JUNE 2018 | VOLUME 31 | ISSUE 1

THE StressPoint®

FOR EXPERTS | BY EXPERTS

A publication of Engineering Design & Testing Corp.

AIRCRAFT ACCIDENT INVESTIGATIONS

NEW BRAND, SAME COMMITMENT TO EXCELLENCE:

We are now EDT.

The World's First 3D Printed Homes for Developing Nations

Jupiter's Great Red Spot

How to Be Severe Weather Prepared

Just in time for the Hurricane Season.

THE CALL AFTER THE STORM

The story of a mechanical engineer tasked with a damage assessment after a major storm incident.

EDT
Forensic Engineering & Consulting

Engineering Design & Testing Corp. is an association of forensic engineers dedicated to the study, and interpretation of loss.

A Message from the President

Dear Friends,

This edition of Stress Point includes some changes, some things kept the same, information on responding to losses, and ways to mitigate the impact of losses. If you like variety, we have you covered. Still, the driving force behind our work does not vary and is yet present here; to help make the future which follows a loss a bit better than the past that preceded the loss. And, an appreciation for the things that we see along the way.

So, take a look and let us know what you think.

Until Next Time,

Mark D. Russell

Mark D. Russell, Ph.D., P.E.
President and Chief Engineer

THE STRESS POINT® is published twice a year
by Engineering Design & Testing Corp.
for our clients and friends.

THE StressPoint®

Those wishing to obtain an EDT Portfolio of Technical Services and THE STRESS POINT® should contact Danielle Newbanks at 1–800–338–5227 or marketing@edtengineers.com.

For reprint permission, please contact the editor.

Corporate Contacts

President and Chief Engineer
Mark D. Russell, Ph.D., P.E.
(303) 799-3967
mrussell@edtengineers.com

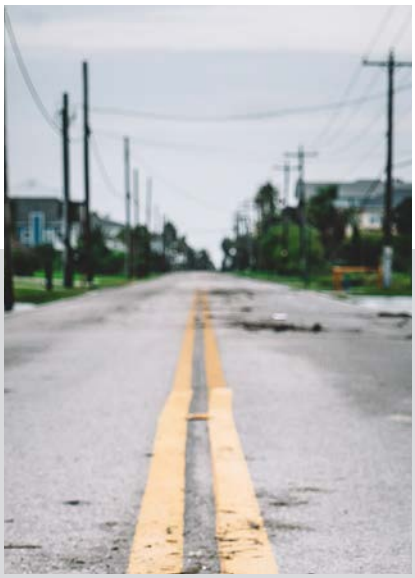
Chief Financial Officer
Christopher Ray
(803) 796-6975
cray@edtengineers.com

Director of Business Development
Charles "Chuck" Jackson
(803) 796-6975
cjackson@edtengineers.com

Editor / Design and Layout / Director of Marketing
Danielle C. Newbanks
(803) 796-6975
dnewbanks@edtengineers.com

Post Office Box 8027
Columbia, South Carolina 29202
1-800-338-5227

Visit Us Online
www.edtengineers.com



On the Cover: Impacts of Hurricane Harvey in Houston, TX. 2017.

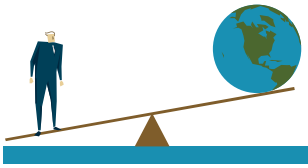
THE StressPoint®
June 2018
Volume 31, Number 1

FEATURE

IN THIS ISSUE

DEPARTMENTS

THE StressPoint®
Fulcrum



“Give me a fulcrum and a place on which to stand, and I will move the world.”

—Archimedes, Greek Inventor and Mathematician

The World's First 3D Printed Homes

For Developing Nations.

Computer Concept of The "Vulcan" 3D Printer, building a home on a community lot.
Image Credit: New Story

Recently a charity organization based in San Francisco called New Story partnered with a construction technology company, ICON, to design a 3D home printer made to work under constraints common in parts of Haiti and rural El Salvador where people are in desperate need of proper shelter.

Thus the 3D home printer named "the Vulcan" was born, and will be able to print an entire home in less than 24 hours and for less than $4,000. This technology is capable of achieving continued cost decrease (from $6,500 per home to $4,000 per home with even lower future cost), and a speed increase from 15 days down to 12-24 hours just to build a single unit with the ability to be customized for families. After much testing and design, it works! They have successfully printed the first house, which was built to US housing standards in Austin, Texas.

