles with the latest features, technologies and metals. Since 1999 we estimate that Holden has donated over 1000 vehicles to ARRO for challenges and research projects, with an estimated retail value in excess of $30M. This remains unrivalled anywhere in the world!

Thank you Holden!

I would also like to thank my Executive; Peter Guard, Glen Maule and Tim Fox ably supported by Paul Jerome our Executive Officer for making my job easier and 2011 a very successful year.

Best wishes for the festive season and 2012.

ARRO membership spreads north

ARRO has its first individual member in Darwin! Earlier this year ARRO President Steve Rothwell resigned as Assistant Commissioner with Queensland Fire & Rescue Service, to take up the role of Chief Officer of the Northern Territory Fire and Rescue Service. Congratulations Steve!

We are pleased to advise that Steve will continue in his role as President of ARRO as well.

Thankyou and Goodbye Gore

W.L. Gore and Associates have been outstanding supporters of ARRO for 10 years, providing a much-needed annual cash contribution to assist with costs of travel and accommodation for the Challenge Management Team. Also in more recent years they have been extremely generous in providing Windstopper jackets for all members of the CMT and some Gore-Tex rain jackets for use by the Scenario Team who often work in very difficult weather conditions preparing the vehicles ahead of the challenge.

Unfortunately due to internal changes in Gore they are no longer to continue their sponsorship. A special thanks to Gore for the assistance over the last 10 years and especially to Warren Redman.

2011 Australasian Rescue Champions!

Congratulations to the 2011 Australasian Rescue Champions, Werribee CFA! The team, who were also the 2010 Australasian Challenge Champions, picked up awards for Best Medical Team, winners in the Immediate class and equal 3rd in the Controlled class. They also won the Controlled event in the World Challenge and came 2nd overall, and if that wasn't enough…they won the Trauma Challenge.

Other winners include:
Immediate Class 3rd – NZFS Greytown
Immediate Class 2nd – NZFS Feilding
Immediate Class 1st – CFA Werribee
Entrapped 3rd – NZFS Feilding
Entrapped 2nd – NZFS Morrinsville
Entrapped 1st – NSWSES Coffs Harbour
Controlled 3rd – CFA Werribee
Controlled 2nd – NZFS Morrinsville
Controlled 1st – QFRS Blackwater
Spirit of the Challenge – Hong Kong FS
Best Technical Team – NZFS Morrinsville
Best Medical Team – CFA Werribee

2011 Champions – Werribee CFA in action at the Australasian and World Rescue Challenge.

Best Team Leader – NZFS - Whitianga
SES Director's Shield – NSWSES Coffs Harbour
Overall 3rd – NZFS Morrinsville
Overall 2nd – NZFS Feilding
Overall 1st – CFA Werribee

There is a large gallery of images on the ARRO web site under the ARC/WRC11 page.

As a result, Werribee and Feilding will be off to represent ARRO at the 2012 World Rescue Challenge in London, England. Good Luck guys!

The Trauma Challenge in Review

Glen Maule, ARRO Secretary/Treasurer and long time champion of the role of the medic in rescue was asked to take on coordinating the Trauma Challenge in 2011. He writes here about his observations.

Since 2008 the World Rescue Challenge (WRC) has included a trauma challenge to enhance the exposure of the team medic and safety officer.

For too long the medic is placed in the vehicle and the viewing public do not get the opportunity to see the excellent work that medics do to manage the injured patients.

As the Australasian Road Rescue Organisation (ARRO) co-hosted the WRC in Wellington this year we naturally had to run this event.

I was skeptical at first as to how this would go, but from the feedback received from the teams it has proved to be a very popular and successful event.

Teams of two are given a fifteen-minute scenario to manage which could be a medical or trauma case.

The impact that was successful in New Zealand was the professionalism and realism of the moulage and the talent of the "patients" in making the scenario life like.

ARRO will look to include this event in future Australasian Rescue Challenges (ARC).

As part of the development of how ARRO can more effectively stage this this valuable learning opportunity for teams, the Queensland Fire & Rescue Service State Challenge and the New Zealand National Challenge will include the trauma challenge as one of their events, which will hopefully showcase their relevant medics.

If you have any questions about this event, please contact me accordingly.

ARRO has a new postal address!

ARRO now has a new postal address:

PO Box 1029
Newport Vic 3015
Australia

Please amend your records today.

All other contact details remain the same.

2013 Challenge planning underway

The ARRO Executive is pleased to announce that the 2013 Australasian Rescue Challenge will be hosted by the ACT Fire & Rescue Service in Canberra from 20 to 23 June 2013.

Stay tuned to hear about some of the exciting plans for the challenge.

More details will follow in the coming months.

Season's Greetings!

The ARRO Executive and Technical Committees wish all our members, sponsors, supporters and families a happy and above all safe and operationally quite holiday season. See you in 2012!

Hosting the Australasian and World Rescue Challenges – A Proud Achievement for the UFBA

ARRO Vice President, Peter Guard, has plenty of experience when it comes to staging international 'double headers'. He project managed the 2005 combined ARC and WRC event. After this year's challenge he spoke to some of the key people involved in organizing and participating in the 2011 challenge and this is what they had to say…

Planning for the big international Road Rescue Challenges had been in full swing for almost a year when the second big earthquake hit Christchurch – the original location – just over four months out from the event. Almost instantaneously, there was an outpouring of support from the international fire and rescue community.

The UFBA was faced with a tough decision on whether to cancel or relocate the event. Given the circumstances, ARRO and the World Rescue Organisation would have understood a decision to cancel it altogether. But the UFBA Board and CEO George Verry immediately reaffirmed their commitment to hosting the event, and with the staff, set about finding an alternate venue.

In just over four months, the UFBA made new arrangements for the large-scale event, and when the 26 teams from around the world travelled to Wellington in mid-July, the organising committee was ready for them.

