

## Forensic Engineering Investigations – A Primer for Adjusters

The claim hits your inbox and the timer starts! One of the questions that might come to mind is “do I need a forensic engineer?” The purpose of this article is to help you make that determination the next time you have a property loss or personal injury claim by furthering your understanding in the following areas:

- *What is a forensic engineer?*
- *What does a forensic engineer do?*
- *How can an engineer enhance the claims process?*
- *What can an adjuster do to get the most out of the relationship?*

The first thing is to understand what forensic engineers do and how they do it.

### ***What makes an engineer a forensic engineer?***

Most engineers are employed in design work; whether it is designing a product or process, or maintenance of machinery & structures. Forensic engineers are concerned with the failure of a product or process. Using their knowledge of engineering design, they begin with the outcome of the failure: structural damage, mechanical or electrical breakdown or a fire, and work backwards to establish what happened and why it happened in that particular scenario. Therein lies the fundamental difference between a design engineer and forensic engineer and why most failures require the expertise of the latter rather than the former.

### ***Are there specific types of forensic engineers?***

Yes, there are! Forensic engineers evolve from a traditional area of study such as mechanical, metallurgical, civil & structural, electrical and so on. Forensic engineering firms typically offer services in four areas: mechanical failures, electrical failures, fire investigation and civil/structural failures. Some firms also offer collision reconstruction and environmental services. Under these two umbrellas, a range of services can be offered. Collision reconstruction can involve road design (civil engineering), geometrics (physics), crush measurements and product failure (mechanical & metallurgical engineering) as well as human factors and biomechanics. Environmental engineers often work hand-in-hand with mechanical engineers as well as civil & structural engineers to establish why there is contamination and if there are implications for remediation. Environmental engineering firms may also have professionals such as hygienists on staff to deal with sampling and testing for contamination throughout the process.

For the purposes of this article, we'll focus on the four traditional areas of forensic investigations most commonly employed in property and personal injury claims: mechanical, electrical, civil/structural & fire.

### ***What does a forensic engineer do?***

A forensic engineer combines their knowledge and practical experience of engineering design and scientific principles together with a methodology related to their specific area of expertise and the failure or injury scenario. In most investigations, the starting point is to establish “what happened” before proceeding to “why did it happen”. While these may appear to be one and the same, there are many scenarios where first impressions may be incorrect. For example, a brick pillar supporting

a second-floor overhang adjacent to parking spaces in a commercial plaza fails causing the wall above to sag. Your first instinct might be to attribute it to an impact. However, further investigation may indicate a combination of events including improperly mixed mortar, incorrect or damaged drainage and flawed installation of a header beam. Thus, “what happened” was construction rather than impact related. The forensic investigation uncovered “why did it happen”. This is where we can see the value of a methodology being followed rather than a “gut feel”.

Not only is a forensic engineer looking to figure out what happened, they are also establishing what couldn't have happened as they work through their methodology. When establishing why an incident happened, there are a number of thresholds for narrowing down potential causals: is the failure mechanism possible scientifically, is it plausible based on a blend of science and professional experience related to the situation, and is it probable or likely. There may be a number of likely causes for the failure but one which is more likely than the others based on the balance of probabilities. Some investigations never produce a conclusive answer relating to why something happened but through the investigation, provide value to the claims process by eliminating causes that did not create the failure.

As mentioned, forensic engineers follow a methodology. In some areas such as fire investigation, there are documented, industry standard methodologies that are followed. This is critical to being able to arrive at the best possible explanation of the failure with enough veracity to withstand scrutiny. In coverage denial or subrogation scenarios, the methodology that was followed can be key in justifying the decision. This might seem pedantic and overly complex for what initially appears to be a simple scenario but it's necessary for the integrity of any decisions related to the failure.

### ***How can the work of an engineer enhance the claims process?***

It's not always the size of the loss that determines whether you need the services of a forensic engineer or not. Findings from an investigation can be used to:

- speed resolution of a claim by validating the source / events leading to the loss
- prevent repetition of claims by identifying a systemic issue or source of fraud
- identify which party is responsible for the loss (subrogation), which policy covers the loss and if an exclusion applies
- improve underwriting for specialized risks

Even if the claim appears straightforward, an origin and cause investigation is typically easier and generally more successful when initiated as soon after the loss as possible. Large, complex, multi-party losses should always be considered for formal investigation.

The following scenarios illustrate situations where a forensic engineer's expertise can be useful.

#### ***The claim involves multiple parties***

There are often situations where multiple insurers are involved in a claim. A forensic engineer can help to protect your interest in a large loss or one which has future ramifications for liability.