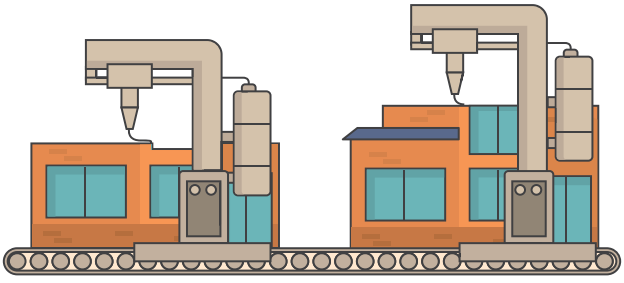
With the success of this first unit being built, New Story intends to extend the project from creating individual units to creating full 3D printed communities. Though this may be a risky move, their goals are to make a dent in the number of people around the world who are living without safe shelter.

With the help of governments and other non-profits all over the world, the ability to increase the impact and transform communities built of tents and shacks to communities of well-built homes (to provide the proper shelter and security for millions of families) will be profound and a step in the right direction to provide a shelter and safe place to live.

New Story continues to raise money to further the progress and place these homes in El Salvador in 2018 with a vision to create an entire community of 3D printed homes by 2019.

To join them and help provide solutions for one of the world's largest humanitarian crises, go to: https://newstorycharity.org/3d-home

Original article credited to: Brett Hagler, CEO, Co-Founder at New Story



How to Be Severe Weather Prepared

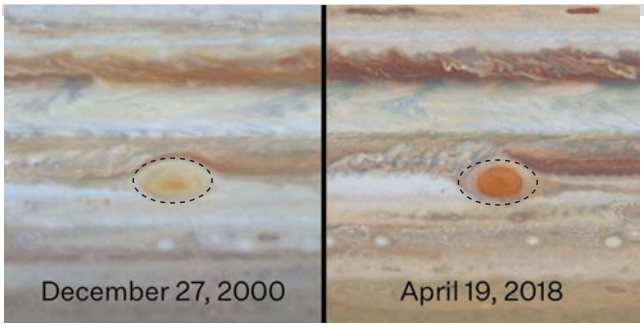
Just in time for the Hurricane Season.

We all know that Spring is the season to kick off each year with severe weather, and each year we, in the United States, experience several months of it. Severe weather is defined as any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. Types of severe weather vary, depending on the latitude, altitude, topography, and atmospheric conditions. High winds, hail, excessive precipitation, flooding, and wildfires are forms and effects of severe weather, as are thunderstorms, downbursts, tornadoes, waterspouts, tropical cyclones, and extratropical cyclones. Regional and seasonal severe weather include blizzards (snowstorms), ice storms, duststorms, earthquakes, and even volcanic eruptions. So what can you do to be severe weather prepared?

- **Know Your Risk.** *Know what hazardous weather could affect you and your family where you live.*

- **Develop and Practice Your Emergency Plan.** *Develop an emergency plan based on your local weather hazards which may include a shelter plan, an evacuation route, and/or a communication plan. With all of those steps in place, you can tailor to your household's specific needs by creating a supplies list. Be sure to have enough supplies to last at least one full week in the event of semi-permanent or permanent displacement. Make sure all dietary and medical needs are able to be met and have a plan in place for your pets or service animals.*

For additonal tips for weather preparedness go to: https://www.ready.gov/severe-weather



JUPITER'S GREAT RED SPOT

In March of this year, NASA released some new information in regards to Jupiter's Great Red Spot... Over the past 150 years, the famous great red spot has been observed changing it's form in size, shape, color, internal wind speeds, and drift rate. These new findings indicate that the Great Red Spot is drifting westward faster than ever before, yet it remains along the same latitude, relative to the planet's eastward rotation. The most recent study confirmed that the Great Red Spot has decreased in length since 1878 and is big enough to house just over one Earth whereas previously it was large enough to swallow three Earths, though historical record observations indicate that the Spot has grown and shrunk over time.

Researchers had expected that the contracting spot would lead to an increase in wind speeds, but have otherwise found that the storm has been forced to stretch up (vertically) into Jupiter's atmosphere. In the case of the Great Red Spot, the change in height is small relative to the overall area that the storm covers, but it is still noticeable. Additionally, The Great Red Spot's color has deepened, becoming intensely orange since 2014. Researchers are not sure as to why this is happening, but believe that chemicals which color the storm are being carried higher into Jupiter's atmosphere as it stretches up. At higher altitudes, chemicals are subject to more UV radiation thus changing the color.

The enigma that is Jupiter's Great Red Spot seems to become more interesting to observe as the storm continues to contract. Researchers do not know whether the spot will continue to shrink and stabilize or if it will break apart completely. If the trend continues, we may see rapid changes in the storm's overall appearance and behavior.

Image Credit: NASA's JPL photojournal | **Original article credited to:** Elizabeth Zubritsky.
https://www.nasa.gov/feature/goddard/2018/jupiters-great-red-spot-getting-taller-as-it-shrinks

New Brand, Same Commitment to Excellence

By: Danielle Newbanks, Editor & Marketing Director

We've introduced a new brand that both recognizes our history and lays the groundwork for our exciting future. EDT leads the industry with over four decades of forensic engineering experience, and we're excited to continue to grow our footprint, expand our services, and adapt to best serve our clients.