Weeks before the Challenges began, crews of volunteers were hard at work cleaning and preparing the venue. And more than a week out, volunteers, helpers, and assessors started arriving in Wellington to prepare equipment; drain, drop, and crush cars; and prepare the seven pits for the huge event that was to take place.

Each day, more volunteers arrived - 140-plus in total generously contributed more than 9,000 hours of labour by the end of the Challenges.

"To pull the event off under the challenging circumstances was one thing," said UFBA Chief Executive Officer George Verry. "To do it well was another. In the end, the hard work and many hours spent by many people working hard paid off. We were very happy with how the event went – and more importantly, our international guests enjoyed their time here and returned home with new information that will help them more

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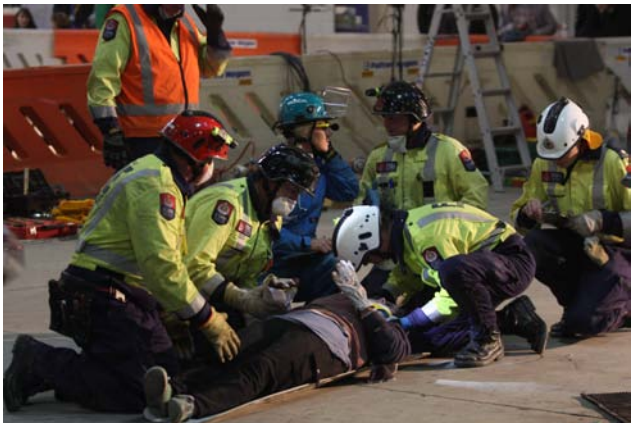
UFBA's hosting success continued…



effectively fulfill their duties."

"The support of ARRO and WRO in the planning of the event, and the contributions from all of our volunteers were extraordinary- it wouldn't have been possible without all the people who were involved."

"We were pleased to see Feilding right up there in the Australasian Road Rescue Challenge," said Verry. "They obviously worked hard to prepare for the event and were very deserving of the second place spot."

"To me, more important than winning is participating. So I was also very proud to have six teams representing New Zealand in these events. I believe that hosting the international challenges was very beneficial in raising the profile of Road Rescue Challenges in New Zealand. We're running our National event in February 2012 and we have 24 teams that have registered their interest – that's a lot more than we've ever had before."

It's All About Learning

Morrinsville Team Leader Andrew "Skinny" Lingard called the Australasian and World Road Rescue Challenges "the best learning experience that can be offered to any brigade member, which can be taken back to their home town and be put into practice in help saving lives on our roads."

"There's no way you'd get that quality of experience unless you participated in these events. And that's what it's about. We want to help other teams along the way, give them tips, and get them participating in Road Rescue Challenges."

That means a lot coming from a member of a team that has consistently been rated highly in Australasia during recent years. Skinny puts these Challenges - which can be so highly

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How safe is your mask?

Michael Vanderzalm is a member of the ARRO Technical Committee and draws on his professional expertise in the health and safety industry to help us understand the risks associated with airborne particles and the need for respiratory protection.

Harmful substances in the form of dusts, mists, fumes or combinations of these substances may be experienced at a motor vehicle crash. There are many important factors to be considered before choosing which respiratory protection is most suitable for a particular application.

So what is the difference between P1, P2 and P3 respirators, after all they all look much the same?

The difference is their filtering efficiency. P1 is for use against mechanically generated particles, P2 for use against mechanically and thermally generated particles and P3 for use against all particles including highly toxic. P1 stops 80% of particles, P2 stops 94% and P3 stops 99.95%. Other filter types or types of respirators should be considered for protection against gases and vapours. The type of contaminant and concentration will determine which filter/respirator is required. However the effectiveness of each is only dependent on how well (correctly) it is fitted.

Road rescuers should therefore assess the working conditions and choose the best respirator /filter protection factor for the type of work they are undertaking and ensure proper fit. Where concentrations permit, disposable respirators are a good solution because of their greater comfort. If you use replaceable filter respirators, you must implement a respirator maintenance program in accordance with AS/NZS 1715.

Rescuers should also conduct training in the need for and correct use of respirators.

Chemical cartridge respirators use a cartridge to remove gases, volatile organic compounds (VOCs), and other vapours from breathing air by adsorption, absorption, or chemisorption. A typical organic vapour respirator cartridge is a

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UFBA's hosting success continued…

competitive - right into perspective.

Denis Fenwick, Greytown's Team Manager, added: "As they say, you never stop learning, and both our new and seasoned team members took much from the Challenge and hope to share those new skills among our local rescue agencies in our area. Mixing with teams from around the world brings home to us the importance of the work we all do."

Teams train several times per week for months leading up to Road Rescue competitions - especially for international events. Of course, it's nice to win or to receive an award for a top place. "But it's not about winning, it's about learning," says Australasian Road Rescue Organisation Executive Officer Paul Jerome.

ARRO's Technical Committee and Scenario Setters put in many months of planning to ensure that all the scenarios teams face are realistic and provide the best learning outcomes. You can witness the precision of the ARRO staff by watching how they painstakingly line up and angle the cars before dropping them from several storeys high - ensuring the impact occurs exactly as it would in a road crash. This attention to detail guarantees a valuable training experience for the teams.

The Hong Kong Fire Service Team in action at WRC11.

Smart phone to the rescue!

ARRO Research and Education Officer, Daryl Rush, has been exploring new ways to get useful information at the rescue scene.

If you have an iPhone, iPad, or Android device you will know what I am talking about.

If you don't, apps (applications) are programs developed for mobile devices and some have relevance for rescuers, paramedics and firefighters.

