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CONTACT DJS

215-659-2010

800-332-6273

Company Information

Joy S. Falk

jsf@forensicDJS.com

ext. 31

Experts/Research/Exhibits

Yaisa Q. Freeman

yqf@forensicDJS.com

ext. 17

High-Definition Survey (HDS) & Investigations

Terry W. Myers

experts@forensicDJS.com

ext. 14

Engineering Animations

Hugh Borbridge, BSME

hbb@forensicDJS.com

ext. 23


Recreating the Scene Although it has Significantly Changed

Steven M. Schorr, PE / Collision Reconstruction Engineer

Case Synopsis: A collision occurred when a passenger vehicle exited a driveway to execute a left turn and was struck on the driver's side by an approaching vehicle.

Expert Analysis: A key factor in the analysis of the collision issues was the ability of the exiting vehicle operator to view to her left prior to exiting the driveway. The exiting vehicle operator claimed that her sight distance to the left was obstructed by a neighbor's trees. A day after the collision, the neighbor cut down the trees. When the engineers arrived to investigate the collision, the claimed obstruction was gone. However, while investigating the collision, the police took photographs of the physical evidence, including the trees. By

completing a high-definition survey [HDS] laser scan of the site, an accurate three-dimensional environment of the collision scene as it was at the time of the inspection was created. Photogrammetry [a scientific process to take measurements from a photograph] and three-dimensional "camera matching" were utilized along with the police photographs to recreate, to-scale, the accurate location of the trees cut down by the neighbor within the three-dimensional environment.

Result: The analysis regarding the effect of the trees on the driver's ability to safely exit the driveway could be evaluated within the accurate and to scale three-dimensional environment within the computer. 


4-Year Old Drowns at Pool Party

Tom Griffiths, Ed.D. / Aquatic Safety

Case Synopsis: A non-swimming four year-old girl was invited to a pool party hosted at a local country club. The parents sent their daughter but did not attend themselves. The parents informed the party hosts that the young girl did not know how to swim. The country club pool had no legal requirements to provide lifeguards, but the management company overseeing the club decided to place certified lifeguards at the swimming pool. Shortly after the children arrived at the pool, the young non-swimmer simply walked into water over her head and drowned. Security cameras captured the tragic event.

Expert Analysis: Although there were two layers of supervision present for this child, both the hosting parents and the lifeguards missed the drowning child in the water. Pool parties

are often the scene of drownings because the hosting parents become too distracted to watch their guests properly; however, the lifeguards assume the hosting parents are watching. Plaintiffs argued that the lifeguards should have prevented the drowning but were poorly trained, poorly stationed and not supervised often. Defense argued that there was no duty to provide lifeguards and that the party hosts and parents should have watched the child and should have fitted the child with a Type III lifejacket.


Result: A substantial settlement was offered to the plaintiffs. Lesson learned: Supervision is often spotty. Just like seat belts and car seats are required for children riding in cars, so should lifejackets be required for non-swimming children at pools and beaches. 

A Shocking Design Failure

Colin J. Bringham, CIH, CSP, CPE, CPEA
Safety Consultant

Case Synopsis: A high school science teacher just completed using a hot plate, on the top of her laboratory bench, in a demonstration to the class. The hot plate was being used to heat and mix materials in a glass vessel. While the hot plate was still turned on, she bent over and began to unplug the hot plate. She received an electrical shock that threw her back, causing her to strike the back of her head on the tray of a large dry erase board. The teacher sustained brain damage.

Expert Analysis: A review of the hot plate electrical cord revealed evidence of an electrical flash, with parts of both the plug and the outlet blackened and melted. Further review of the underside of the hot plate also showed blackening of a small section of the perforated stainless steel base plate. Upon removing this plate (revealing the internal workings) a small metal spring was found welded to the base plate. The spring was directly below an exposed electrical terminal strip. The spring had become dislodged from one of the two power control stems and fell to the inside bottom of the hot plate, with the electrical energy flow welding it there.

Result: The spring caused the electrical energy to flow directly to the case, bypassing the ground wire, and allowing the shock upon plug removal. The design that would allow the failure of the power control stem with the resultant separation of the metal spring was felt to be flawed. There is now a newer design hot plate available that does not have this design flaw. 


Water Main Break Repair Effect on Building Foundation

Jon J. Pina, MS, CSP / Safety Consultant

Case Synopsis: A water main adjacent to a medical plaza cracked and caused a water leak. The Water Authority's subcontractor repaired the leak by installing a repair clamp over a piece of water main that had cracked and resulted in the initial leak. After the repaired section of the pipe failed again, the subcontractor was blamed for washing out the foundation of an adjacent building.