WHY THE REBRAND?

We want you, our clients, to have reliable access to our services and engineering expertise across all platforms and office locations. That's why we've developed a number of branded materials to ensure the new EDT identity is consistent, helpful, and professional, just like your work with our engineers.

We've revamped our logo, our signage, the website, and much more– making it easier for our clients to access our services. For example, on the website, it's easier to explore our engineers' expertise, or you can simply ask for an engineer match, and we'll do the work of finding the right engineer for your project.

We're also bringing new insights to you - through our blog, LinkedIn posts, and our webinar series. You can expect the same level of excellence, but more access to it, right at your fingertips.

OUR NAME.

Many will notice that our logo has changed to EDT, Forensic Engineering & Consulting – a more concise identity and meaningful tagline that describes our core business as well as a nod to our strong origins as EDT, Engineering Design & Testing Corp.

THE EDT DIFFERENCE.

Decades of excellence with broad expertise.
We have professional engineers licensed in all 50 states, and our consultants are credible, unbiased experts in their fields.

Reliable, Objective Service
With us, you're getting objective answers and reliable service. Our engineers are diligent, proactive, and transparent, so you can be confident in our reporting and technical analysis. Whether on the stand or behind the scenes, we act with integrity and speak with authority.

Nationwide Consulting on Any Scale
We're an ideal engineering partner because we have forensic engineering experts across the country who can consult on any scale – from minor damages to large losses and in-depth investigations.

SERVING YOU.

We look forward to working with you and growing as a company. We encourage you to provide feedback about our efforts to share insights with you. Our aim is to serve you as best we can.

Thank you for your continued support as we strive to provide excellent service.

Danielle Newbanks, Marketing Director

Now Open: SOUTH FLORIDA OFFICE

ENGINEERING SERVICES IN SOUTH FLORIDA

In May we launched our EDT South Florida engineering office. We're excited to expand our forensic engineering services in the South Florida region. In conjunction with our existing EDT Orlando office, our new office will also provide services offering clients efficient, objective answers about structural, electrical, automotive, and mechanical engineering damages and losses.

Our South Florida forensic engineering consultants offer failure analysis services, damage assessments, and structural examinations as well as storm damage assessments when floods, hurricanes, and high winds strike.

MEET SERGIO G. ARRATIA, M.S.C.E., P.E.

We're excited to introduce our South Florida lead, Sergio Arratia, a civil/structural engineer and certified residential and commercial roof inspector. Mr. Arratia is fluent in English and Spanish.

As a consulting engineer, Mr. Arratia has experience evaluating the structural design of residential and commercial buildings, including low and mid-rise residential and commercial properties, mid-rise commercial storage buildings, educational and athletic facilities, religious and health care facilities, restaurants, and car dealerships.

*** Work with our South Florida Office and get in touch with Sergio at:**
sarratia@edtengineers.com or 954-743-4500

CIVIL/STRUCTURAL ENGINEER CONSULTING SERVICES

- *Storm damage evaluations*
- *Roof damage evaluations*
- *Code compliance reviews*
- *Building envelope evaluation*
- *Assessment of structural systems and structural integrity*
- *Water intrusion investigations*
- *Repair cost estimates*
- *Damage scope and repair analysis*
- *Determination of cause of damage to structures*
- *Work with our South Florida Office*

Industrial plant after a hurricane

THE CALL AFTER THE STORM

The story of a mechanical engineer tasked with a damage assessment after a major storm incident.

By Melissa A. Simpson, P.E.

The wind was calm and the clouds had finished dumping water on the coastal region of Texas. After the call came about damage to equipment, I made arrangements to visit the site to observe and report on the storm-related damage. Driving to the site was not a problem since the traffic had not yet reached its pre-storm gridlock. Arriving with time to spare, I pondered my surroundings and considered where I was based on what I was able to glean from satellite images I pulled from the internet. Stepping out of my truck, I walk towards the building and reflect on my role in the matter at hand. After introductions, there is a long discussion about what happened. My pen's rapid response is to record as much information as possible while I pose questions and listen to the answers. Once the discussion slows down, it's time for the tour.

DAMAGE TOUR

The typical purpose of a damage tour is more than a simple observation of the equipment reported as damaged. The intent is to verify the damage and identify the factors contributing to the damage, delineating between pre-existing, storm, and otherwise unrelated damages. Observation, photographic documentation of the current condition, and review of the available records are important steps in this process. Due to the evolving nature of some claims, the observed current condition is documented for equipment known, suspected, or having the potential to be reported as damaged as a result of the storm. This way, if the claim changes to include additional equipment, there's a record available from the previous site visits.

