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**CALSPAN REMOTE INADVERTENT AIR BAG DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. 95-17
VEHICLE: 1994 MITSUBISHI GALANT
LOCATION : OHIO
DATE: AUGUST, 1995**

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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<i>16. Abstract</i> This remote investigation focused on the inadvertent deployment of the driver and passenger side air bags in a 1994 Mitsubishi Galant. The air bag system deployed during extrication efforts by professional firemen who responded to the injury crash. One of the rear seated passengers of the Mitsubishi was entrapped by intrusion of the right front seat frame. The firemen neglected to disconnect the vehicle's battery during the extrication activities. A hydraulic tool compressed the case of the air bag system's diagnostic control unit which resulted in the inadvertent deployment. A fireman was positioned over the steering wheel of the vehicle and was struck in the face and upper chest by the driver's side air bag. A second fireman positioned in the right front of the vehicle was struck in the right chest and upper extremity by the expanding passenger side air bag. Both firemen sustained minor injuries and were treated and released from local hospitals.			
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SUMMARY

This remote investigation focused on the inadvertent deployment of the driver and passenger side air bags of a 1994 Mitsubishi Galant during extrication efforts by professional fireman. A multiple event crash sequence resulted in the entrapment of a rear seated occupant of the Mitsubishi. The firemen responded to the crash scene and initiated efforts to extricate the occupant. During this procedure, a hydraulic tool was utilized to displace the right front seat track assembly to free the right foot of the occupant. The firemen failed to disconnect the vehicle's battery as the tool was placed against the center console mounted air bag control module. As a result, the module assembly was damaged and apparently shorted against the metal components which inadvertently deployed the air bags against two firemen that were assisting in the extrication efforts. Both firemen sustained minor soft tissue injuries from the deployment. A local television film crew was video taping the event when the deployment occurred. A copy of the video tape has been submitted with this summary report.

The crash occurred during early morning hours at the onset of dawn in a city environment. The driver of the 1994 Mitsubishi had approached traffic that was slowing for a stop sign at an intersection. The investigating police agency suspected the Mitsubishi was initially traveling at a high rate of speed on the approach to the intersection. The driver apparently steered in a clockwise direction and braked which induced a clockwise yaw to the vehicle. The left rear passenger side of the Mitsubishi Galant impacted the right rear area of a stopped 1992 Dodge Dynasty which resulted in an lateral impact force (estimated at 9-10 o'clock) to the Galant. The vehicle was redirected in a counterclockwise direction as it departed the right road edge and impacted a small diameter tree with the right side area. Again, the secondary impact force was lateral (estimated at 2-3 o'clock) which did not deploy the dual air bag system.

The Mitsubishi Galant was equipped with supplemental driver and passenger side air bags. The driver side air bag was incorporated into the steering wheel assembly in a typical configuration. The passenger side air bag was mounted in the right mid/upper instrument panel in a mid (transitional) mount configuration. The system's control/diagnostic module was located in the mid aspect of the center console area located rearward of the floor mounted automatic transmission shift lever.

The Galant was occupied by four adult male occupants who were positioned in the four outboard seated positions. Although the vehicle was equipped with manual 3-point lap and shoulder belts in the four outboard seated positions, none of the occupants were reported to have been restrained by the belt systems. Immediately following the crash, the right front and left rear occupants exited the vehicle and fled

the scene. The driver and right rear passenger were reported to have been entrapped within the vehicle, however, the driver was not mechanically restricted in the vehicle. The left front door was reported by firemen as jammed which may have prevented the driver from fleeing the vehicle. The right rear occupant's right foot was physically restricted by deformation of the right front seat track that resulted from intrusion of the right side structure.

A spokesperson for the fire department stated that all department personnel had received and reviewed a 5-6 page memorandum that pertained to safety aspects relating to vehicles equipped with air bag systems. A policy implemented by the department several years prior to this event focused on steering wheels and columns. This policy prevented personnel from cutting steering columns and/or steering wheels from a vehicle that was equipped with a non-deployed driver's side air bag system. In addition, the department was instructed not to physically displace steering columns by hydraulically pulling the component away from an injured occupant. The spokesperson noted that there was minimal information regarding passenger side air bags.

The firemen responded to the crash scene to provide emergency service and to extricate the two remaining occupants of the Mitsubishi. The firemen was dressed in full protective gear which consisted of helmets with integral face shields, heavy weight turn-out coat, pants, boots, and fire fighting gloves. The helmets were constructed of a light weight fiberglass outer shell with a urethane foam impact resistant cap and suspension liner. The face shields were hinged at the temples which allowed the user to rotate the shield up over the facial area.

Initial assessments of the occupants of the Mitsubishi indicated the driver was dazed from the crash and the right rear passenger complained of lower leg pain. The firemen observed the seat track and seat frame assembly displaced laterally, pinning his right foot against the raised center console area. The firemen made the decision to remove vehicle components to gain full access to the occupants. Hydraulic equipment was utilized to remove the roof of the vehicle, open the left front door that was jammed closed, and to cut the right front seat back from the vehicle. It was unknown if the firemen were fully aware that the vehicle was equipped with driver and passenger side air bags which remained active during these efforts.