The apps listed below are focussing on extrication,

How safe is your mask?

metal or plastic case containing from 25 to 40 grams of absorption media such as activated charcoal or certain resins. The service life of the cartridge varies based, among other variables, on the carbon weight and molecular weight of the vapour and the cartridge media, the concentration of vapour in the atmosphere, the relative humidity of the atmosphere, and the breathing rate of the respirator wearer. When filter cartridges become saturated or particulate accumulation within them begins to restrict airflow, they must be changed.

Shelf life and storage conditions can also affect the life of respiratory protection.

Rescue Apps ….

and many others are available for technical rescue and medical applications.

Note: for extrication, although the majority of programs listed below reflect vehicles from overseas, imported, hybrids and electric vehicles would be very similar to Australia variants.

iOS5 – iPad / iPhone

http://itunes.apple.com/au/genre/ios/id36?mt=8

http://www.apple.com/au/iphone/from-the-app-store/

Extraction Zones – Extraction Zones LLC

Hybrid Auto Extrication Guide – Field Applications LLC

QRG – West Virginia University Research Corporation and National Alternative Fuels Training Consortium (NAFTC)

iCRS – iCrash Recovery System (iCRS) from Moditech

Firehouse Magazine – the iPad edition includes select features from the monthly magazine, including Ron Moore's University of Extrication.

Android

https://market.android.com/

http://www.androidappsstore.com.au/

Extricate – a crash rescue guide to Hybrid vehicles.

Extraction Zones – Extraction Zones LLC

There are many more apps, so if you have found apps or websites that are useful for extrication or other forms of rescue you wish to share, please visit the ARRO discussion website and share these with your fellow rescuers.

http://www.arro.org.au/01_cms/details.asp?ID=219

250 Rescuers Benefit from the 5 Challenge Team Member's Learning Experience

(That's pretty good value for money in anyone's book!)

In these tough economic times, Chief Officers are continually re-evaluating the benefits gained for the costs outlaid. Here is an excellent example of return on investment for participating in the Challenge.

Leading Firefighter Barry Bones of the Tasmania Fire Service is based in Hobart and was a member of their team that participated in the 2011 Challenge in Wellington, New Zealand. He shares with us how his team spread the learning across their entire organisation.

Congratulations to both Barry and the management of TFS for supporting this initiative.

The experience of the ARRO Challenge including the lead up gave all members of our team invaluable experience, in particular the exposure to new vehicle technologies. As with most agencies the only time we get up close to new vehicle technology is on the road, where you do not have the luxury to experiment. Our main aim on returning home was to share the lessons learnt with as many qualified Road Crash Rescue operators as we could in the Tasmania Fire Service.

We firstly needed to sit down as a team and identify what the main lessons learnt were. We identified six main learning outcomes. They were new car technology, Packexe SMASH, spinal alignment, new winching ideas, foot/sill entrapment, "A" Pillar hold and ute entrapment.

Further to those were two techniques that we had practiced prior to going to N.Z. Firstly ram lifting (we used this in our entrapped scenario) and a technique of our own that we unfortunately did not get the opportunity to try "The Little Horse Manoeuvre" or LHM for short, named after one of our team members.

Our delivery format for our people was simple; setup a PowerPoint and static display. The idea being that we could spend some time in the classroom and then outside to the drill yard where the vehicles were already prepped. We used six vehicles in the practical session to achieve this. (Unfortunately no newbies). These vehicles would remain set up for six weeks to allow shift training.

The Southern Instructors were up skilled first with the idea they would take it back to their shifts and we then replicated this in our state's two northern regions

The feedback from this training has been excellent. This process has resulted in a possible 250 staff sharing in the information that five people brought back from New Zealand. I am sure that this information has or will be ultimately useful to our operators Statewide and will essentially help better prepare us for work on the road. This is an example of the benefits an organisation has by attending ARRO Challenges.

Prop cars set from left to right:

1. Sill entrapment
2. Foot entrapment
3. A pillar hold
4. Space creation-roof removal
5. Air tool use- space creation

Training for Trains

Chair of the ARRO Technical Committee, Tim Fox, recently conducted a training session for the Tasmanian Fire Service on behalf of ARRO. He writes about training for rail incidents.

If you have a rail line passing through your rescue area, you will benefit from training in train lift rescue.

This article will focus on safely lifting a train to gain enough clearance to remove a person.

The best way to prepare for "person under a train" incidents is to train at a rail facility using full size modern rolling stock.

Where to train?

You will get the most out of your training session if you practice on current types of rolling stock, which pass through your area. It is very difficult to get access to current rolling stock. Current models of locomotives and carriages are in high demand, and the owners are concerned that they may be damaged during the training session.

Look around your local area and find one of the following five types of training venue commonly used for train lift training:

Rail Training Centre

The operators of large urban rail systems usually have their own training centre where they conduct training in emergency procedures for their rail staff. These training centres often have newish carriages on an isolated section of track and are perfect venues for train lift training.

NSW Rail Corp Training Centre, Petersham.

Maintenance Yards

Maintenance yards are also perfect venues for train lift training. They have current model trains and maintenance staff that can help identify suitable lifting points on carriages and locos.

Maintenance yards are usually very busy places, with many active rail lines and moving trains in close proximity to the training area. It takes careful planning and cooperation to ensure the rail staff and rescue crew can work together safely.

Tasrail Maintenance Depot, Launceston, Tas.

Branch Lines and Sidings

Rail companies will often have branch lines or sidings that can be used as training venues. You will need to liaise with rail staff to have a carriage, goods wagon or loco delivered to the site. It is imperative that the site is able to be isolated from the main line to prevent rail traffic inadvertently driving onto your training area.

Rail Museums

Rail museums are usually easy to get access to and staff and volunteers are always eager to help. The trains in the museums are usually old and may not be a good representation of modern rolling stock. The suspension systems on goods wagons have changed very little over the decades and locos have always had substantial suspension systems because of their weight. With a good selection of full sized trains to work on, rail museums make good training facilities.