Storm-related damage can result from or be influenced by many factors including lightning, wind, precipitation, and floodwater. The timing and duration of these factors, affect the quantity of damaged equipment and extent of the damage based on how long the equipment was exposed to damaging conditions and timeliness of efforts to mitigate damage.

> Storm related damage can result from or be influenced by many factors including lightning, wind, precipitation, and floodwater.

In addition to having the potential to ignite fires, lightning can damage equipment in numerous ways. Circuitry and electrical components without surge protection can be overloaded with current and rendered inoperable. High wind and running water can exert forces on surfaces and joints that exceed the design allowance for stress, even more so when the wind or water carries large debris, which can impose high impact and bending forces. Water ingress from directional rain, splashing, submersion in floodwater or storm surge can damage electronics or initiate corrosion on surfaces not rated for wet environments. Water itself is corrosive to many metals but rain and floodwater have dissolved elements, such as salts, that remain on surfaces after the water evaporates and are corrosive to some materials. Prolonged exposure to a corrosive environment can have a significant impact on the operability and remaining service life of equipment. Hail damage has a distinctive appearance based on the size of hail that impacts a surface and can result in substantial damage to thin or soft materials.

Safety gear and equipment typical for a site visit

Valves and flanges in a lay-down area that flooded during a hurricane

WATCH WHERE YOU STEP

Noticing that I am drawing closer to a compressor skid, I hear the familiar phrase, "watch where you step." Thanking my host, I continue to make my way around the skid, documenting its condition and measuring from grade to the apparent floodwater line. If this skid was operational, it would take more than the standard earplugs to be comfortable taking a picture of this engine nameplate. Most situations require the standard personal protective equipment (PPE) including steel-toed boots, hard hat, gloves, or ear plugs. On the other hand, some situations require additional tools such as lockout-tagout padlocks, fire retardant clothing, respirators, chemical boots, or other specialized tools to safely examine equipment. When walking through an unfamiliar area, safety is more than just where I step. In case I miss a hazard, though, I appreciate knowing that my host is looking out for me.

DIALOG OF DAMAGE DETAILS

The next compressor skid was operating and looked at least a few years newer. Sure enough, the nameplate revealed it was just a few years old. "Was this one here during the storm?" "No," they responded, "it was brought in as a temporary replacement until we can fix the other one since it wouldn't start up. We have a new one on order that will be here next month." I scribble a note next to the serial number on my paper and make a mental note to mention it to my client. I was asked to be on the lookout for equipment brought on site after the incident. Moving on through the plant, I noticed a downed tree on the opposite side of the fence near a tank with visible damage. "What happened to this tank over here?"

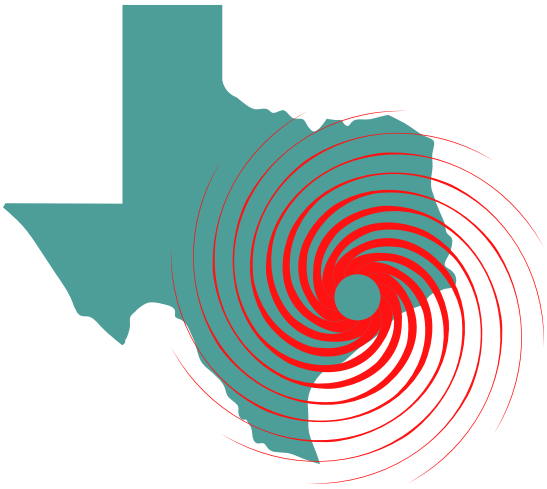
Rather than hearing that the tree had fallen against the tank during the storm, I was told a story about a forklift incident a few years back. I'm glad that I asked instead of making an assumption about the tree.

Close to the center of the property is an area dense with mechanical equipment. Since flooding was reported in this area, I searched for lateral discoloration or debris that would indicate the approximate level that equipment in this area was submerged. Finding a control box with the tell-tale signs of floodwater, I pull out my tape measure and take a picture for reference. Opening the door of the control box, I notice the wiring and electronic components in the bottom few inches were submerged. As I take a few close-up images of the wetted wire and components, I ask about testing of the equipment. "We haven't tried to start up the equipment over here since we knew they were submerged. A technician is scheduled to work on it tomorrow." When evaluating equipment for damage, it's important to understand the difference between what is verified and what is apparent or assumed. Since this equipment had not been tested yet, the extent of the damage has not been verified. Based on the visible indications of submersion and my familiarity with similar equipment, I can determine with reasonable certainty that damage exists. Without further diagnostics or repair activities, the evaluation of this equipment for repair or replacement would be based on assumptions of damage.

