

The Dayton Airbag Incident

Ron Moore, University of Extrinsication
Firehouse magazine

"It ejected me from the car. It was a pretty violent ejection. I landed on my back. At that point I really didn't know what happened. I just told them ...make the pain go away, I can't take the pain anymore."

(Firefighter Tom Trimbach, Rescue One, Dayton OH FD describing the Dayton airbag incident)

On Monday morning, August 21, 1995 at 05:49am, Dayton, OH, firefighters received a call reporting people trapped in a motor vehicle accident on Hoover near McGee. The four member crew of Rescue One responded in their rig to meet Engine 17, Truck 13, and Medic 4 at the scene. For firefighters Jim Kohler and Tom Trimbach responding with Rescue One, little did they know that in a few moments they'd be making history. And little did they know that the next fire department vehicle they'd ride in would be a fire department ambulance.

Rescue One Captain Loren Johnson describes the response;

"As we were responding to the alarm, I noticed it was a clear day, early in the morning, so it was still dark. We probably had a response of six or seven miles to get to this location. After we got approximately half way there, the first due crews arrived on scene and notified us that we did have people trapped in this automobile.

We got out started and our operation. I walked around the vehicle and noticed that we did have two people trapped...one in front of the car, one in the rear. As I walked around the vehicle... I found I did have a vehicle that was up on the curb... wrapped around a tree on the driver's side. The crash had compressed that side completely into the passenger's area of the vehicle.

As I was looking around, I noticed that the (tail)lights were still on at the rear of the car and the battery was still on. I knew that we had an electrical situation.

Captain Johnson's initial scene survey continued as he noticed there was no fuel or oil spills around the car. Due to the early morning darkness, firefighters established lighting on the scene. After completing his survey, Captain Johnson talked to paramedic Jim Simonson to find out what was planned for both patients in the vehicle and what the Rescue One crew members could do to assist EMS personnel.

The front seat occupant was still in the driver's seat after the crash with the entire left side of the vehicle crushed from impact with the tree. The most seriously entangled victim was seated behind the driver in the back seat. His feet were almost completely buried within the crushed rear seat floorboard metal. Both legs were twisted to the right towards the center transmission hump area.

Paramedic Jim Simonson, responsible for the management of the injured patients, relates information gained in the initial assessment;

They were both alert and conscious and most likely had serious injuries. We couldn't tell at this time. We did have the driver pretty well organized and ready to move out. We had traction applied manually and rotated him onto a longboard. We slid him out through the passenger door once they(Rescue One) got the door popped. He was pretty well stable at this time.

District Chief Jim Beach arrived and assumed command of the 14 firefighters and rescue personnel on scene. Everything was going smoothly at this point seeming almost routine. As at all accidents Chief Beach had been to in his career, hazard control and scene safety remained his priority.

Incident Commander Beach;

At this point we had a member of Truck 13 assigned to open the hood of the vehicle to disconnect the battery cables. With the condition of the vehicle, the hood had to be forcibly opened with the claw bar. When the firefighter attempted to open the hood, it caused a lot of movement (of the car) and discomfort to the victim.

It was decided not to forcibly open the hood but to leave the hood intact. We had the firefighter standby with a CO₂ fire extinguisher and we had a member of Engine 17 standby with a charged hoseline.

In what was a pivotal moment of the rescue operations, Chief Beach decided to accept the inherent risk of working on a damaged vehicle with the electrical system intact. Accepting this calculated risk coupled with a failure to completely stabilize the vehicle against unwanted movement, set the stage for the historic events yet to unfold.

Incident Commander Beach;

We were aware that the electrical system was intact. We didn't feel at this time that it was necessary to disconnect the electrical system. Our prime concern was the possible hazard of fire. We weren't looking for airbags at this time.

Rescue work continued on the four-door sedan vehicle after the passenger front door was forced open and the front seat patient removed. The passenger rear door and B-post was completely removed followed by windshield glass removal. To completely open the vehicle up, all roof posts were cut at dashboard level and the roof completely removed.

Paramedic Jim Simonson;

We focused our attention on the rear seat passenger who we suspected had severe fractures of the lower extremities.... tib, fib on both legs and severe foot trauma. He was complaining of a lot of pain, was alert and oriented at the time. We were concentrating our efforts on holding traction on him and getting him out of there. He had some minor trauma to his face and wasn't complaining of any difficulty breathing or chest pain. Our concern was in getting the seat off his feet so that we could extricate him.

The seriousness of the entrapment of the rear seat passenger was also obvious to Chief Beach and the Rescue One crew. The difficulty of accessing the driver's side rear seat area was compounded by the large tree completely inside the vehicle. With access to the patient's legs

and feet so severely limited, one rescue plan was formulated to work inside the vehicle to systematically remove interior portions of the vehicle while a second plan was devised to actually move the vehicle away from the tree.

Incident Commander Beach;

At this time we decided we had limited space to make a proper extrication of the victim in the back of the car. The car had struck a tree sideways and the tree was literally positioned in the center of the vehicle. The Captain of the rescue unit felt that it may be better use to the front-mount winch of the rescue to remove the vehicle from the tree... to put the vehicle in a position where we had more room to work.