*You are suspicious about the nature of the incident.*

We'd like to give everyone the benefit of the doubt, but the application of engineering principles and the use of technology by qualified experts are often the best method of determining the cause of a loss. If a claim is going to be declined, a diligent investigation is owed to the insured and having third-party validation of the reasons will be useful.

*The other party has engaged the services of a forensic engineer*

It is not uncommon for information gathered during an investigation to be interpreted differently by experts. While every opinion should be unbiased, it doesn't mean that every interpretation of the causes of a loss will be the same.

*The claim may end up in court*

If a negotiated settlement cannot be reached, you need to consider your position well before you are in court. Using a qualified forensic engineer may mean the difference between a favorable or unfavorable judgment.

*The claim involves the failure of a specific product or piece of machinery*

While the claim of your insured might be valid, the loss might have been the result of the improper installation or repair of machinery by a 3<sup>rd</sup>-party or faulty product manufacturing. A forensic engineer can help you ascertain the subrogation potential.

*The claim involves a personal injury*

If the claim involves a personal injury, a forensic engineer can provide an expert opinion regarding the relationship of the injury mechanism and the alleged source of liability.

*There is structural damage*

A civil & structural engineer will be able to confirm whether damage to a structure can be repaired or if more substantial work is necessary. They will be able to assist in determining the extent of damage caused by the damage mechanism (i.e. tree or vehicle impact) and what was pre-existing. If reconstruction is required, engineering drawings can be provided and building permits applied for. Often, a structural assessment and drawings are needed simply to estimate scope where an insured is cashing out. Where safety is an issue such as after a fire, a civil & structural engineer can determine what emergency shoring or demolition needs to be completed before further work can be done at the site.

*You are self-insured (high per incident deductible)*

There are companies where their per-incident deductible can mean that a considerable amount of money is being spent each year on this "self-insurance". A forensic engineering investigation should be considered if the claim is near your client's limit of self insurance, the claim is small but there have been a number of similar claims or if they simply want peace of mind to know that they are not paying out for frivolous claims.

### ***How do I get the best value from a forensic engineer?***

Overall, the better you are at setting expectations and communicating in a clear, concise and timely manner, the better able your engineer will be at keeping their work on time, on budget and in scope. Also keep in mind that adjustments to timing, cost and scope may be required as the investigation and the claim progresses to its conclusion. Here are some suggestions for creating a positive working relationship and getting the most value from retaining a forensic engineer.

#### **Scope**

Keep the scope tight and take a step-wise approach. If a site visit is required, have the engineer attend the site, document everything and either call you from the site or shortly afterwards for a discussion of preliminary findings and to get further instructions. A broad or loosely defined scope has timing and cost implications. Here's some insight as to how a forensic engineer's brain works. They are naturally curious and love to dig deep and then share that with you in glorious detail. If that level of insight is not necessary, focus their work through the expectations you set.

#### **Timing**

Be realistic. Depending on the nature of loss and the scope of work, more time may be required than you think – discuss it with the engineer. If multiple parties are involved, this might cause delays in producing a final report. If it is urgent to get to a site, then communicate that but don't be the one whose every claim is urgent. In a fire related loss, if there is a structural integrity and thus, safety issue, deal with that before involving the fire investigator. If access to the site is compromised for any reason, let your engineer know. If there are specific parties to contact for access, all relevant details should be provided up front. Writing reports takes time. If a litigation report is required, plan for it accordingly in terms of timeframe and cost.

#### **Cost**

Don't get fixated on hourly rates. Based on the potential value of the claim and the scope of work involved, identify a budget for the engineer to work within for that phase. If you can access photos, video footage and other documentation that would be useful to the engineer's work, send it to them as early as possible. Coordinating joint inspections when multiple parties are involved can be less costly for you to do than the engineer or a lawyer. Another way to manage costs is to keep the reporting as simple as possible; email summary for initial findings, brief written report for simple scenarios or full report with background documentation for litigation.

#### **Summary**

A forensic engineer is a great resource but needs to be managed according to the context of the claim by setting expectations around scope of work, budget and timing and communicating in a timely fashion. If you're not sure whether their involvement can add value to resolving the claim, ask them, but use your own critical assessment of the situation to ultimately decide whether to involve them or not. Use an engineer with expertise best suited to the nature of the loss and finally, not every claim requires a full investigation. A review of the evidence and a verbal opinion may be all that is needed to provide "peace of mind" and a speedy settlement of the claim.