> When evaluating equipment for damage, it's important to understand the difference between what is verified and what is apparent or assumed.

With the tour drawing to a close, it's time for the golden question, "is there anything else you want me to be aware of or look at today?" I've found that responses to this request for additional information do not disappoint and often reveal interesting or critical details not mentioned beforehand. After the extended conversation and traditional farewell handshake, it's time to leave. Sitting in my truck after packing my camera and other gear, I pull out the file information and give my client a call to summarize the visit before departing.There is still a lot of work to be done, so I head back to the office, hoping that traffic cooperates.

Pallet of motors flooded during a hurricane



AFTER THE VISIT

Back at the office, the photographs are downloaded and processed. Each image is reviewed and described in the photo log, including where and when the images were taken. Business cards and notes are sorted, scanned, and reviewed. With everything organized, it's time to sift through the available details, analyzing the facts and their relative importance to the question I've been asked to answer.

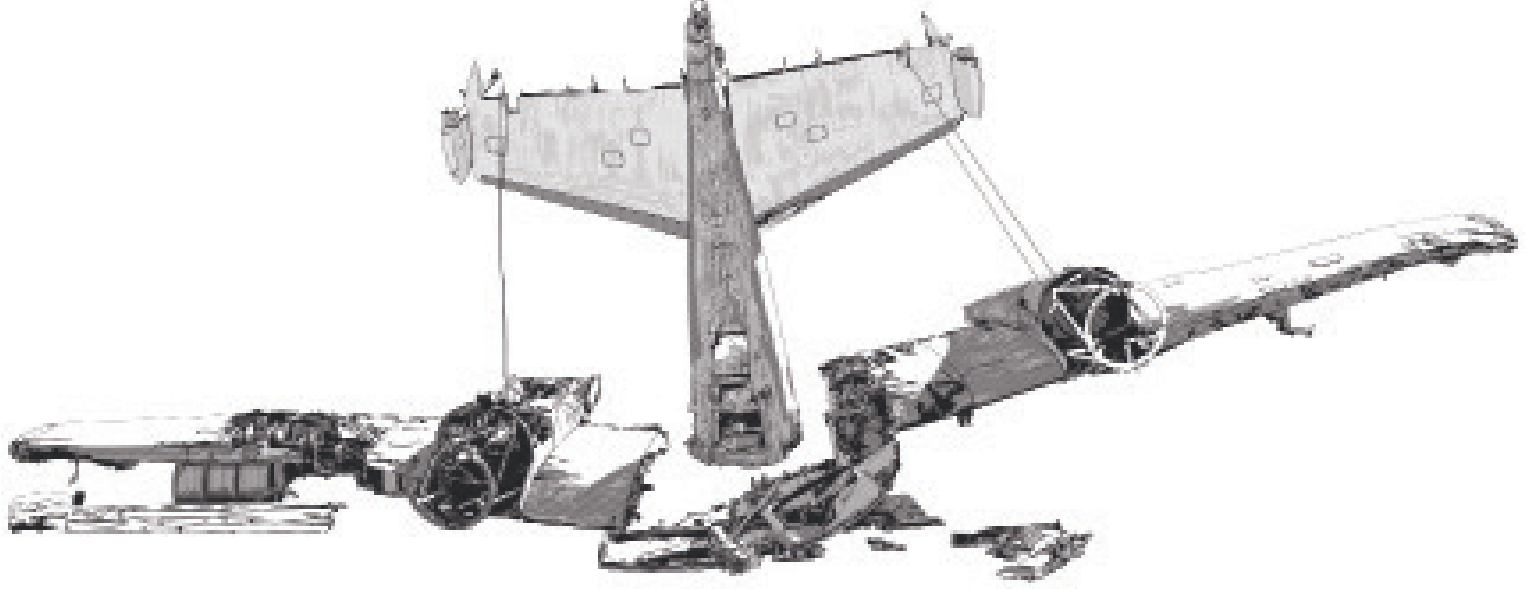
The question is different for each file. Sometimes it's just a matter of documenting the damage and other times it involves a more in-depth investigation into valuation, repair or replacement options, or root cause of the damage. The questions can evolve based on the results of an investigation. Communication with the client throughout the life of the assignment keeps me on track to working no more or less than necessary to meet their needs. After all, answering questions is my role in the matter at hand.

ON THE COVER: Empty street post Hurricane Harvey

ABOUT THE AUTHOR:

Melissa A. Simpson, P.E.

After receiving her Mechanical Engineering degree from Texas A&M University, Melissa gained experience that includes mechanical, manufacturing, quality, and design engineering. Her familiarity with project management, cost estimation, scheduling, and manufacturing procedures assist her with damage assessment and repair/replacement valuation of equipment.



