



Plick and Associates, Forensic Engineers

HOW TO PREVENT DAMAGE FROM FROZEN PIPES!

Damage from frozen pipes has reportedly cost the insurance industry 4 BILLION DOLLARS over the past decade. Pipes freeze when they are routed through unheated spaces, such as in an exterior wall or through a garage or if heat is lost in a building. Often a pipe burst occurs under a sink or toilet where there is heat. One frequently asked question is: Why does a frozen pipe in the exterior wall or garage ceiling cause a burst in a heated bathroom?

Water supply pipes are water-filled. Ice, which expands when formed, is formed when water freezes. You may have experienced the burst or expanded can or plastic bottle of soda when you put it in the freezer and have forgotten about it. The same phenomenon takes place in the frozen pipe. Water cannot be compressed when it is squeezed by the expanding ice and is trapped between the ice and the faucet. The expanding ice raises the pressure to many thousands of pounds per square inch. Eventually the high pressure bursts the pipe.

So, why does a burst occur in a heated bathroom when the frozen pipe is in an exterior wall or garage ceiling? Pressure is a function of the force applied in a pipe and the pipe area. A smaller area results in a higher pressure being

applied in a pipe. For example, water enters a house in a 1/2 -inch pipe. The branch pipes to a sink or toilet is 3/8-inch. The pressure in the 3/8-inch pipe is higher than the pressure in the 1/2-inch pipe. This greater pressure is exerted on the smaller pipe until the burst occurs. There are several ways to prevent freeze-ups and pipe bursts:

- Do not install pipes in unheated spaces such as exterior walls and garages.
- Turn off the water at the water meter, open the faucets, and let the water drain. If there is no water in the pipes it cannot freeze. This suggestion works even if your heat fails due to a power outage.
- Do not lower the room temperature below 50° F.
- Keep bathroom doors, shower doors and lavatory sink cabinet doors opened to allow air circulation.

This Edition's Joke

Normal people believe that if it ain't broke, don't fix it. Engineers believe that if it ain't broke, it doesn't have enough features yet.



THE BLACK BOX/EDR- IMPROVING AUTO SAFETY

An event data recorder (EDR), sometimes referred to as a black box (which it is not) is a device installed in some motor vehicles to record technical vehicle and occupant information for a short period of time (typically 20 seconds) before, during and after a crash.

An EDR has the ability to provide crash investigators and auto engineers with critical information from real-world crashes. This information may include:

- ◆ Driver Input-Throttle/brake application and steering wheel angle before, during, and after the crash event.
- ◆ Pre-Crash Vehicle Dynamics-Vehicle speed, engine speed, and gear selection. Some systems will record pitch/yaw/roll, revealing a rollover event.
- ◆ Occupant Restraint and Positioning - Which occupant in the vehicle were restrained and where they were sitting during the crash event.
- ◆ Post Crash Data-Which airbags, if any, deployed. Automatic crash notification system activation.

EDRs are useful in analyzing real-world crash data scenarios and information. This information from the event data recorders will assist automotive engineers design even better occupant-protection systems in vehicles. EDRs also aid in crash research development; defining specific parameters to assist law enforcement personnel in determining contributing factors of a crash.

Look for part two of the article in the next edition of the Forensic Engineering Newsletter.



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How to Find and Identify Hail Damage on Aluminum Siding, Part 1 of 2

After a hail storm, check the exterior aluminum siding on all surfaces closely for indications of damage from hailstones. Depending on the size, density, speed, direction and angle of impact of the hailstones, as well, the age, coating, surface texture, configuration and thickness of the siding, the types and amounts of damage observed will vary.

General indications of hail damage include splatter marks with or without dents, and in extreme events, bent or deformed panels. Identifying traits for these included:

- Splatter marks visually look as if the surface of the siding was sprayed. The discolorations being the result of the removal of oxidized paint from the surface by the collision of the hailstone with the surface of the aluminum siding. Splatter marks can occur with any sized hail stones.
- Dents may be visible depending on the size and depth of the formed dimple along with the texture and surface finish of the siding. Dents are the indentations resulting from 1" diameter and larger sized hailstones impacting the surface of the aluminum siding at moderate speeds.

Bent or deformed panels may be visually identified by a bow, twist or abrupt change in direction in the face of the panel, and by open or disconnected joints between adjacent panels. Bent or deformed panels are the result of largest size hailstones impacting the aluminum siding at high speeds, or a combination of smaller hailstones loosening the panel and allowing damage from the intense winds that usually accompany hailstorms.

Remember that some types of damage to the aluminum siding may be visible only in particular sunlight or with a trained eye. Therefore, additional means to aide with review of the surfaces

Include:

- Checking when the sun is lower in the sky during the morning or early evening.
- Shining a bright light down onto the siding from overhead
- Spraying some water on the siding.
- Looking at various angles, above below, left, right.
- Feel the surfaces.
- Use binoculars or digital cameras.



Examine adjacent items made of soft metal on and around the house. These include items, such as, flashing, ridge vents, pipe jacks, etc.

