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DJS Associates Welcomes Robert S. Kinder, JR., BSME to its Engineering Staff

DJS Associates is pleased to announce that Robert S. Kinder, Jr., BSME, Mechanical Engineer, has joined our firm. Robert utilizes the latest technology to investigate automotive/mechanical failures involving passenger vehicles, motorcycles, and commercial trucks. Robert is an accomplished motorcycle enthusiast, with experience in custom motorcycle design, modification, and fabrication. He has advanced motorcycle riding skills both on and off the roadway and has participated in skilled automotive events, including drifting and drag racing.

Robert is a graduate of Rutgers University. He is a Licensed Pennsylvania State Certified Inspection Mechanic for Passenger Vehicles, Motorcycles and Trucks over 17,000 lbs., Trailers over 10,000 lbs., and Buses. Robert is also a Crash Data Retrieval (CDR) Data Analyst and System Operator, and has obtained his Comprehensive Air Brake Systems Certification.

DJS is thrilled to have Robert join our team. We welcome the opportunity to provide our clients with Robert's expertise and look forward to referring him to you for your case needs.

A Shocking Design Failure

Colin Brigham, CIH, CSP

Case Description: A high school science teacher was 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 material in a glass vessel. While the hot plate was still turned on, she bent over and began to unplug the hot plate and 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 did reveal 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 of the hot plate), 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 had fallen to the inside bottom of the hot plate, with the electrical energy flow welding it there. The spring caused the electrical energy to flow directly to the case and bypass the ground wire, thus 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 determined to be a design flaw.

Case Result: The design flaw in the hot plate was determined to be a factor in accident causation. There is now a newer design hot plate available that does not have this design flaw. Two other causative factors were the failure to use a GFCI outlet, and the failure to turn the hot plate off before unplugging it.

Up In Smoke

Nicholas Palumbo, MS, CFEI

Case Synopsis: A fire broke out at a two and one-half story twin, single-family dwelling. Fire fighters reported a heavy smoke condition upon arrival, with fire in evidence at the first floor rear of the structure. The Inspector from the Fire Marshal's Office examined the scene and determined that the fire originated within the kitchen and was the result of a failure within a chest freezer.

Expert Analysis: An investigation of the exterior was conducted. Heavy smoke staining from all first floor windows was noted. The interior examination was conducted by working from the least damaged area(s) to the most severely damaged area(s). This examination led to the kitchen, which sustained severe damage to both building and contents. Remaining portions of the structure sustained moderate to severe damage to building and contents. Examination of the circuit breaker panel, the Arcoaire (natural gas fueled, forced hot air furnace) and the natural gas fueled water heater indicated that they were not involved with the fire's cause and thus were eliminated.

A careful and detailed examination of the fire scene revealed a partial "V-pattern" along the wall behind the cook stove. The overhead wall cabinets were completely burned away. Removal of fire debris from the top of the cook stove revealed another partial "V-pattern" on the splash area of the cook stove coming from the right rear burner, and two fry pans on each of the rear burners. Examination of the burner knob controls found the right rear burner in the "ON" position.

Reconstruction of the area of fire origin indicated that the fry pan located on the right rear burner had a liquid ring mark inside of it, and the wood handle was severely charred. The underside of the fry pan had a considerable amount of grease attached to it, and a slight outline of the burner resting plate. The ceiling area directly above the stove was extremely burned and charred. Examination of the chest freezer did not reveal any damages of any kind to the electrical power cord; however, the refrigerant line was slightly burst, which can be attributed to the heat from the fire directly impinging on the line, and causing it to burst.

Conclusion: Based on a careful and detailed examination of the loss site and interviews conducted, it was opined that the fire originated within the kitchen of the structure, at the location of the right rear burner of the natural gas-fueled cook stove. The fire was determined to be accidental in causation, the result of unattended cooking.

From Celebration to Tragedy

Philip Wayne, BS, CPM

Case Synopsis: On this particular day, the 4th of July, one could enjoy the many fireworks in the neighborhood with large commercial displays lighting up the distant sky. As time approached for the pool to close, friends of the pool attendant came to hang out. Wanting to participate in the festivities, the attendant produced a hand gun and proceeded to discharge the weapon into the air angling it toward the lake. The attendant then handed the pistol over to his friends to continue shooting while he left to lock up. When he returned, the police had arrived questioning everyone in the area if they knew anything about shots being fired. The attendant/gun owner volunteered that he and his friends had been firing a pistol. The police stated that a bullet fired from the direction of the pool traveled across the lake, through the trees, and struck a pre-teen. The shot was fatal.

The pool attendant immediately volunteered that regardless of who pulled the trigger, he would stand as the responsible party. He was later prosecuted and jailed to serve his sentence. Subsequently, the surviving family filed a civil suit against the landlord/management company alleging negligence in the proper supervision and oversight of a staff member.