Aircraft Accident Investigations:
Purpose, Intent and Methods

By G. Wayne Maltry, M.S.M.E., P.E., C.F.E.I., A.M.T.

In 2015, the National Transportation Safety Board (NTSB) reported 1,282 civil aviation accidents in the United States, 1,210 of which belonged to General Aviation (GA). Of these 1,210 GA accidents, 238 involved a total of 406 fatalities. There are more than 220,000 general aviation aircraft in the United States, which conducted 24,142,000 flight hours in the same time period. That's 1.68 deaths per 100,000 flight hours. Using an average speed of 60 mph for automobiles, it may be surprising to know that this number is nearly 25 times the rate of deaths per hour traveled by automobile.

For this reason, the promotion of air safety in the United States is a big deal. One of the primary means by which air safety is promoted is by the investigation of and probable cause analysis of all aviation accidents. In accordance with Federal Aviation Administration (FAA) Order 8020.11 an aircraft accident, and subsequent definitions are provided as follows:

- ***Aircraft Accident***
  "An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage."

- ***Serious Injury***
  "Any injury which: (1) Requires hospitalization for more than 48 hours, commencing within seven days from the date of the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface."

- ***Substantial Damage***
  "Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component."

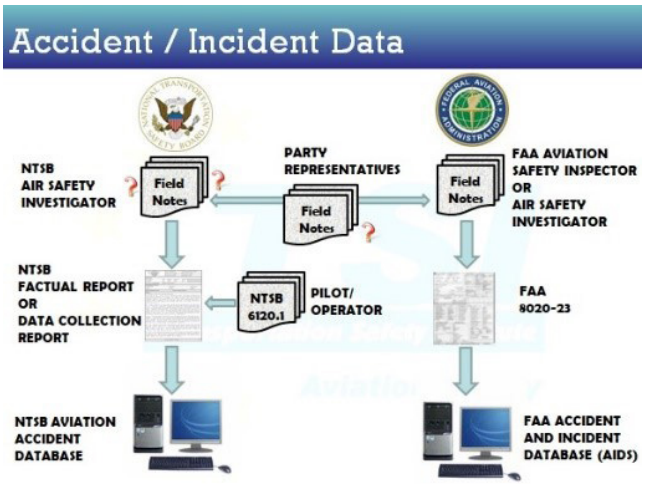
- ***Serious Incident***
  49 Code of Federal Regulations (CFR) Part 830 defines an aircraft incident as any one of a series of specific occurrences that may, or have the potential to result in serious injury or substantial damage. These occurrences include flight control system malfunctions, flight crewmember illness, in-flight fires and collisions, among other things.

It is not necessary to report to the NTSB any occurrence not meeting the definition of aircraft accident or serious incident. For those occurrences that are reportable, however, the responsibility to investigate falls to the federal government through the actions of the NTSB and the FAA.

The NTSB derives its authority from 49 CFR 831.5 to determine probable cause of aircraft accidents. The FAA derives its authority to investigate "all" aircraft accidents from 49 U.S.C. Sections 40101, 40113, and 44701. The FAA may act to investigate aircraft accidents either alone, or in cooperation with the NTSB's Investigator In Charge (IIC). In all cases, however, it is the NTSB's responsibility to determine probable cause for the aircraft accident. In cases where the NTSB did not conduct a first-hand inspection of the involved aircraft due to either limited resources or limited severity, the information they utilized to determine probable cause is provided by the FAA.

The FAA's activities on an investigation are provided through FAA Order 8020.11, by which FAA Form 8020.23 (Accident/Incident Report) is completed. Until the NTSB takes possession of the involved aircraft, or grants a release of it, the aircraft should not be moved except to remove persons, protect wreckage or protect the public. If movement of the aircraft is required for these purposes, then photographs of the aircraft, its position, and all impact marks must be documented prior to its movement. It is the responsibility of the aircraft operator to assure that these initial requirements are met.

The main purpose of the federally mandated investigation is prevention. Parties authorized to attend an NTSB investigation are authorized by the NTSB as needed for expertise. Parties that are prohibited include attorneys, families of victims and insurers, or anyone else who may be deemed by the NTSB to have a personal or monetary interest in the outcome of the investigation. However, information requests can be made by anyone to the NTSB IIC by contacting the NTSB Response Ops Center at (202) 314-6290. The NTSB's relevant information of the accident and probable cause will be provided in the NTSB Data Collection or Factual Report.



At the conclusion of the NTSB investigation, the subject aircraft are released through NTSB Form 6120-15 completion. As indicated above, the purpose of the NTSB investigation is accident prevention. Further investigation of the incident aircraft may be necessary if additional information or documentation regarding the aircraft accident or incident is desired. In addition, a cause analysis may be required of occurrences that did not meet the accident or incident criteria specified by FAA Order 8020.11 or 49 CFR Part 830. In these instances third-party accident investigation services can be beneficial.