Two primary means of confirming the observed indicators of hail damage are from the storm under consideration and not a result of prior storms include:

- The coloring present at the splatter marks and dents. Typically, the area of impact within splatter marks and dents from recent hailstones should have a color different from adjacent areas and splatter marks and dents from prior hailstone impacts.
- The storm path and direction of winds. Hail comes down in specific directions and at angles just like rain. Typically, wind-driven hailstones impact everything that is unsheltered in a random pattern. Look for a pattern, not just a dent or two. Hail damage will usually be noted on one or two vertical elevations. Surfaces facing the wind will incur greater impacts than those on the leeward side. So damage found on the rear and right would indicate the storm came toward the house from the rear and toward the right corner. You should not see the same damage to the front and left elevation.
- Look at the AC compressor, trees, shrubs, etc. Are there dings to the fins or other damage that is consistent with the direction?

Look for part two of the article in the next edition of the Forensic Engineering Newsletter.

The Electrifying End of a Love Affair



John Doe and his girl friend Jane X were living together in her condominium apartment in a small town. He had been her live-in boyfriend for three years. The relationship had soured and Ms. X insisted Mr. Doe leave her apartment. He refused, and after a heated fight, she fled the apartment to get local police to help evict him. Ms. X had later indicated she had been trying to get him to leave for almost a year without success. Two police officers returned with Ms. X. Once inside the apartment, the police claimed he was agitated and there was a scuffle. Mr. Doe then lunged toward a light switch as police officers entered the apartment. The purpose of this peculiar action did not become apparent until later in the evening. Mr. Doe was cited with disorderly conduct.

An hour after the police and Mr. Doe left her apartment, Ms. X found an electrical device the state prosecutor subsequently charged was rigged to booby-trap the welcome mat with an electrical shock device. Mr. Doe allegedly cut off the receptacle end of a two conductor, extension cord, skinned away the insulation of the two conductors and inserted the plug into an electrical receptacle that was part of an outdoor lighting fixture. The two exposed conductors were then inserted through individual holes punctured into a metal pan. A door mat was soaked with water and placed on top of the pan. The receptacle was energized whenever the outdoor light was turned on. Thus, when the aforementioned light switch was placed in the “on” position, the electrical contraption hooked up by Mr. Doe was electrically energized. The prosecution called the improvised electrical device a “human deep fryer” and proceeded to charge Mr. Doe with attempted murder and aggravated assault. The jury acquitted Mr. Doe of attempted murder and aggravated assault but convicted him of the lesser charge of reckless endangerment. The maximum sentence for reckless endangerment is two years in prison, as opposed to thirty years for the more serious crimes. The reasons why the jury determined he was guilty of the lesser charge is a proper ending to this Kafkaesque tale. Perhaps, Mr. Doe only wanted to “shock” Ms. X into reconciliation.





Make Safety the First Item on Your Christmas List this Year by Following These Simple Steps

According to the National Fire Protection Association, Christmas trees were the items first ignited in an estimated average of 310 reported U.S. home structure fires per year in 1999-2002. These fires caused an average of 14 civilian deaths, 40 civilian injuries, and \$16.2 million in direct property damage per year. These statistics include both real and artificial trees. More than four of every ten home Christmas tree fires are caused by an electrical problem or malfunction. One in four (25%) home Christmas tree fires resulted from a heat source placed too close to the tree. Seven percent were started by children playing with fire.

- Be watchful of young children and pets playing in and around the Christmas tree area.
- Make sure lights are UL listed.
- Make sure the outside coating of the lights isn't frayed from prior use.
- Make sure heavy objects such as furniture or the Christmas tree stand are not resting on the cord.
- Beware of open flames around the Christmas tree area.
- Check all of your extension cords thoroughly for any wear or damage.
- When stringing sections of lights together, do not exceed the manufacturer's recommendations.
- Christmas tree lights can not only cause fire but serious electrical shock, especially when using a metal Christmas tree.
- Also, apply safety rules to Hanukkah menorahs which can either be electric lights or candles. Give your family the greatest gift possible this year, their safety.





Plick and Associates, Forensic Engineers, On The Road!



Plick and Associates, Forensic Engineers exhibited at the Insurance Society of Philadelphia's annual Philly I-Day. It was a real pleasure getting out and meeting different insurance company representatives from the tri-state area. One lucky attendee walked away with two 4th row Flyers tickets and V.I.P. parking, courtesy of Plick and Associates, Forensic Engineers.



In November, Plick and Associates, Forensic Engineers, headed to the Lone Star State to exhibit at the National Association of Subrogation Professional's Annual Conference. It was wonderful seeing old friends and making new ones at this four day seminar. Attendees truly seemed to enjoy reading the first installment of the Plick and Associates, Forensic Engineers', Forensic Engineering Newsletter.



Plick and Associates, Forensic Engineers, respond to the scene at International Association of Arson Investigators Annual Conference in Arlington, VA. With an attendee list spanning the globe, Plick and Associates, Forensic Engineers felt right at home amongst some of the world's best Origin and Cause Investigators.

Plick and Associates, Forensic Engineers, loves to hear from its newsletter readers. Please call or e-mail us with article suggestions or feedback. Reader feedback led to the addition of this edition's Hail Damage – How to Find and Identify on Aluminum Siding article.