The rescue vehicle was positioned for this eventuality while firefighter Trimbach moved in with the Amkus™ cutter unit on the passenger side. If he failed to gain sufficient room to access the crumpled floorboard from the passenger front seat area, the vehicle would then be moved away from the tree. Trimbach climbed inside the passenger front seat area of the vehicle. His plan was to remove the back portion of the left front bucket seat. Maneuvering the cutter into position, the blades closed around each hinge and quickly cut the seatback free.

Firefighter Trimbach;

I knelt down into the right front cushion. The console area was being pretty well crushed. It only took minor hand tools to remove the plastic outer components of the console. I removed the lid, the inner basket and the actual console housing itself. That exposed a wiring harness and the hump, which gave me access between the seat cushion and the hump.

Trimbach stood a power spreader on its' tips positioning it between the crushed floor and the curve of the transmission hump console area. His objective was to pry the floorboard metal away from the center hump thus freeing the victim's feet. What he failed to realize however was the significance of the aluminum-colored metal box sitting on top of the center console area.

There were brilliant red-colored cables located at the rear of the box, each cable resembling a battery jumper cable in appearance. The bright yellow label on top of the metal box identified it as the vehicle's SRS Diagnostic unit. Under the aluminum cover was a sophisticated electronic circuit board. Although Trimbach never realized it, just under the metal cover was a small shiny metal cube. Inside this cube is where Mitubishi air bag engineers located the contact points that complete the circuit during a crash to deploy the vehicle's airbag system. As Trimbach pried the floor off the patient's feet, one tip of the spreader settled against the aluminum box crushing the cover and the circuitry underneath.

Firefighter Trimbach:

I made four or five attempts at a point below a metal box that was sitting on top of the hump. They'd spread or move the area a little bit but not allowing enough to let the medics remove the victim's feet. They cut his shoe off hoping to slide his feet out from his shoe. That apparently not working, we made another attempt with the spreaders. At that point as I spread the jaws, they came up into the side of the metal box. There was a sudden tremendous explosion. I felt myself ejected from the car... propelled from the car... landing on my back. I had no idea what happened... whether the tool had blown up or the car itself

had blown up... I never lost consciousness but I became tremendously disoriented and experienced pain on my right side from my waist all the way up to the right side of my forehead.

Firefighter Kohler, who was standing outside the vehicle near the driver's front door hinge area was leaning over the steering wheel area when the dual air bags deployed.

Firefighter Kohler;

Tom was operating the tool and I was in position waiting to see if I could clear out more debris. When he struck the box, the (driver's side) airbag deployed out of the steering wheel, catching me in the upper chest and face and staggered me backward. At the time I was struck, I didn't exactly know what had happened. All I knew is that I heard a loud explosion, felt something hit my chest and face, and then I couldn't breathe.

Chief Beach:

Trimbach was found laying on the ground in great pain. He was holding his stomach area and rolling around. Everybody was in somewhat of a state of shock. I walked over to Trimbach with the rest of the crew. Thoughts were going through my mind that now we've got several victims to deal with. Also... while everybody was dealing with Trimbach, I happened to look over the hood and noticed Kohler laying in the front yard in a daze. I pointed to him and said that he will need attention.

Chief Beach quickly radioed for two additional medic units and an engine company for manpower. As Incident Commander, he also faced the challenge of the victim still trapped in the back of the car.

Paramedic Simonson:

Initially your first gut reaction is to go ahead and work on your own people but you have to consider all the people that are at the scene. We wanted to look around and make sure that no one we hadn't seen had gotten hurt when the bags deployed and make sure we were limited to the three patients. We triaged them and it turned out that the two firefighters were more serious than the patient that was actually in the back seat with lower extremity trauma.

We noticed that Trimbach was the more seriously injured of the two. He had chest trauma and head trauma. Fortunately he was wearing his gear. Once we got the gear stripped off him and assessed him, we noticed some red marks on his chest and were again very concerned about a possible pneumothorax or some other injuries to the chest.

Trimbach:

The medics came over and they gave me tremendous victim care.. More than anything, it put me at ease to feel the medics there giving me the care that I probably would have done that much if not more if it had been a friend of mine. That was more comforting than anything to realize that they were giving me the care that was making me feel better even though it still hurt.

Captain Johnson realized that the two injured firefighters were both from the rescue crew, leaving only himself and one other extrication trained member on scene. After approximately 10-15 minutes, these two rescuers were able to get the victims' feet free from the vehicle.

What started out as a challenging extrication call for the Dayton Fire Department turned out to be the first-ever case of dual air bags deploying on a vehicle with the fire department on the scene. After the incident, Dayton Fire Department members reflected on the significance of the events that had taken place.

District Chief Jim Beach:

There is nothing worse than seeing several firefighters on the scene injured... possibly to the point that they may be critical. With that thought going through your mind, you have to deal with them and the citizen at the same time and make sure that everyone is receiving the best medical care that can be done at the scene. It always runs through your mind, was this necessary or was it not?