Aircraft Accident Investigation Methods

Engineering Design & Testing Corp. (EDT) provides third-party aircraft accident investigation services, with the objective of providing expert cause analysis. The cause of an accident or incident is defined as follows:

- ***Hazard***
  A condition or situation that can result in property damage, personal injury, or death.

- ***Controlled Hazard***
  A hazard for which all reasonable steps have been taken to minimize the risk associated with the hazard.

- ***Defect***
  An uncontrolled hazard that is a lack of reasonable steps or the presence of unreasonable steps.

- ***Cause***
  A defect that is attributed to the actions of a person or entity, an act of the natural world, wear and tear, any combination of these categories, or to unknown conditions or circumstances.

As can be seen by a review of the above definitions, an aircraft accident is a hazard that can be assigned to a specific cause, even if that cause is unknown. An example where a cause may be unknown is if the remains of an aircraft that was involved in an accident is consumed in a post-crash fire, or if an avionics package that is suspected of a malfunction has been damaged so that testing is no longer possible.

The methods that EDT utilizes in cause determination mirror those utilized by the FAA and NTSB. The following methodology, which is provided by the Transportation Safety Institute (TSI), Aviation Safety, is utilized to determine:

- **What happened?**
- **Why did it happen?**
- **What can be done to prevent it?**

Preparation

Preparation, which includes personal readiness, learning of policy and procedures, and by obtaining proper equipment, begins the moment an aircraft accident investigator decides to enter that line of work.

Data Collection

When an accident or incident takes place, and an assignment is made, the aircraft investigator then enters the data collection phase. This phase involves the gathering of factual information. This begins when the assignment is made by the gathering of date, location, time, aircraft type, route, weather conditions, flight crew, passengers, cargo, witnesses and any additional information which is or may become available.

Data collection continues through the period that the investigator is onsite at the crash location, or where the aircraft and its components are stored. The first order of business is to establish control of the accident site. The purpose of this activity to preserve accident artifacts. Also required is to determine what personal protective equipment (PPE) will be required for working in and around the wreckage. Further, special equipment and expertise should be decided. These items should be taken care of before any of the wreckage is touched or moved, and before an initial walk through of the wreckage or crash site is conducted.

Included in data collection is wreckage arrangement, fire signatures, metallurgical signatures, indications of system failures (such as communications or controls), ground scars, paint transfer marks, and structural deformation, among other things. The objective in collecting data is simple– gather as much factual information in as expedient a manner as possible and document it for later review and analysis. Photographs will be taken at this stage and diagrams of the wreckage will be completed. In addition, the velocity and angle of impact will be determined. A deliberate effort must be made to exclude all speculation during this phase of the investigation.

Wreckage Reconstruction

Many, if not all, of these crash site data collection efforts are completed by the FAA or NTSB prior to any third-party inspections of the wreckage. It is important, however, to recognize the methods employed so that confidence in the data integrity can be established. To that effect, therefore, the first exposure that third-party investigators may have to the wreckage will be after it is reconstructed in a better protected environment.

The arrangement shown above is a two-dimensional reconstruction. A three- dimensional arrangement may also be constructed when vertical arrangement of components may be deemed significant.

Analysis

During this phase of the investigation, data is correlated from multiple sources into a logical form that helps to explain what happened. Three main causal factors will be considered: Man, Machine and Environment. An example of the tabulation of these factors are shown in the table below:

Man	Machine	Environment
• Current medical past due	• Both engines operational	• Observation at time of accident 10 mile visibility and no ceiling
• Problems with crosswind landings	• No in-flight fire	• Forecast for route of flight was isolated thunderstorm and modern turbulence
• Last flight 180 days ago	• Total of 121 hours	• PIREP reported gusty surface wind
• VFR-only pilot	• Maintenance records show properly maintained	
• Recent divorce	• Prop damage consistent with runway scars	
• Told friend he was not comfortable with new A/C		

Shown in the figure above are some of the elements associated with Man, Machine and Environment that investigators must consider when assessing aircraft accident or incident causes.

The collected data will also be arranged by the investigator in charge who, for third-party investigators, is typically the expert retained by the aircraft owner, into three categories:

- **What is known**
- **What is not known**
- **What is desired to find out**

Data analysis also involves establishing a time line to which every member of the investigation team can agree. Because of the large amount of data that must be considered in aircraft accident investigation, it is much better to deliberate with other members of the investigation team. Conclusions as to the cause of the accident are more accurate when an open dialog is

maintained and differences of opinion are discussed. In any event, an open-minded investigator who makes a genuine effort to develop un-biased opinions will best serve both the general welfare of the public and his client's interests when a direct correlation is demonstrated between the facts gathered during the investigation and the conclusions that are derived.