Expert Analysis: The first task was to ascertain if the defendant landlord had operated within the standard of care commonly practiced by property management companies in their supervision of on-site employees and, in particular, pool attendants. This involved both the "reasonable person" test, as well as research of available industry guidelines and articles, and materials provided in training courses for certification. In the process of establishing benchmarks for a comparative analysis, city and state regulations, pamphlets and instructive materials promulgated in this regard were also analyzed. The accumulation of facts was used as the baseline to measure depositions, employment files, and various interviews. Did the managements' practices reach, first, the level of care common to the industry, and second, did the facts satisfy the reasonable person test? (management is not a guarantor of the public safety, but must raise to the level of care commensurate to a level that will minimize harms to the public.)

Result: Plaintiff's attorney conducted numerous interviews with neighbors and residents. One resident was willing to come forward and testify that, on several occasions, he was an eye witness to the pool attendant shooting his pistol over the lake and had previously informed management regarding the pistol shooting. The case settled.

Skimming The Surface

Lt. Col. Bryan Smith, PE

Case Description: While walking on the sidewalk leading up to the front door of the apartment she rented, the plaintiff alleged that she stepped onto an icy patch and fell. Her fall caused multiple injuries to herself. Plaintiff's expert opined that the sidewalk had a slight concave surface to it, allowing water from weather events to pool. Freezing temperatures allowed the pooled water to freeze and this caused the slipping hazard that plaintiff experienced. Plaintiff sued the property owner and property manager.

Expert Analysis: A site survey was conducted approximately a year after the incident to gather evidence. Still photos and videography were performed, as well as slope measurements. The evidence showed that the incident sidewalk surface was indeed concave; however, it was also sloped to a degree that allowed water to completely run out of the slightly dished area. The survey also revealed that adjacent to the alleged fall location was a decorative stone half-wall that a prudent pedestrian might grasp onto in order to afford stability while walking over ice, if any had been present. The plaintiff alleged that she chose not to grasp the half-wall. The site survey revealed no surface defects in the sidewalk at the location of the alleged fall. Pennsylvania law doctrine (Hills and Ridges) requires that plaintiffs alleging a slip and fall on ice or snow-covered surfaces prove that their fall was due to a defect in the walking surface and that the fall was not due solely to the ice or snow. The doctrine also states that "…an owner of land is not liable for slippery conditions resulting from fallen ice and snow unless he or she permitted the ice and snow to unreasonably accumulate in a dangerous manner in uneven elevations, such as small ridges and hills of frozen snow or ice. The landowner also must be on notice about the dangerous condition in order to be held responsible." It was found that the property owner and manager had no notice of any dangerous conditions at the fall location, and that the plaintiff had not fallen due to any surface defects.

Result: Plaintiff accepted a minor settlement offer.

Shallow Water Blackout

Tom Griffiths, Ed.D

Case Synopsis: A six-year old swimmer attended a country club pool for the day with his mother. He was an accomplished swimmer, for a six-year old, and spent most of the day swimming underwater recovering sinking toys that his mother had purchased. He spent all of his time in a very large, shallow-water pool intended for small children and guarded by two lifeguards, instead of the deep-water pool intended for adults.

Expert Analysis: The lifeguards hired by the country club were very well-trained, certified, and qualified. Not only did these lifeguards maintain American Red Cross certificates, but they also obtained the required Health Department lifeguard license. Supervisors met with the lifeguards regularly to provide on-going in-service training. In addition, there was a mandatory rest or safety break prior to each hour. Sometime during the safety break, with the pool empty of all members and guests, the child separated from his mother but was not thought to be missing. Shortly after letting swimmers back in the pool, the lifeguard on-duty noticed the child submerged underwater. She responded by bringing the child out of the water and beginning resuscitation. Resuscitation efforts failed and the child died due to drowning.

What made this case unusual is that the boy drowned in a depth of water where he could easily stand up. The family argued that there were not an adequate number of lifeguards, they were not well-trained, and they were distracted at the time. Defense argued because the young boy was an accomplished swimmer and could stand up in the water where he had drown, and that he was repeatedly holding his breath, this could have easily been a case of shallow-water blackout or perhaps a genetic drowning trigger precipitated by voluntary breath-holding.

Result: An undisclosed settlement was reached in this case.

A Matter of Security

William Birks, Jr., CPP, CHS-III

Case Synopsis: A plant worker left the premises without authorization, only to return with a gun later in the shift and shoot his supervisor (Plaintiff). The plaintiff brought a negligence action against the security services company stating that they failed to maintain a sufficient and effective security presence.

Expert Analysis: A review of the materials revealed that in this case the security services company worked at the pleasure and direction of the plant. It was the plant that failed to properly balance the probability of harm, the gravity of the resulting injury, and the burden of precautions adequate to prevent the harm. The site specific post orders revealed that the security officers were not responsible for access control. The security services company was hired to perform certain duties and responsibilities that were specifically spelled out in the agreement between the parties, none of which stated that the security officers were hired or intended to protect the plaintiff or other plant employees from physical injury. The agreement did not set any security officer responsibility towards employee protection.