Two firemen were assigned the task to sever the battery cables to ensure that all 12 volt power was removed from the vehicle. The hood was jammed closed due to the right side impact and probable bowing of the vehicle. As they attempted to open the hood manually, their assistance was required to aid in the removal of the sheetmetal components. During this process, the battery remained connected which supplied power to the vehicle. Following removal of the roof, no further efforts were initiated toward the removal of the hood and the disconnection of the battery cables. The departmental spokesperson noted that this was a gross oversight by the firemen at the scene of the crash.

The driver was easily removed from the vehicle on a backboard and prepared for transport to a local hospital for treatment of his injuries. The primary attention of the firemen was then directed at the extrication of the right rear occupant. Seven firemen was assisting with this task. Two members were

positioned in the vehicle with one located in the left rear area attending to the occupant and the other firemen positioned in the right front, kneeling on the seat cushion operating the hydraulic spreader tool. This fireman had positioned the outward extending jaws of the tool between the center console and the deformed right front seat frame. He noted that the tool had slipped on 3 or 4 attempts which required repositioning of the jaws against the console. These initial attempts fractured the plastic panels which concealed the console and the air bag diagnostic/control module. The firemen noted that a component was deformed by the jaws, however, they did not realize that the component was the air bag control module. At this point in time, the firemen were approximately 20 minutes into the rescue activity.

With four additional firemen positioned at the right side of the Mitsubishi Galant and the seventh leaning into the left front position, over the steering column, the fireman operating the hydraulic equipment positioned the jaws against the air bag control module and proceeded to expand the tool against the seat frame. During this procedure, as documented in the video, the fireman rocked his body in a rearward direction toward the right front door opening. The driver and passenger side air bags subsequently inadvertently deployed.

The passenger side air bag expanded against the right arm and right chest areas of the fireman that was operating the hydraulic tool. He immediately lost his grip on the tool and was displaced upward and rearward from the vehicle. He came to rest on his posterior right side perpendicular to the right side of the vehicle. The fireman rolled onto this back and was assisted by the other members of his department.

The fireman who was positioned over the steering column, was struck in the lower face, neck, and upper chest by the deploying driver's side air bag. He was displaced rearward, however, he apparently remained upright. He immediately proceeded toward the front of the vehicle and removed his helmet, gloves, and coat and slumped to the grassy area to recover from the unexpected event. None of the other firemen were directly involved in the deployment sequence of the air bags.

The video tape clearly documents the trajectory of the fireman that was positioned in the right front of the vehicle. The tape did not record the fireman's involvement with the driver's side air bag. Based on the review of the tape, the right front positioned fireman was fortunate that the roof had been removed from the vehicle as the posterior aspect of his head would have probably impacted the roof side rail as he was displaced from the vehicle. In addition, both firemen were afforded protection by the protective clothing and helmets. None of the clothing or equipment used by the firemen was damaged by the inadvertent event.

The fireman positioned in the right front of the Mitsubishi was a 45 year old male with a height of 172.7 cm (68.0") and weight of 74.3 kg (165.0 lbs.). He sustained multiple contusions (AIS-1) of his right thoracic and upper arm areas from the deploying air bag and soreness of the back and buttock areas. He was transported by ambulance to a local hospital where he was treated for his injuries and released.

The second fireman who was positioned at the left front of the vehicle was dazed and momentarily winded, which resulted in a brief void of his normal breathing rhythm. He complained of soreness across his entire

body and was transported by ambulance to a local hospital for examination of possible injury.

The right rear occupant of the Mitsubishi was subsequently removed from the vehicle and transported to a local hospital. He and the driver were admitted for treatment of their injuries.

A supervisor for the fire department contacted a representative of Mitsubishi who informed him that the vehicle's air bag system had an energy reserve of 60 seconds following the disconnection of the power supply to the vehicle. The department recognized that if the battery had been disconnected at the onset of the rescue, this event would not have occurred.

ATTACHMENT A

Newspaper Coverage

2 firefighters hurt during res

Two firefighters trying to extricate crash victims from a wrecked car were injured Monday when air bags popped out and slammed into them.

Firefighters and had to be treated at local hospitals after the incident about 6:30 a.m.

was admitted to

Hospital and released several hours later. was treated at Medical Center and released.

The firefighters were trying to extricate two people trapped in a 1994 Mitsubishi Galant when the air bags deployed.

The passenger-side air bag knocked against the car's door and then to the ground. The driver's side air bag struck

The air bags deployed about 40 minutes after firefighters responded to the car crash, said of the Fire Department's training center.

"We've had lots of warnings, but this is the first time I've ever seen anyone hurt by one," said.

The Mitsubishi had been traveling east on Avenue when it went out of control,

cue when air bags pop open

police said. The rear of the Mitsubishi struck the front of a 1992 Dodge Dynasty, which was stopped at a sign at Avenue.

The driver and a passenger of the Dodge did not appear to be seriously injured, police said.

The Mitsubishi spun and slid down the road, its side slamming into a tree at Ave.

Because the Mitsubishi sustained only side and rear impacts

from the crashes, the air bags did not activate, authorities said.

, a Mitsubishi spokesman, said the computer device controlling the air bags is in the center console on that model.

"This is the first time I've heard of an incident like this involving any of our cars," said.

Four people were in the Mitsubishi as it swerved out of control. Police said two of them fled

the scene, but two others, the driver and a passenger, were trapped in the car. Authorities identified the driver as, and the passenger as, 20. Both live in

was in stable condition Monday night at Hospital and Center.

was listed in fair condition at Medical Center.