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Discovery Aspects in Forensic Engineering Cases – A Geotechnical Expert Engineer's Perspective

By Gennaro G. Marino, Ph.D., P.E., D.GE – October 31, 2018

Forensic engineering can play a critical role in litigation cases involving a failure of some kind. Consider for instance the recent sinking and tilting of the 58 story Millennium Tower in San Francisco. The cost to fix the problem reaching $500 million. Forensic engineering experts will most certainly play a critical role in determining what caused the skyscraper movement and who is to blame.

Forensic engineering is utilized to determine the cause and origin (or the WHY) of an engineered condition that did not perform as it was designed and caused significant loss. That cause and origin could be acts of both omission and commission typically by the owner, designer, installer/contractor, quality controller, and/or the user. Losses examined through forensic engineering can take various forms but are more typically associated with environmental, construction, or mechanical related failures.

Importance of Discovery

The building blocks for any forensic engineering analysis starts with the data received by the engineer through the discovery process (see Figure 1). That input data is used as the basis for a prediction or estimation methodology, which leads to the engineer's final results and ultimate opinions.

***FIGURE 1**: The Forensic Engineering Process*

Raw facts and data, especially independently discovered without evaluation, have the highest value in the forensic analysis. "Second hand" information containing evaluation, interpretation, opinion, basis, etc. has lower value and can breakdown under expert scrutiny. Missing vital data can also lead to incomplete or invalid forensic analyses and conclusions. To avoid uncertainty in expert analyses and opinions, targeted and expedient discovery is required to obtain the best usable and complete data in a timely manner.

A coordinated discovery process can lead to key information that may drive settlement, early dismissal, or the overall success of the case. A quality forensic engineering opinion needs to be based on facts and data that are obtained through the discovery process. The strength and credibility of that opinion directly relate to the quality of the discovered evidence.

Plan for Discovery

It is important to collaborate with your forensic engineer expert on a discovery plan to determine what witnesses, documents, and information are important to your case and the expert's opinion. Will discovery require only document requests, or more intrusive requests for admission, interrogatories, site inspections, and depositions?

It is also important that your expert is engaged in the early stages of fact discovery. Failure to do so may severely limit you and your expert in the inspection of damage or loss conditions and uncovering important data for the expert's engineering analysis. Engaging an expert late in the discovery process may force your expert to rely on incomplete or second-hand data which he or she may not adequately have time to scrutinize.

Fact Discovery Process

From the engineer's prospective, the fact discovery process can be broken down into three parts: 1) Tailored Summary Request, 2) Timely Discovery, and 3) Sub-sequential Discovery. A description of each part along with the important considerations are described as follows:

1. Tailored requests for production should take place early in the discovery process and involve the assistance of your expert. Requesting production along information categories which are too general, if fully complied with, can result in overwhelming amounts of information. This in turn can lead to added time and cost for analysis including added time in deposition clarifying production materials. As such your experts should assist in developing specific requests for information. For example, information produced related to miscalculations in analysis, and un-relied upon input/output files, are useless and add unnecessary confusion. Such information however, can be common in forensic engineering cases.

   Being as specific as possible in your production requests by collaborating with your expert(s) and any other consultants should result in tailored requests for information necessary in the investigation.

2. Timely discovery involves production from all relevant parties. This should be pushed to obtain the project information as soon as reasonably possible. If the documents requested are obtained, for example, five days before the trial, they can be of little use. Moreover, the deadline for fact discovery at or after the expert reports are due is likely to cause expert re-analysis and re-evaluation and an inefficient forensic investigation. Therefore, you should obtain documents and information for the expert as soon as reasonably possible. Propose or adjust deadlines for fact and expert discovery to minimize the chance that expert re-analysis and other re-work becomes necessary. After production, there are occasions where measurements, testing, or data are still being collected by another party related to the damage or loss site. After each instance, this relevant information should be requested as soon as reasonably possible.