Private Rail Carriages

If you don't have any other train lift training facility in your area, you may have a privately owned rail carriage or goods wagon in your area. Some people (usually rail enthusiasts) purchase rail carriages, complete with bogies and wheels and place them on a small section of track. They have been put to many uses including restaurants, storage areas, guest accommodation, family home and even a training venue for the Army.

These trains are usually old, but an old full size carriage is better to train on than nothing.

Establish a Good Working Relationship With Your Local Rail Supervisor!

The most important aspect to establishing and keeping access to a training site is to have a good working relationship with the managers of the

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Training for Trains

facility. This may take some time and the facility managers may have concerns about your insurance cover, injuries to their staff, injuries to your members and damage to their rolling stock and infrastructure. Take time to build this relationship, get to know them and allow them to get to know you. Once this relationship is established, look after it and you will have a venue that you can use to conduct regular training for years to come. The rail managers may want you to supply them with proof of insurance cover from your organisation and a written risk assessment prior to allowing you to conduct any training at their site. A written risk assessment should be conducted prior to each training session. A copy of this risk assessment can then be given to the facility manager for their records.

Damage to Rolling Stock

Rail managers usually have concerns about how you are going to conduct the train lift and that you may damage their rolling stock in the process. The best way to allay their fears is to invite them to watch your training session. When the rail managers see the train lift training they are usually happy for you to conduct your training without the supervision of an engineer.

Rail Safety & Risk Assessment.

There are many hazards that need to be managed while conducting train lift training. If you are working on electric trains, the area you are working in needs to have any live electrical wires isolated by a qualified rail electrician. The power supply should be isolated, locked out and tagged out. The electrician should then give you a written "permit to work".

Another hazard that may be present at your training site is moving rail traffic. A system must be put in place to prevent other trains entering your training site. This may include setting the points on the track to divert trains away from your training site and locking the points in this position. A metal derailing plate can be placed on the track to derail any train that inadvertently enters the line you are training on. Other methods may include placing detonator caps on the track to warn you that a train is approaching, changing the signals to red or placing red flags on the track to indicate it is closed.

The train rolling forward or backward along the track during lifting evolutions is another hazard that must be managed. The wheels on the train must be wedged in front and behind on at least two wheels and these wedges must be checked before each lift is performed. This will prevent any forward and backward movement of the train.

A set of points locked (see close up below)

Locking mechanism of the points

Types of Train Lifts

The following training session is designed to release a person who is trapped under a train. The objective is to lift the train, creating sufficient space for the Ambulance Officers to remove the patient.

There are four categories of train lifts:

- Wheel lift
- Bogie lift
- Axle lift
- Carriage lift

Stabilizing the train

Before performing a wheel or bogie lift one problem needs to be taken into consideration. Sideways movement of the bogie can occur when one or more wheels are lifted clear of the rail. This sideways movement will cause the carriage to derail and may injure any person working under the train. To prevent sideways movement the bogie must be pulled with a winch to keep the wheels that are not being lifted hard up against the rail. This is called **chaining the bogie.**

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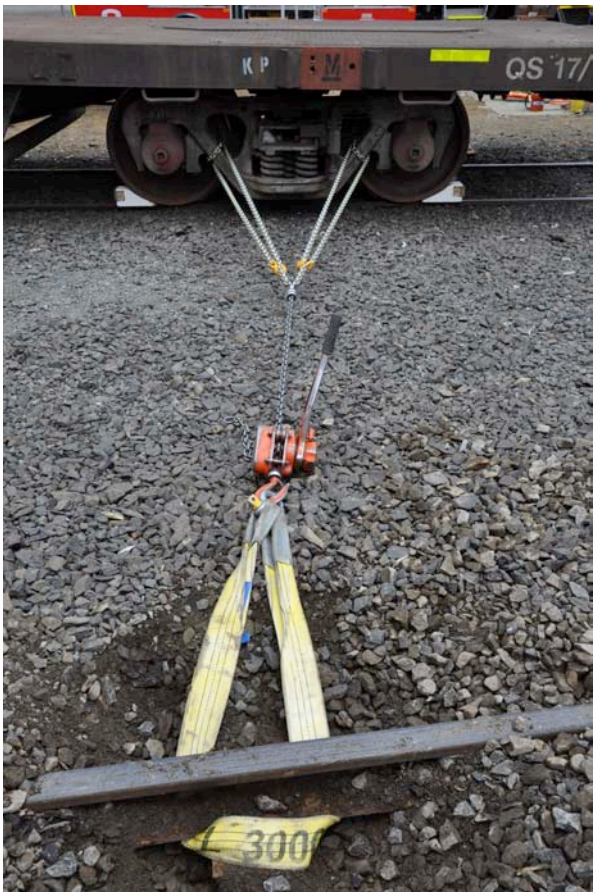
Training for Trains



Chaining the bogie

Wheel lift

If a person is trapped under one train wheel, lifting that one wheel will free them. The bogie needs to be chained to prevent the other wheel on that axle from moving sideways. The person will usually lying on either the inside or outside of the wheel.

If the person is on the inside of the wheel, the rescuers will lift from the outside of the wheel. Conversely if the person is lying on the outside of the wheel, the lift is made from the inside.

For an outside wheel lift, find a strong lifting point, (usually under the bearing housing) and lift using a hydraulic ram.

Follow the principle of "pack as you jack" using packing that is independent of your jacking point with one notable exception. When lifting trains and other heavy objects, use a **common base block.** The reason for using a common base block is that the ground under the ram will be compressed as the train lifts. If you don't use a common base block and the train slips onto your blocks, your packing will sink into the ground and the wheel will fall back down to the rail. In other words, your packing will be ineffective. Another way to ensure effective packing, preventing the wheel from falling back onto the rail is to simply place a wedge between the wheel and the rail. This system is employed if the wheel is to be lifted, the person quickly removed and the wheel lowered back down. If the wheel is to be raised for a long period of time, full stabilization should be utilised.