In Summary

The four phases of accident investigations are: preparation (which begins now), data collection, analysis, and reporting. Aircraft accident investigation is a process that works best when it is used in its entirety. It cannot be emphasized enough: Conclusions must be supported by all of the factual information and evidence that is gathered utilizing the technique associated with the three W's of aircraft accident investigation: What happened? Why did it happen? What can be done to prevent it?

About The Author:

G. Wayne Maltry, M.S.M.E., P.E., CFEI

Mr. Maltry holds a master's degree in mechanical engineering, structural mechanics and materials, and a bachelor's degree in aerospace engineering from North Carolina State University. Prior to college, he served in the US Army Reserves and worked as a licensed airplane mechanic in the general aviation industry. Upon completion of his bachelor's degree, he attended pilot training in the US Air Force and performed trajectory analysis during Desert Storm.

Mr. Maltry joined EDT in 2007. He offers consulting services in the following areas: fracture and failure analysis, including finite element analysis; aircraft crash and vehicle collision investigation and reconstruction; origin and cause of air and land vehicle, structure and equipment fires; machinery scope of damages; assessment of appliances, machinery, vehicles and equipment (including HVAC); evaluation and analysis of process equipment, plumbing and piping; industrial accident analysis; and lightning damage assessment.

EDT
Forensic Engineering & Consulting
Post Office Box 8027
Columbia, South Carolina 29202-8027

PRESORTED STANDARD
US POSTAGE PAID
COLUMBIA, SC
PERMIT #410

RETURN SERVICE REQUESTED

THE StressPoint®
A publication of Engineering Design & Testing Corp.
June 2018 | Volume 31, No. 1

A New Year, A New Look!

if Spring cleaning is in your future...

The saying goes "out with the old, and in with the new," and as you saw in our article about our rebranding, it goes without saying that the question is often "to keep it, or not to keep it?" If you are considering recycling, donating or throwing out your collection of magazines, you'll be happy to know you are covered. Back issues of *The Stress Point®* magazine are available in PDF format on Engineering Design & Testing Corp.'s website.

At *www.edtengineers.com*, click on "The Stress Point® Archive." You will see the various documents available online, including *The Stress Point®* magazine. Also available on our website is our Engineer Match tool where you can search for engineers with experience in your area(s) of interest, and don't forget to check out The Stress Point blog for weekly insights from our experts!

ENGINEERING DESIGN & TESTING CORP.

Corporate Office
1022 State Street
Cayce, SC 29033
(803) 796-6975

Birmingham District Office
2748 Alton Rd. Suite 100
Birmingham, AL 35210
(205) 838-1040

Columbia District Office
1105 State Street
Cayce, SC 29033
(803) 791-8800

Charleston District Office
1668 Old Trolley Rd. Suite 200A
Summerville, SC 29485
(843) 832-1052

Charlotte District Office*
5009 West W.T. Harris Blvd.
Suite A
(Northridge Business Center)
Charlotte, NC 28269
(704) 523-2520

Cleveland District Office
925 Engle Rd. Suite C
Middleburg Heights, OH 44130
(440) 239-0362

Dallas-Fort Worth District Office
990 N. Bowser Rd. Suite 740
Richardson, TX 75081
(972) 437-6200

Denver District Office
7342 South Alton Way, Suite 7A
Centennial, CO 80112
(303) 799-3967

Houston District Office
9756 Whithorn Drive
Houston, TX 77095
(281) 463-4548

Kansas City District Office
8405 Melrose Drive
Lenexa, KS 66214
(913) 859-9580

Mid-Atlantic District Office
7905 Browning Rd. Suite 114
Pennsauken, NJ 08109
(856) 662-0070

Mobile District Office
Post Office Box 1378
Daphne, AL 36526
(251) 210-6146

Nashville District Office
130 Seaboard Lane
Franklin, TN 37067
(615) 915-5255

New England District Office
425-C Hayden Station Rd.
Windsor, CT 06095
(860) 285-8000

Oakland District Office
2150 John Glenn Drive, Suite 300
Concord, CA 94520
(925) 674-8010

Orlando District Office
750 S. North Lake Blvd. Suite 1020
Altamonte Springs, FL 32701
(407) 865-9900

Santa Rosa District Office
52 Mission Cir. #124, PMB 167
Santa Rosa, CA 95409
(707) 578-9030

Seattle-Tacoma District Office
2006 48th Avenue Ct. Suite E
Building 11, Fife, WA 98424
(253) 345-5187

South Florida
Post Office Box 590487
Fort Lauderdale, Florida 33359
(954) 743-4500

**Services in North Carolina and New York provided by the affiliated firm EDT.Engineers, P.C.*