Expert Analysis: Defendant's safety expert provided geological documentation that the area was known to have sinkholes due to naturally acidic rain, over the years. This led to chemical erosion of the limestone deposits. The geology of the area has a high incident rate of sinkholes due to acid rain dissolving the thick layers of dolomitic limestone. Rain water is naturally acidic, even without the burning of fossil fuel sulfur and nitrous oxides, due to carbonic acid from carbon dioxide. Geology has "lots of time" compared to a human lifetime. Areas with thick layers of carbonate rock such as limestone (dolomite is

a carbonate mineral with a high amount of magnesium) are notorious for caverns and often sinkholes, especially if the rock formations are looser in nature. Natural sinkholes are somewhat analogous to underground mine subsidence.

Result: Defendant's safety expert opined that the pipe did not cause the erosion under the building because the eroded soil went down into the earth and there was a huge hole. Had the water main caused the erosion the soil would have been deposited where the water velocity slowed. The eroded soil just couldn't "disappear" and had to go somewhere which was into a series of underground caves. Case settled. 

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Injuries Not Consistent With Alleged Fall Mechanics

Robert J. Nobilini, Ph.D. / Biomechanical Engineer


Case Synopsis: Plaintiff was reportedly walking across a wood foot-bridge and claimed she tripped at the end of the bridge and fell forward onto her outstretched hands. At the end of the foot-bridge was a step down to a gravel parking lot. Plaintiff's expert, who examined the bridge some time after the incident, identified a small piece of wood missing from the last plank on the bridge floor. He opined that the missing piece of wood was a trip hazard and was the cause of the plaintiff's fall. Plaintiff reportedly incurred fractures of her right distal tibia and fibula. It was further reported she had stones from the parking lot embedded in the soft tissue of her right lateral calf. It was requested that the incident be examined to determine if the plaintiff's injuries were consistent with her alleged fall mechanics.

Expert Analysis: The missing piece of wood on the last plank of the foot bridge created a small depression. During normal walking gait, trips occur when the trailing foot is prevented from swinging forward to heel strike. This typically occurs when the foot is impeded by an object in the walkway that is raised. The defect identified by the plaintiff's expert was not a trip hazard. The fall mechanics described by the plaintiff were consistent with a trip; however, they were inconsistent with the injuries she incurred. Had the plaintiff fallen forward

onto the stone parking lot surface it was reasonable she would have incurred certain injuries to her upper body and/or her hands, but she did not. Furthermore, the injuries the plaintiff incurred to her right lower leg were not consistent with a trip. Had the plaintiff tripped, as she testified, her right

foot would have remained on the bridge and her center of mass would have continued to move forward as she fell onto the parking lot surface. Under these circumstances the plaintiff's right leg would have been unloaded and the forces necessary to produce the fractures she incurred to her right lower leg would not have been present. The fractures the plaintiff incurred to her right

distal tibia and fibula were consistent with her stepping off the foot-bridge in an awkward manner. The stones embedded in the plaintiff's right lateral calf were consistent with the weight of the plaintiff's body forcing the lateral surface of her right lower leg down against the stone parking lot surface when she landed with her right leg bent under her.

Result: Based upon the plaintiff's injuries, it was determined to a reasonable degree of engineering certainty that the plaintiff's fall was consistent with a misstep, due to her inattentiveness, as she stepped off the bridge. 

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Airport Tug Accelerator Malfunction

R. Scott King, BSME / Mechanical Engineer

Case Synopsis: An airport tarmac worker sustained a serious leg injury while assisting a co-worker couple a cargo tug and luggage dolly. Witnesses testified the Tug accelerated unexpectedly while backing toward the dolly, causing the operator's tug to strike his co-worker. Immediately after the incident, a supervisor reportedly tested the accelerator pedal and found that it stuck upon full application.

Expert Analysis: A forensic examination revealed that a portion of the accelerator pedal was physically broken, possessing indications of wear and neglect that, in plaintiff's expert's

opinion, spanned several scheduled preventive inspections. Although experts for the defendant maintenance company opined that despite being a "wear and tear item", and that the accelerator linkage was not subject to routine lubrication, the Tug's maintenance manual clearly contradicted this assertion and even specified the required lubricant.

Result: Together, the witness testimony, inspection findings, and research data provided plaintiff's expert the foundation for a liability theory against the defendant maintenance provider, thus contributing to a pre-trial settlement. 