An outside wheel lift

Bogie lift

A bogie lift raises both wheels on the left or right side of the bogie. This may be necessary if the person has an arm pinned under the front wheel and a leg pinned by the rear wheel of a bogie. The bogie needs to be chained to prevent sideways movement. One way to achieve a bogie lift is to use high-pressure air bags under the centre of the bogie. Again the easiest way to stabilise is to place a wedge under each wheel.

A bogie lift

Bogie lift with wedges under the wheels as stabilisation

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Training for Trains

Axle lift

Another common way to lift a train is to both wheels on the one axle. During an axle lift there is usually no need to chain the bogie. The axle can be lifted with both rams on the outside of the wheels, both rams on the inside of the wheels or one ram on the outside and the other on the inside, which ever suits your situation. Again, wedge the wheels if you are doing a quick lift or fully stabilise if it is a protracted rescue.

An axle lift (Stabilisation removed for clarity of photo)

Carriage lift

A person hit by a train may be thrown up and on top of the bogie and stuck between the bogie and the floor of the carriage. To create enough space to remove them, you must lift the carriage and leave the bogie on the track.

Before you can lift the carriage, you must see there is a **king pin** connecting the carriage to the bogie. Ask a rail engineer for advice on disengaging the king pin or examine the king pin and disengage it yourself.

There are two common places to perform a carriage lift, either by ramming between the bogie and the carriage or by lifting under the draw bar box at the end of the carriage. Again you must pack as you jack, placing the packing in the best place you can find.

Carriage lift, the airbags provide most of the lift, the power rams help keep the wagon level during the lift.

Carriage is lifted clear of the bogie, exposing the king pin.

If you practice these four mail train lift techniques, you will be well prepared for any "person under a train" incident you may attend.

Tim Fox is an Inspector with Fire and Rescue New South Wales, he has been a carrier firefighter for 26 years and has spent much of his time at rescue stations and working as a rescue instructor.

Tim Fox and participants at the Tasmania Fire Service Train Lift Workshop

Access Options for Door Entry

Dave Stackhouse is a member of the ARRO Technical Committee and passionate about improving the efficiency of extrications. He writes here about options for gaining entry.

Often when I am out in the field training, assessing at challenges and debriefing operational extrications I hear comments from personnel with varied experience levels when it comes to the best method of casualty access via door entry, saying we always use the `B pillar rip' or we always use the `quarter light spread' or `Nader pin' entry option.

So what is the best technique? You will always get plenty of opinion in the rescue fraternity as we have such a mix of personalities and variables that influence our perceptions as to what is best practice. Different agency training and policy, type of equipment and knowledge of use, level of theoretical and practical experience etc., etc. the list goes on.

One of the biggest mistakes you can make as practitioners is to adopt a closed minded approach. Vehicle extrication is a science of alternatives, which when put simply is selecting the best option for each component within the three main phases, those being casualty access, physical extrication and the final casualty pathway for removal.

What I want to challenge you to take from this article is to try to keep a flexible approach to door entry techniques within the extrication phase we term casualty access.

Let's look at a case study; we have a driver casualty trapped in a four-door saloon, we have taken care of the concurrent preparatory phases of glass management and stabilisation. The OIC has got interim medical access via a window and established the physical entrapment of the casualty finding them to be pinned by the dash and steering wheel rim. The OIC cannot sight the lower legs but the vehicle damage offers some clues with deformation of the front wheel into the foot well of the driver's side.

The OIC knows he needs further access and space making to further sight the entrapment and the medical team need to complete a full primary and secondary assessment as soon practical.

The extrication team go with a full side out as they recently trained on this with straight cars in the wrecking yard and they know that they can B pillar rip to effect a side removal in 3-5minutes with simultaneous twin tool work using the spreader and cutter running from the duo hydraulic pump.

The side is cleaned out and the medical team is happy with the access, while they are squaring the casualty up the crew remove the roof to assist with access and possible final casualty pathway options with a half and full backboard. The OIC has a further look and establishes that the main entrapment is in fact the wheel assembly, which is crushing the pedals into the lower legs of the casualty.

This is where the OIC's options for release have been narrowed by the full side removal option. The crew has removed the two purchase points that would have given them the best ramming/spreading options. The **`B' Pillar**, and **the rear door, which** if left in place would have acted as a strengthening brace on the pillar as the ram moved the wheel assembly forward away from the casualty.

I hear some alternatives being offered, but would they be the 100% option given the fact we know from training and experience that with the B pillar in place we can push practically anything away as long as we have a straight ramming line and solid purchase point.

In this case given the main entrapment being unsighted, the better action would have been to `piece meal' remove the driver's door first which would still give the supported ramming or spreading points and vision to all the entrapment. From this the one hundred percent option would be taken for release instead of the crew having to work in the lower percentage area of success.

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Fig 1. Case study crew forced to centre dash roll instead of working from the 100% option of the B pillar with rear door in place.

Roof removal or A pillar removal would have given more space and pressure relief to the frontal entrapment while ramming.

So what's the best technique? The answer is that there are many door entry techniques that are widely known within the rescue arena, such as;

- Quarter light spread
- Nader pin/latch side entry
- Roof rail spread
- Latch/Nader pin crush
- Rear door panel crush
- Guard crush
- Front hinge spread and cut
- B pillar rip (total side removal, both normal and inverted)
- Third door conversion
- Piece meal doors

They are all options to have in your arsenal, no one better than the other. What you should consider with all casualty access is that you and your crew need to be able to provide interim casualty access for the medics (usually windows or a door) and main access and space making for the next phase which is the actual physical release, (usually a combination of door/s or roof or both) without restricting the option taking or the perceived 100 percent plan of release.