3. Sub-sequential discovery can take place as a follow-up to earlier discovery requests. Most times, sources of relevant information are not identified until review of the initial expert production or fact depositions take place. For example, a third-party source may be discovered or new information may be become available upon examination of the deposition testimony by the expert. Other times, clarification is required of the produced materials including documents or calculations, photographic images, and damages. Experts can play a critical part in the creation of follow-up discovery requests.

Types of Data and Information

From an engineering expert's prospective, the following important documents and case materials to a forensic engineering analysis include but are not limited to:

1. Reports: Design and forensic reports or other project documents which assist in understanding the project or damage related conditions. In damage reports, it is important that a complete and thorough understanding of the damages or loss conditions is obtained. Seek advice from your

expert(s) to insure sufficient breakdown of the claim which is obtained, in order to understand the key issues.

2. Contract Documents: These documents include the construction agreement, the plans, drawings, and specifications. As-built plans or changes in the specifications may also prove to be valuable. Plans or drawings should be provided in both CAD and PDF formats in addition to relevant color hard copies.

3. Onsite and Lab Measurements: Data measurements, tests, and observations in the field or the laboratory that are relevant to damage conditions. All relevant documents and files that contain field or site measurement or descriptions should be requested. It is important to recognize that a formalized report based on this field information may not be comprehensive of all raw data collected, as these reports can contain interpretation and may have a different intention and thus emphasis.

4. Recorded Images: Photographs or videos are also relevant to the project or damage conditions. Black and white or grainy images are of little use. Seek high resolution electronic color photographs, in addition to relevant hard copies that include the date the image was taken, its location, and description of content.

5. Calculations: Calculations for the completed design or forensic analyses should contain all assumptions made. The relevant calculations can be in long hand and computer form. Ask for only relevant calculations to issues in the case by consulting with your expert/consultant. For ease of analysis, in addition to scans of hard copies, the electronic input and output file of any computer-aided calculations from spreadsheets to any other calculation program should be obtained. Also, the purpose of calculation information should be identified for efficient analysis.

Expert Discovery

Production of expert materials should be requested at least by the time your expert(s)/consultant(s) has received and examined the expert report(s) by opposing other experts. This should be done expeditiously and sufficiently before the respective expert deposition in order to obtain respective input from your consultant/expert. The advice and commentary provided above under fact discovery also applies here. In the process of requesting the expert's materials, however, do not attempt to limit the production to information that was relied upon. The request of reliant material requires an evaluation of what is important in the mind of the opposing expert. Therefore, this production request can exclude information your expert would find not relevant. However, for easier assimilation and more efficient examination, only request those calculations and analyses which are considered the most valid and/or relied upon.

Forensic engineers can also be involved in gathering evidence during the time of the loss or failure or afterwards. Therefore, evidentiary discovery should also be performed. For example, expert field investigation of the damage conditions is important in lieu of relying on second-hand observations/testing of damage conditions, especially when generated by those insufficiently trained in forensics. Direct observation and testing of the damage conditions should provide a more accurate understanding of causation and nature of the damage or loss without having to decipher second-hand contradictory or incomplete information. Where the damage or loss conditions are ongoing, expert discovery should be pushed to obtain ample access to the site for expert investigation as soon as reasonably possible.

Conclusion

Hiring your forensic engineer expert before discovery puts you and the expert at a distinct advantage. He or she can assist in formulating the discovery plan, identifying specific documents and information to request, and later, analyzing the production for usability and completeness. Also, you will gain an early understanding of the issues and documentary record for more effective litigation. During discovery, query the expert to understand the status of the analysis and need for additional facts or data. Discuss the development of any limitations on expert analysis or opinions – how strong are the opinions, for example, within a reasonable degree of engineering certainly. Finally, monitor expert costs to date and estimates going forward – things may have changed for better or worse. In the end, the discovery period represents an opportunity to involve your expert beyond simply having him or her draft a report and give testimony. It could be short sighted not to take advantage of that opportunity.

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