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February 22, 2011

Robert Strassburger
Vice President, Vehicle Safety and Harmonization
Alliance of Automobile Manufacturers
1401 Eye Street, N.W., Suite 900
Washington, DC 20005

Dear Mr. Strassburger:

We are writing to you to request that your members join our fight to protect the disabled from burn injuries caused by exposure to vehicle seat heaters. Each year, occupants who suffer from lower body sensory deficits experience burns from malfunctioning or poorly designed seat heaters.

While most occupants are able to discern when the seat heater has exceeded human tolerance, occupants who suffer lower body sensory deficits caused by paralysis, diabetes and neuropathy can be seriously burned when a heater malfunctions. These injuries have been described in the medical literature.

Doctors from the Haydarpasa Training Hospital's Department of Plastic and Reconstructive Surgery and Burn Unit and the Gullhane Military Medical Academy and Medical Faculty in Istanbul, Turkey reported on second and third degree burns suffered by a 38-year-old paraplegic due to prolonged contact with a malfunctioning seat heater.[1] The doctors described the injury in a letter to the editor of *Eplasty*, the *Open Access Journal of Plastic Surgery*. They noted the potential risks to the disabled:

> "…Electric heated car seats are now commonplace and have been known to malfunction and become dangerously hot, which may cause third-degree burns. The surface temperature at the heated car seat may reach 120°F. This temperature may cause localized deep and even life-threatening burns within 10 minutes. Therefore, this injury is a major potential risk for patients with sensory deficits such as paraplegia, diabetes, vascular disease, stroke, and mental or physical disabilities."

[1] An Unusual Burn Caused by Heated Car Seat; Celalettin Sever, MD, Yalcin Kulahci, MD, Fatih Uygur, MD, and Sinan Oksuz, MD; Letter to the Editor; Eplasty Open Access Journal of Plastic Surgery; April 8, 2010

A 2003 article in the *Journal of Burn Care Rehabilitation* described the case of a 48-year-old male paraplegic with decreased sensation in his buttocks who suffered third-degree burns, caused by the seat heater in his new minivan.[2] The patient reported that the heater was on for 20 minutes before he noticed the pain. Researchers found that the vehicle was equipped with four heating panels. Their tests showed that they reached a temperature of 95°F, but the heating panel near his burns reached a localized temperature of 120°F. At this temperature third-degree burns can occur within 10 minutes.

A 2005 paper written by German physicians described the severe burn injuries suffered by a 42-year-old paraplegic, who remained in contact with a seat heater for four hours.[3] His burns covered 6 percent of his body and they were so extensive on his posterior and thighs they required hospital care and surgical skin grafts. The authors noted that seat heaters were now another potential burn injury source for a vulnerable population:

> "Paraplegic patients belong to the risk population for burns. On the basis of reduced or increased sensitivity, pain sensation and limited mobility due to their illness, there is a fundamentally increased risk of suffering thermal burns and difficult recoveries. The desire for warm seats and backs when motoring has led, in recent years, to a clamor for heated car seats. This increased popularity of seat heating in motor vehicles of the new generation has entailed a new thermal burn source for paraplegics. On the one hand, this can be purely technically conditioned, due to possible faulty functioning of regulating electronics, creating a risk of overheating with a panic reaction and burn danger. Additionally, prolonged, consistent use of a defective seat heater when anesthesia and analgesia are present could produce serious burns in a user if local overheating goes unnoticed. Third degree burns can occur after 10 minutes with car seats warmed to 49ºC."[4]

In September, a trio of British physicians described in the technical publication, *Spinal Cord*, the case of a 50-year-old diabetic woman who suffered burns from prolonged contact with heated seats.[5]

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[2] Car Seat Heaters: A Potential Hazard for Burns; Pirko Maguiña; Tina L. Palmieri; David G. Greenhalgh; Journal of Burn Care Rehabilitation; 2003
[3] Car Seat Heaters – a Potential Danger for Paraplegics; E. Demir1 D. O'Dey; P. Fuchs; F. Block; N. Pallua; Neurologist 2005
[4] Car Seat Heaters – a Potential Danger for Paraplegics; E. Demir1 D. O'Dey; P. Fuchs; F. Block; N. Pallua; Neurologist 2005
[5] Pain in your buttocks? Check your heated car seat isn't burning you; KRM Rakowski, N Sivathasan and N Sivathasan; Letter to the Editor; Spinal Cord; September 14, 2010

The problem has also been noted in publications aimed at the disabled. In 2008, *New Mobility* magazine featured a story about three paraplegics who suffered burns from car seat heaters.[6]

While there are no voluntary or mandatory standards governing seat heaters, there is a wealth or research literature on human heat tolerance. In the late 1940s, Henriques and Moritz conducted several important studies on the subject.[7] They documented a range of temperature vs. time of exposure for second degree burns. They reported second degree burns at 70˚C (158˚F) for a 1 second exposure; 60˚C (140˚F) for 5 seconds; to 52˚C (126˚F) for 90 seconds; and 44˚C (111˚F) at seven hours. They documented that third degree burns occur at temperatures around 49˚C (120˚F) within 10 minutes.

Some manufacturers have included in their designs heaters which automatically shut off after a specific period of time, or after the occupant compartment reaches a particular temperature. Most manufacturers also build maximum temperature points of up to 105° F into their designs. But other manufacturers leave it to the occupants to determine when to turn off the heated seat feature and some have no visual telltale to alert occupants that the seat heater is on. Some manufacturers, such as Toyota, Chrysler and Ford include special warnings about the potential for harm to the disabled. The Aspen Owner's Manual contains this warning:

> "Persons who are unable to feel pain to the skin because of advanced age, chronic illness, diabetes, spinal cord injury, medication, alcohol use, exhaustion or other physical condition must exercise care when using the seat heater. It may cause burns even at low temperatures, especially if used for long periods of time."

Despite these advisories and pre-cautions, tests of heated seats show that the systems do not detect hot spots and some of these seats have been tested at temperatures reaching 120°F and beyond.

"The car seat heaters should never reach these temperatures," wrote researchers in the *Journal of Burn Injury Rehabilitation.* "Because there is no warning light on the dashboard to signal when the heaters are ON, patients with impaired sensation may not be aware that the car seat heater is on. In addition) the heating elements should have a control device to turn them off when they overheat. The seat heaters could be improved if they offered a temperature control instead of just an on/off button that sets to maximal

[6] Escaping the Hot Seat; Bob Vogel; New Mobility; April 2008
[7] Studies of Thermal Injury. II and III: The Relative Importance of Time and Surface Temperature in the Causation of Cutaneous Burns; Henriques and Moritz; American Journal of Pathology; September 1947

heat every time. Most importantly the seat heaters on every car should be tested to prevent accidents with heaters that come defective from the factory.[8]

We believe that automobile manufacturers can help in two ways. In the short-term, they can amend their mobility programs to address this hazard. Seat heaters should be automatically disconnected for drivers with lower body sensory deficits.

Beyond immediate adaptations, manufacturers should limit the maximum seat heater temperatures to the limits of human heat tolerances and set all seat heaters on a timer. These time and temperature limits should be codified in an industry standard.

We have prepared an overview describing the safety problem, the research on human heat tolerance, the current state of seat heater design, the history of seat heater investigations and recalls and our call to action for all stakeholders. It is attached for your reference.

I'd be happy to discuss this further with you at a mutually convenient time.

Sincerely,

Sean Kane

[8] Car Seat Heaters: A Potential Hazard for Burns; Pirko Maguiña, Tina L. Palmieri, David G. Greenhalgh; Journal of Burn Care Rehabilitation; 2003