Some tips to achieve access with door removal are offered for you to practice.

1. B pillar/side removal: This technique is still a useful access option however it can lead crews to the pitfalls described above. It is slightly dated with a new car with modern technology such as reinforced pillars, sills and roof rails. The best method if using total side out on a modern vehicle is to adapt the technique, which many agencies have done. Remove the front door and the rear door then cut the B pillar higher to keep a ramming point while still retaining effective access.

Fig 2: Standard B pillar rip.

Fig 3: Modern NCT version B pillar cut higher for purchase and to effect ramming option.

2. Spread and cut true simultaneous tool use: The quickest way to increase door removal speed is to utilize the cutter and spreader together. This requires quite a higher level of skill from both tool operators and the OIC to ensure the quality and tool safety, however if practiced it is poetry in motion to watch. The spreader is used to create space for the cutter, which is used to cut the hinges and in some cases the latch.

Advantages of cutting hinges:

- Clean/quick operation especially when door is heavily impacted on casualty
- Better control over door removal
- Less potential for impact trauma on casualty
- Metal doesn't tear especially in older vehicles

Some pointers when cutting hinges: The NCT and modern cutter blades have been designed to cut hinges and most of the high and ultra high strength steels in modern vehicles. The key is to

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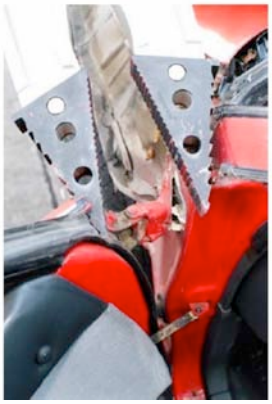
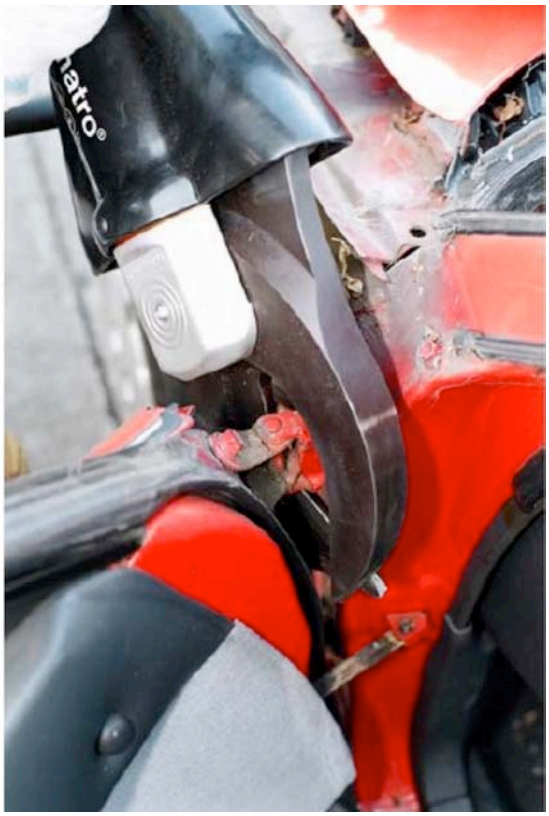
recognise the different types of hinge and ensure you always cut them on a 90 degree or straight angle. ***Remember the following when cutting hinges:***

- Cutter angle should be straight/90 degree to cut and watch for blade separation/twisting. If this happens reposition and get a better angle.
- Try to use the notch area of the cutter blades, do not cut on the outer edges if you need more room create it with the spreader (spread and cut). The Holmatro NCT blades will draw you into the cut, (they are designed to do this) however ensure you have the D -handle facing outward or you could bend it back if not careful as the cutter moves into the cut the handle can catch on the vehicle.
- Avoid hinge pins and Nader pins.
- Cast hinges will shear once the blade bites, I tend to cut these only operationally.
- Pressed steel hinges cut easily.
- Don't fight the tool let it find its natural balance this will assist you when cutting.
- Work from the top hinge down to the lower hinge as the door is released subtle pressure can be applied to open the area for better tool access or utilize the spreader.

Holmatro, 4035NCTII & 4050NCTII cutters makes clean work of the Holden VE hinges



Utilise the spreader to assist with space making for the cutter



Cutter well positioned for hinge cut.

Finally a word on training, my motto is ***"train as you work"*** if you train to objectives you will move forward in extrication. Dismantle all your working jobs in a constructive way to see how you could have improved. Talk to the ambulance crews to find out what they perceived was good and not so good.

Talk to your workmates about their jobs and how they went, study pictures and recreate training scenarios based on jobs with impact damaged vehicles. Use a combination of manikins and live casualties to actually challenge crews to come up with an extrication plan that physically they must carry out. There is no place for armchair critics in modern operational crews.

Above all keep an open mind and always go for the 100% option and you will grow from job to job.

ARRO to contribute to setting Australian Standards for Electric Vehicles

Holden Volt.

Since August 2009, ARRO has been participating in Standards Australia commissioned research into the need for development of Australian Standards for electric vehicles (EVs). This is important given there are a number of commercially available EVs on Australian roads now, and into 2012 more will be arriving.

Education and Research Officer, Daryl Rush, has been representing ARRO at Standards Australia, and key details of development stages and outcomes to date are outlined below.

Key stakeholders across Australia were engaged during the initial scoping study that suggested that there was a need to adopt a strategic approach that advanced a suite of Australian standards in five core focus areas:

- Vehicle design;
- Vehicle power systems;
- Vehicle recharging;
- Rescue, vehicle repair and vehicle recovery; and
- Consumer information and GHG emissions.