Manholes: Open and Not Always Obvious

Johann F. Szautner, PE, PLS / Civil Engineer

A medical student rushes to catch a bus, falls fifteen feet into an open manhole and breaks his back. A lady parks her car on a city street, walks back to the car trunk, steps into an open rainwater catch basin and breaks her leg. During a lunch break, a factory worker walks out on the plant's parking lot to purchase lunch, returns toward the building, steps into an open manhole and breaks a wrist.

It is astonishing how frequently these accidental falls into open manholes occur, with a fairly even distribution among men and women, young and old. While some open and unguarded manholes are the result of vandalism or thievery, others have their lids or grates displaced by vehicular impact, if they are not tight fitting into their frames and not well anchored into the pavement.

Occasionally, manholes are left open by utility maintenance personnel out of carelessness or inexperience. When utility personnel access a confined space, such as a manhole, they have to follow strict OSHA workplace safety protocol and guard the opening and warn the public. Such protection devices are not to be removed until the manhole is closed. Manhole lids and grates can be protected from unauthorized opening by installing locking devices or tack welding the lids and grates to the frame. While in most instances the proximate cause of someone falling into an open and unguarded manhole is readily established, proving notice is more difficult and often requires an exhaustive search of maintenance records.

The entity responsible for leaving a manhole open and

unguarded most likely will claim that the danger of falling into such a manhole was "open and obvious" and the hazard should have been recognized and avoided. This assumes that we are constantly looking downward to check where we are stepping; however, this is not normal human behavior. Visual attention is goal-oriented; when we walk, we typically orient our gaze towards a specific target, be it a stoplight, a building entrance, or our parked car. The line of our gaze forms the axis of our cone of vision. The cone of vision and a person's eye height delineate that person's specific field of vision. Any object outside this cone of vision will be in that person's peripheral view, and may be perceived distorted, or not at all.

Another circumstance to be considered is the ability of people to consciously perceive an object. At every moment, people are bombarded by more sensory information than they can mentally digest. In order to see an object, a person must be able to detect that object because it stands out from the background and is visible and sufficiently conspicuous. Also, people are more likely to notice an object if it is located where the viewer is focusing. People can selectively allocate attention to near or far. Unless we focus continuously on an object, we may not see it. Human factors experts refer to this limitation of attention as "inattention blindness".

"Open and obvious" is a legal doctrine to define the anticipated human behavior as a matter of law. This however may negate real human conditions, including attentional capacity, which can vary from person to person.

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Moisture and Mold Analysis

Harry Neill, CIH / Environmental

Case Synopsis: Plaintiffs' home suffered a minor leak from a second floor bathroom into the kitchen. Upon inspection, more severe damage was observed than would have been expected from the magnitude of the leak which raised the suspicions of the plaintiffs. Prior to purchasing the home, plaintiffs retained a home inspection company who did not identify moisture/mold impacts to the structure. Seller did not disclose any repairs to the structure for moisture incursion/leakage or mold impacts during their tenure in the Sellers' Disclosure. It was only during discovery that the plaintiffs learned that the realtor did not provide them with a home inspection report developed on behalf of a previous prospective buyer that did identify the potential for moisture incursion/leakage into the structure. The issues at hand were the causation of the mold growth, the extent of property damage, and the timeline.

Expert Analysis: Both home inspection reports were reviewed and visual observations conducted of the home. Infra-red thermographic imaging and building material moisture content tests were conducted to focus invasive inspections into wall, floor and ceiling assemblies for the presence of hidden mold growth and to view the construction to determine if previous repairs had been made prior to the plaintiffs tenure. Wood microbiology, air and dust sampling was conducted to characterize the fungal conditions in the house. Both internal and external moisture sources and pathways were identified. Extensive visible mold growth was present in wall, ceiling and floor assemblies primarily related to window/door penetrations, roof terminations and at flashing. There were also plumbing and shower/tub leaks, as well as visual evidence of previous repairs being made to the structure. Bulk wood samples of the structural members confirmed the presence of "late stage" wood decay placing a timeline of 5 years or longer of moisture exposure which predated the plaintiffs' tenure in the house. The air and dust sample results indicated fungal contamination throughout the home and in the heating, ventilation and air-conditioning (HVAC) system.

Result: Verdict rendered in favor of the plaintiffs against the previous owners and the realtor. The home inspection company was not held responsible for conditions in the house that were not readily visible. 

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