For safety precautions, the security service company did recommend the construction of a new road into the plant which would include a gate to restrict access into the site. The plant declined to act on the recommendation.

As with the case above, courts have been generally reluctant to extend third-party beneficiary status to employees; however, the recent $46.5 million dollar settlement against the security company demonstrates that the tide may be changing. In that case, even though the unarmed U.S. Security Associates security officers called 911, they failed to warn other plant employees or attempt to contact management. Plaintiff's counsel was quoted as saying that guards can't simply run away in the middle of a crisis, they actually have to act like security guards.

Result: Case settled.

Autonomous Vehicles: Scratching the Surface - Legal and Ethical Decisions Required For Self- Driving Cars

Steven M. Schorr, PE

The definition of autonomous is “having freedom to act independently”. To that end, an autonomous vehicle (AV), a fully “self-driving” vehicle must be designed to “think” on its own and make decisions on its own, without the operator’s involvement. Many vehicles are already performing some “automated” functions such as parking assist and lane change assistance. Those individual functions make a vehicle “partially” automated. A true “fully” automated vehicle would require the vehicle to make all driving decisions. To do that, the AV must decide what data to collect; must collect the data; must process the data; and then must make decisions utilizing that processed data. The ability of an AV to make a split-second decision in an attempt to avoid a collision is based on CRASH OPTIMIZING ALORITHMS created by…humans. Necessarily, someone needs to define the algorithms utilized by the AV, i.e., someone needs to program the vehicle to “how to think”.

A beginning thought process for AV algorithms can be traced back to the Isaac Asimov short story “Runaround” where he sets forth three rules of robotics, which provide the framework of the four laws of robotic cars as set forth by Dr. Raul Rojas [Professor at University of Nevada, Reno]. Rule 1 – An AV may not injure a human being or, through inaction, allow a human being to come to harm; Rule 2 – An AV must obey the traffic rules, except when they would conflict with Rule1; Rule 3 – an AV must obey the orders given to it by human beings, except where such orders would conflict with the First or Second Laws; Rule 4 – an AV must protect its own existence as long as such protection does not conflict with the First, Second, or Third Laws.

So what would happen if an AV is confronted with a situation where a collision is not avoidable if the AV abides by the Robotic Rules set forth above? For example, often referred to as “The Tunnel Problem”, an AV is traveling down a mountainous roadway approaching a narrow tunnel. Just before entering the tunnel, a child attempts to run across the roadway but trips near the center of the lane, blocking the path of the AV. The AV has two options- hit and kill the child, or swerve into the wall on either side of the tunnel and killi the AV “operator”. The tunnel problem sets forth the issue of whether the AV should choose to kill the “operator” or a third party. Who should decide how the AV should react (i.e., be programmed)? The AV manufacturer…? One would think that the manufacturer would opt to protect their consumer over a third party. The government…? What specific moral/ethical foundations would the governmental authority rely upon, and who ultimately would be in charge of making that decision? The AV owner…? It is probable that the owner would chose self-preservation above other options.

The tunnel problem reflects just one tiny scratch on the surface of the incredibly complex issues of how an AV should think. There are moral, ethical and legal dilemmas aplenty as the government and manufacturers travel down the road towards a world where people cede control of their very existence to autonomous vehicles. This topic will expand exponentially over the next 5 years. We will attempt to keep the reader informed with timely updates as to the progression of the technology and the effect on the forensic world. [An excellent article on the above subject, from which some of the data has been adapted, is “Crashing into the Unknown: An Examination of Crash-Optimization Algorithms Through The Two Lanes of Ethics and Law” by Jeffrey K. Gurney.]

Going Down?

J. Donald Kennedy, QEI, CET

Case Description: The plaintiff entered the elevator at an upper landing in order to descend to the lobby. The elevator began jerking and finally came to an abrupt stop. This caused her to be thrown into the back wall of the elevator and onto the elevator floor, allegedly injuring herself in the process.

Case Analysis: There were on-going renovations being performed at the owner’s property. These were being accomplished in various stages and by various trades. The building was in operation during the renovation period, and each trade was expected to utilize OSHA safety standards to insure the safety of the public. Because the building was open to the elevator-riding public during the renovation period, there was an existing elevator maintenance contract in place between the property owner and the elevator maintenance contractor. It was during this period that the plaintiff was allegedly injured. The property owner did not perform any renovations or repairs prior to the incident on the elevator involved. It was pointed out during discovery that the property owner did not assume control of the elevator in question until after the alleged incident occurred. If there was any liability in this matter it would have been on the existing elevator maintenance contractor.

Result: Case settled.

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Additional Case Study on Reverse Side . . .