During stakeholder discussions, the scoping study highlighted a wide variance in the views of individual stakeholders and as a consequence, it was suggested that there was a need to assemble a national working group to consider the findings of the scoping study and oversee the development of a workplan for preparation of Australian Standards for EVs.

The development of the workplan required the completion of two specific tasks:

- Identifying priorities for the development of EV standards; and
- Assembling the overall workplan, including:
  - Specific standards development tasks;
  - Scheduling activities;

  - Identifying industry composition of the project teams for development of individual standards; and
  - Designing the overall structure of the approach.

The subsequent workplan has identified the following key areas as a priority for the development of Australian Standards for EVs:

- Definition of terms;
- Procedures to assess the electrical safety of EVs;
- Aftermarket conversion of EVs;
- Recharging infrastructure;
- Identification and labelling of EVs;
- Rescue and recovery procedures for EVs; and
- Battery safety and handling.

ARRO representative, Daryl Rush, has been nominated to be a member of the committee focussing on 'Identification and labelling of EVs', and he has been requested by Standards Australia to chair the 'Rescue and recovery procedures for EVs' committee.

Both of these committees will require Daryl to engage with ARRO member agencies and individuals in the coming months.

Congratulations Daryl on some great work, bringing the role of ARRO as the 'Peak body for the exchange of knowledge and skills in road rescue' to the attention of Standards Australia and other peak bodies.

Nissan Leaf and its 'recharging' station.

Changing the Way We Rescue – ARRO Research

In 2010 ARRO Medical Specialist on the Technical Committee, Brad Setch, received a scholarship from the KJ McPherson Education and Research Foundation. He joined forces with Daryl Rush, ARRO's Research and Education Officer to undertake a controlled study of potential benefits and efficiencies of relocation in rescue. Here they present some of their preliminary findings.

Throughout Queensland, road crash rescue services are coordinated and managed through a collaborative response by the:

- Queensland Police Service (QPS);
- Queensland Fire and Rescue Service (QFRS);
- Queensland Ambulance Service (QAS); and
- State Emergency Service (SES).

Improving extrication outcomes is a dynamic and continuous improvement concept, and as a result of Queensland emergency services involvement with the Australasian Rescue Challenges and Symposia; a collaborative study of vehicle relocation was identified as a priority for QFRS and QAS.

Vehicle relocation is not currently in any QFRS or QAS training curriculum, but is undertaken within Queensland when the operational needs determine that approach for the timely rescue of the patient. Rescuers working outside their scope of training framework can potentially put themselves and their organisations at risk of litigation issues should this technique of rescue ever be put to question.

During 2010 Brad Setch (QAS), the QAS Research Unit and Daryl Rush (QFRS) commenced planning including research, developing terms of reference for the conduct of the study and securing funding sources. In November 2010 Brad Setch was awarded the KJ McPherson Education and Research Foundation Patron's Grant and Daryl Rush secured funding through the QFRS State Road Crash Rescue Committee to ensure the conduct of the collaborative study could proceed.

During the research phase, we could only find anecdotal evidence with no published articles for or against this practice, and if Queensland was going to introduce this practice it would need to be supported with evidence. The goals of the study included:

- Prove or disprove an improvements in extrication time;
- Improve access to the patient/s for paramedics and rescuers; and
- Identify safer options for extrication.

The study benefited from ARROs assistance in gaining support from Holden Limited through the supply of modern vehicle technology in the form of donated Holden Statesmen sedans. These vehicles were prepared with simulated side pole impacts collisions at 30km/h, equivalent to the standard Australian New Car Assessment Program (ANCAP) pole impact test. The results of which were validated by the QPS Forensic Crash Unit; ensuring that science is behind the crash simulation model.

The study design utilised a comparative assessment of the same extrication scenario (side impact collision into a fixed pole) conducted using (two) 2 different options. A live casualty with simulated entrapment was used in each option so that there were no variances. The comparative assessment supplied evidence through the video capture of the (two) 2 options from a range of external and internal cameras and audio sources.

The two options exercised during the study where:

1. Static extrication; and
2. Relocation extrication.

A standard model of response crews from both agencies supplied the extrication and medical treatment.

A standard briefing was supplied to the crews, and no interventions were made to stop or delay the crews during the comparative assessments.

The following images are key steps and examples of performance identified through the study:

Size-up - exterior

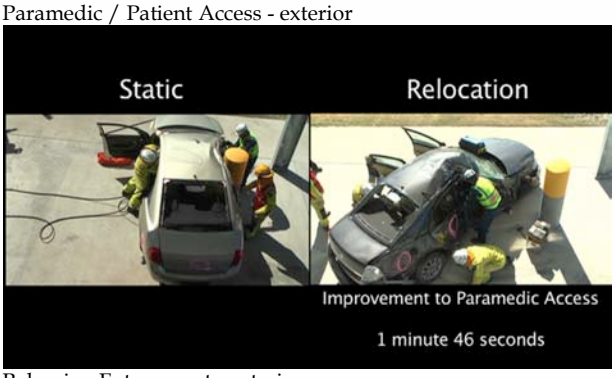
Size-up - interior

Rescue Research….