Paramedic Jim Simonson:

Use your training as much as you possibly can when you're treating one of your own. You don't want to get focused in on the fact that this is someone that I just sat and watched a football game with. You've got to go ahead and just let your training take over and everything will work out as best it can.

Rescue One Firefighter Tom Trimbach:

There is no standardization to the SRS units or the deactivation of those units. I think there is probably certain things that will affect all the vehicles. One of them is to disconnect the battery cables, both battery cables. That seems imperative in the training we've learned since the accident. Both cables need to be removed from the battery.

Another thing I've learned personally is at the time I saw the metal box on the console it really didn't it looked unusual. Being placed in the position it was, it didn't seem to be anything real critical to be concerned with other than a wiring harness. But if you look at it now... it's an unusual looking box with some heavy duty red, bright red wiring you don't normally see in a vehicle. And anything unusual from here on is going to get a little bit extra attention from me and that's I think probably the biggest lesson I learned. If it looks unusual it probably is unusual and it takes a little more caution if you're going to deal with that area.

Rescue One Captain Loren Johnson:

Firefighters are brothers to each other and we try to take care of each other. When one of ours fall, it scares us to death.

The Insurance Institute for Highway Safety of Arlington Virginia recently reported in the March issue of their publication Status Report that air bag-equipped cars make up an increasing proportion of cars on U.S. roads. Since the 1987 model year, more than 33 million cars have been sold with driver air bags. Another 15 million have passenger bags too.

Air bags themselves can cause occupant injuries, usually minor but sometimes serious or even fatal ones. This is true even as air bags are saving lives and preventing many serious injuries.

To understand the extent of air bag-induced injuries and the nature of injury patterns, Institute researchers analyzed recent crash data. Ninety-six percent of all air bag injuries to vehicle occupants during a crash are minor, 3 percent are moderate, and fewer than 1 percent are serious injuries or worse. Minor injuries occurred mostly to people's heads, faces, necks, shoulders, arms, or hands. These injuries consisted mainly of contusions and abrasions that heal without scars. Strains and sprains are also encountered occasionally. Concussions constitute about half of the moderate air bag-induced injuries. Next are fractures, mostly to upper extremities and contusions. Serious air bag-induced injuries are rare and mostly involve chest-heart lacerations, lung contusions, and fractures of the ribs.

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Insurance Institute for Highway Safety
1005 No Glebe road
Arlington VA 22201

What do fire, rescue and EMS crews do when confronted with a vehicle equipped with supplemental restraint systems. If the air bag system has deployed, normal operations can proceed. Rescuers should minimize contact with the deployed bags because the powdery residue on the bags is a potential skin and respiratory irritant to some individuals. Do not introduce the air bag residue into the eyes or any open wounds. Remove infection control gloves and wash hands after handling a deployed air bag.

As in the Dayton incident where rescuers encounter a 'loaded' air bag system that has not deployed, action must be quickly taken to control the vehicle's electrical system. Here is a quick checklist for 'loaded' air bag system management at an accident scene;

- Stabilize scene hazards; fire, fuel, wires down, hazmat, etc.
- Stabilize vehicle to prevent movement; block and chock
- If safe to do so, utilize vehicle's electrical controls to;
 - 1) unlock power doors,
 - 2) lower power windows,
 - 3) open rear trunk or hatchback,
 - 4) move power operated seat(s).
- Take away electrical power by disconnecting or cutting negative ground cable near battery. Secure end of cable with duct or electrical tape to prevent re-establishing contact with any metal components.
- Remain clear of the inflation zone of each air bag if it were to deploy
Electrical storage capacitors present in an air bag system may allow the system to remain energized with reserve power even though the battery has been disconnected.
- Proceed with normal rescue and EMS activities.

For further information on firefighting and extrication procedures, please contact the International Association of Fire Chiefs at the following address;

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Side impact air bags are currently available on select model Volvo and BMW vehicles. Firefighters in the Dallas, Texas area have already responded to the first ever activation of a side air bag system at a real-world crash. Linda Dugger and the 10-year-old daughter, riding in their 1995 model Volvo 850 automobile (the first vehicle in the US to feature side impact air bags) were struck broadside on Interstate 75 in November 1994. The side air bag system deployed and protected them from the crushing impact with the second vehicle. Although their Volvo was destroyed, both driver and passenger received only minor cuts and bruises (both were wearing safety belts).

Side air bags are typically smaller than frontal ones. Designs being introduced today feature side air bags that deploy from the door panels, the seat structure itself, or from the roof posts/pillar area. A variety of sensors are being developed for these new side air bags. Volvo uses a mechanically activated one in the seat that initiates air bag deployment when contacted in the first few moments of a side collision. Other manufacturers are developing electronically activated bags.

Future cars of model year 1998 and beyond may well be equipped with six air bags- two frontal bags for the front seat driver and passenger and two side air bags each to protect the side and head area of the driver and passenger.

A 30-minute video documentary on the Dayton, Ohio air bag incident is available from the Fire & Emergency Television Network(FETN). This exceptional training program contains interviews with responders involved in the incident and shows graphic video footage of the actual dual air bag deployment as shot by a local new media cameraman at the scene.

Please contact FETN for further information on the Dayton air bag incident at;
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