Challenges of Extrication Involving Vehicles with Advanced Steel Structures

Ron Moore
Division Chief(ret.)
McKinney Texas Fire Department
Reports of Inability to Complete Extrications Arrived from 1st Responders (2008-2009)

2008 model year B-pillar encountered during extrication by Rockville (MD) Vol FD
“Driver was pinned in with the "A" post almost down to his chest. We removed the soft top and drivers door. When we went to try and cut the "A" post, our Amkus ‘O’ cutters could not make the cut! We quickly tried another cutter and another power unit with shorter hose but still had no luck.”

“Our crew was getting ready to try sawz-all's when EMS was able to remove the patient horizontally ending our operation.”
1st Responder Extrication ‘Case Studies’
Boron A-pillar
State Farm & AISI Assistance Obtained

- Query to State Farm Insurance Vehicle Research Center
- Contact with American Iron & Steel Institute
- “Advanced Steels” explained for the first time to First Responders
Stronger Metal Poses Challenge to Rescuers

Susan Rieko for The New York Times
OPEN WIDE Daniel Monaghan, with Mike Mitchell, checks an extraction tool.

By HENRY FOUNTAIN
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Ron Moore, a firefighter in McKinney, Tex., who trains rescuers around the country to extricate victims from car wrecks, remembers when the puzzled inquiries started to come in.

was 2007, Mr. Moore said, and some of the people he had trained over the years were contacting him about problems that were cropping up at accident scenes involving late-model cars. They were owing trouble with what was normally a straightforward task: cutting through steel parts to gain
Ron’s Year-long Advanced Steel Research Project

2007 Dodge Caliber donated for the research work

Hot Stamped t=0.899 mm
(Boron Steel)

05074066/7AA WInd

05074116/7AA Bpillar Rein

Hot Stamped TRB t=1.9-1.041 mm
(Boron Steel)

When welding Hot Stamped (Boron) Steel (Boron Steel) use resistance spot welds structural adhesive. Weld nuggets should be 6.5 mm.
What Current Extrication Tools Work or Don’t Work on Advanced Steels? (2009)
Project work involved field testing of hydraulic rescue tool power cutters to evaluate ability to cut through advanced steels.
Extraction Challenges Of Advanced Steel In Vehicles – Part 1

Due to the construction of today's vehicles and the variety of ways in which people can be trapped inside a vehicle after a collision, rescuers are being called upon to perform a wide variety of extraction tasks. One common task involves working to force open and remove a jammed door. However, after opening and removing a jammed door, the B-pillar or roof may still obstruct the ability of the rescue team to effectively remove the patient. Our most common solution is a crushable roof or a deformed B-pillar that allows access when we want to remove the patient to cut away the B-pillar or cut the roof off. Power cutters, electric ratchets, and even an air chain can accomplish this task.

With increasing frequency, fire departments across the country are reporting an inability to cut through structural areas such as the B-pillar of late-model vehicles. Our normal rescue cutting tools, whether hydraulic, electric or air-powered, are failing. One power cutter you have in your tool arsenal that has worked as well for many years, the one that has cut through many roof posts and A-pillars successfully in the past, may finally be used by the tool found in new-model vehicles produced within the last few years. What fire departments...
New Rescue & Extrication Techniques Developed for Advanced Steels

“Pie Cut” roof rail and lay B-pillar down
“Work-Around” Rescue & Extrication Techniques Developed for Advanced Steels
New Rescue & Extrication Techniques Developed for Advanced Steels

“Ram” the Roof off the B-pillar
Great Designs in Steel 2012: ‘Live’ Extrication Demo

- Trained personnel...
  - Livonia MI FD

- State Farm donated vehicle with Advanced Steel

- Newest generation of hydraulic rescue equipment
Our ‘FUTURE’...

✓ First Responder relationship with OEMs

✓ Access to vehicles & vehicle structural information for rescue & extrication research work

✓ First Responder concerns included in design decision-making process
STEP-BY-STEP
SKILLS YOU NEED
TO GET THE
JOB DONE.

With more than 1,200 full-color illustrations, Ron Moore’s "Vehicle Rescue 1-2-3" contains vital information that highlights key steps for completing more than 200 actualization tasks in an easy-to-follow, step-by-step, visual format. Whether you are learning these skills for the first time, refreshing and reinforcing your vehicle rescue abilities, or instructing others in vehicle rescue training, this is a 'must have' reference book for you.
**Scenario:** Driver’s foot trapped between brake pedal and floorboard, requiring pedal to be moved off patient’s foot/leg.

1. Determine which side of steering column the shaft of the brake pedal is located on & work from that side.

2. Secure webbing or rope to the brake pedal shaft and run from beneath pedal pad to pulling side.

3. Utilizing a partner, obtain firm grip on webbing and pull pedal shaft away from steering column.

**Pedal Lift Step 1:** To manually lift pedal, secure webbing to pedal shaft then run from under pad up to steering wheel.

**Pedal Lift Step 2:** Pull on webbing using steering wheel ring as a ‘change of direction’ to lift pedal up from floor.
**Scenario:** Occupant trapped in vehicle underride situation; 18-wheeler trailer truck combination.

1. Stabilize both underride vehicle and tractor-trailer truck; deflate all tires on underride vehicle in effort to lower.

2. Consider access through window. Try accessible door and make patient contact with trapped driver.

3. Power down tractor trailer truck and underride vehicle; consider side or front end battery access.

4. Consider lowering jacks of tractor trailer truck to raise trailer off underride vehicle.

5. Consider total side removal (4-dr), door removal, plus 3-door (2-dr vehicle), as well as trunk tunneling.
www.universityofextrication.com
Retired Division Chief Ron Moore has ended this phase of his 32-year Fire Service career with the McKinney (TX) Fire Department in 2011, serving as their Safety Officer and Chief Training Officer.

His years of fire service experience have allowed him the opportunity to conduct thousands of advanced automobile rescue seminars and bus rescue training programs nationwide and throughout Canada. His presentations have taken him as far as Sweden, England, Germany, and The Netherlands. He is a most sought-after and highly recognized expert in his field.

In 1984, he received the International Society of Fire Service Instructors “Instructor of the Year” award. In 2000, Ron was awarded the International Association of Fire Chief’s “Excellence in Rescue” award for his work in the field of vehicle rescue.

Ron is a member of the SAE Hybrid and EV First and Second Responder Task Force Committee(J2990). As a writer, he is the author of now over 200 published fire service and emergency responder-related articles and has just self-published his own unique extrication training manual titled ‘Vehicle Rescue 1-2-3’. It is a 100% completely illustrated manual depicting step-by-step practices and procedures for the training of emergency responders in accomplishing vehicle rescue and extrication tasks.
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