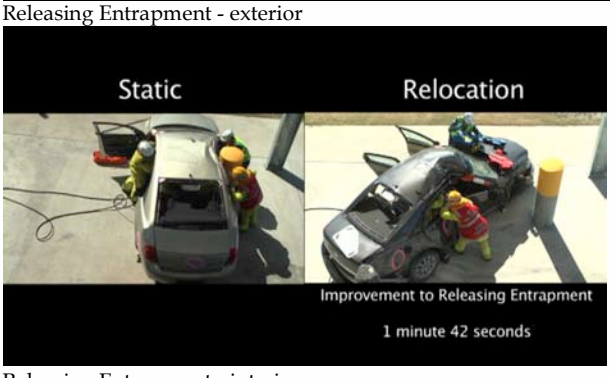
Space Making – exterior

Space Making - exterior

Paramedic / Patient Access - exterior

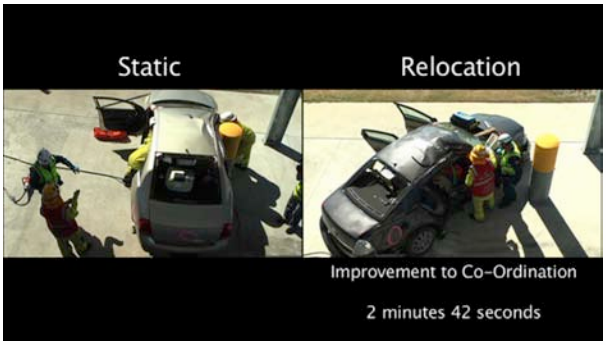


Releasing Entrapment - exterior

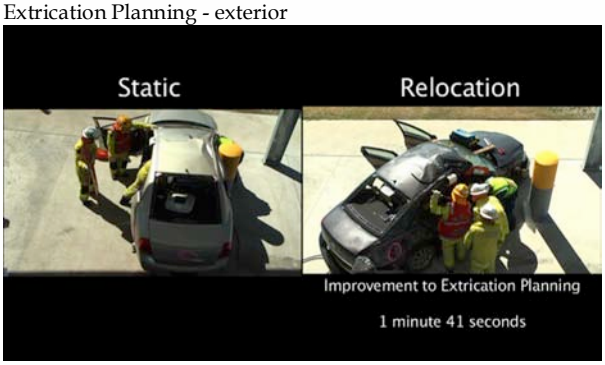


Releasing Entrapment - interior

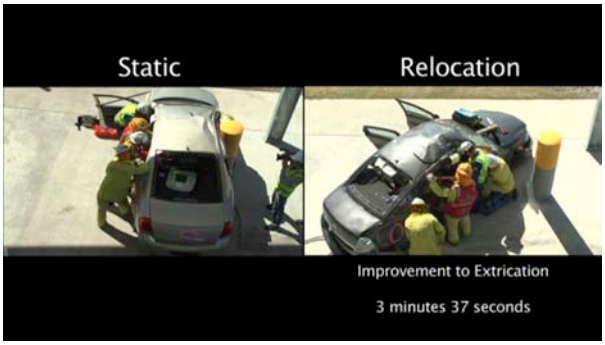
Coordination - exterior



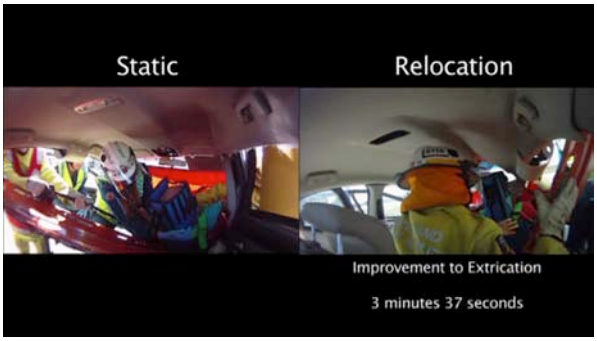
Extrication Planning - exterior



Extrication - exterior



Extrication - interior



The results of the study included:

1. *Determining the extent of vehicle relocation and if it improves access and extrication outcomes for the patient.*

   Result - there was a positive improvement to patient access in the vehicle relocation model as the real estate that the key stakeholders, being the rescue provider and the paramedic, acquired was much larger and allowed for concurrent work activity which aided better planning and safer extrication paths for the patient and the rescuers. The crews made improvements to overall time to extrication

of the patient. These can be further improved when concepts are embedded through organisational policies and training.

2. *Whether the relocating of the vehicle causes significant observable movement and poses any clinical risk to the patient.*

   Result - the initial study used a smooth concrete surface and the results showed the patient and the paramedics were unaware that the vehicle had been relocated. The Medical Directors of the QAS have stated that movement is unavoidable in the uncontrolled setting that we operate in as we accept movement in the extrication phase and the transport phase of the patient. All movement of any injured patient has to be done in a controlled and coordinated manner to decrease the clinical risk to the patient involved in a road traffic crash.

3. *Identifying operational issues associated with the potential introduction of vehicle relocation into operational practice. This objective was always going to be the biggest challenge for a multi disciplinary team.*

   Result - We identified scene management as a key element to the success of vehicle relocation as this would have to be identified early into the rescue operation so significant time savings can be achieved and allows for greater planning in the big scheme of the operation. We believe there needs to be a greater emphasis on joint training which would allow paramedics to understand the fundamentals and challenges to the rescue providers and also for the rescue providers to operate in unison with the paramedics as we both have a common goal. This would allow for a safer environment for the patient and the rescuers if all parties had an understanding of each other roles and responsibilities.

Further challenges noted by QFRS and QAS during the study included variations in our terminology and reporting structures - it is a goal to get common terminology within our organisations:

- Extrication pathways (in-line, short-lateral, long-lateral);
- Patient criticality, QAS use time criticality and QFRS use immediate release; and
- Personnel at the rescue scene from QFRS and QAS have different understandings of the terms entrapment vs. encapsulation. Sometimes this even differs within the agency from Officer to Officer.

We would hate to do a survey of all ARRO's rescue providers on their definition of the terminology, as none would be wrong but there would be a big difference.

Rescue is the science of alternatives but one thing will always stay the same, the importance of early development and communication of an extrication strategy. At the scene of all cases, whether vehicle relocation is required or not, this factor will determine the extrication time of each rescue.

Remember there is never a bad plan just sometimes a better one.

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