

Chapter 6

The Legal Forum

6.1. INTRODUCTION

The American system of jurisprudence provides for resolution of disputes by a structured, but seemingly arcane process. The system presumes each side of a dispute may be presented by professionals trained in the process (lawyers), to a panel of one's neighbors (the jury), overseen by another professional (the trial judge), who orchestrates the process (the trial). This all occurs within a set of rules created either by the legislature or by a body of commentary created by appellate judges, who do not actually oversee trials, but instead review and evaluate the trial judges' conduct to provide a guide for other trial judges. Having heard both sides, the jury resolves the dispute. This is litigation. Civil wrongs, known as "torts," arising out of conduct deemed negligent are adjudicated within the court system by litigating whether the conduct was negligent, and whether it proximately caused the injury. Juries hearing disputes involving negligent misconduct often are assisted by opinions offered by forensic engineers.

This chapter briefly describes the American system of jurisprudence and discusses the relationships of the forensic engineer with other parties in the system. After these introductory sections, the chapter focuses on admissibility of testimony from a legal perspective and discusses the role of engineers in non-adjudication forums.

This chapter is not intended to serve as a thorough exposition of these topics, but rather to introduce some of the key terminology and outline some of the legal system workings related to forensic engineering. Readers seeking more thorough descriptions are referred elsewhere.

6.1.1. Description of the Legal System

Litigation is generally defined as a "lawsuit." It begins with the official filing of the complaint within the appropriate court system or alternate dispute resolution forum. As the lawsuit proceeds, each party is entitled to engage in a process called "discovery," where all evidence and testimony any party may offer at trial can be fully examined by all parties.

The discovery process is intended to avoid a trial by surprise. By reviewing the total body of evidence, the parties and their attorneys are able to gauge the potential for courtroom success. Perhaps if each party is fully informed of the facts and legal bases available to the other side, and is fully aware of the facts and legal bases available to it, and can gauge the potential for success at trial, reasonable people will reach a common ground prior to trial,

and the case will be resolved without trial (commonly called a “settlement”). Much of the evidence gathered during the preparation of a case based on a tort claiming negligence, or a case with an engineering context alleging a product defect or error in structural design, is gathered by opinion witnesses or reviewed by opinion witnesses, and many of those opinion witnesses are forensic engineers.

In many jurisdictions, construction cases can be designated as complex cases—those involving many complicated issues requiring extensive discovery. For instance, interrogatories—a discovery tool used early in the litigation to discover the names of witnesses and location of pertinent documents—are written questions answered under oath by a litigant and are passed between parties. A defendant may request that an injured plaintiff name all occurrence or post-occurrence witnesses, list all treating or consulting physicians and all hospitals or clinic where treatment was rendered, and perhaps outline the proof of the plaintiff’s case, particularly disclosing any expert opinion witnesses the plaintiff may call. A plaintiff may request that the defendant list all persons involved in the design, fabrication, or construction of the product or structure, all applicable Standards or Codes, any prior complaints, the defendant’s opinion witnesses (both those who may have been retained as consultants to the defendant and those who are employees of the defendant), and outline the theory underlying the defendant’s assertion of non-responsibility.

The discovery process in a complicated construction case may last for a year or more. Witnesses, both fact and expert, are identified in the interrogatory answers, after which witnesses are routinely examined in a proceeding known as a deposition. In the deposition, attorneys for the opposing parties subject the witness to extensive questioning in a fairly informal setting, perhaps the lawyer’s office. The witness is under oath, and a court reporter makes a written and perhaps a video record of the proceeding.

A third tool of the discovery process is a “request for production of documents,” written requests passed between parties, seeking copies of pertinent documents in the possession of one party or the other, or in the alternative, the locations of such documents which then may be acquired by a court-mandated process called “subpoena.” The individual discovery tools are discussed below.

Once discovery is completed, the case may be settled or it may proceed to trial. Because of burgeoning caseloads, many jurisdictions require litigants to attempt to resolve the dispute by a mandatory settlement process known as mediation. In this forum, the parties hire an outside negotiator to aid in reaching a settlement. This process is “off the record,” and no information discovered may be used at trial. This process ends with a mutually agreed upon settlement or when it becomes clear that a negotiated settlement is not

possible. It is not unusual for the mediator to stay involved with the case right up to and sometimes during the trial.

If the conflict cannot be resolved by mediated settlement, and if the parties choose not to use other alternate resolutions techniques, the case will be tried in court before a judge and jury, or only a judge, sitting as both judge and “finder of fact.” Each side presents its demonstrative (non witness) evidence. Witnesses testify under oath. The initial testimony by a witness is referred to as direct testimony. Lawyers for opposing parties may then cross-examine the witness. Further questioning may occur and is referred to as redirect (which is followed by re-cross examination, and so on, until the witness is excused). The plaintiff—the party bringing the suit—has the burden of going forward, presents its suit first. When it has presented all its witnesses and has offered all its demonstrative evidence to the court, it “rests.” The defense then presents its case-in-chief.

Arbitration and mediation are non-judicial forms of litigation. Instead of the judge and jury, one or more arbitrators or mediators hear the case. A panel of arbitrators is usually called a tribunal. The arbitrator or mediator may be a lawyer, engineer, architect, or construction expert. Usually a tribunal will contain a mix of professional backgrounds.

Arbitration hearings and mediation proceedings are less formal than those of the courtroom. Stenographic records may or may not be taken. In arbitration, the lawyers present their cases just as they do in the courtroom. The arbitrator may also pose questions to the witnesses. Opinion witnesses often do not appear in person, but instead submit their work product to the arbitrator or mediator in the form of an affidavit or report, or, the opinion witness may have appeared earlier at the lawyer’s office and questioned as if at trial, in a process called an “evidence deposition” (described more fully in a later section). The written transcript of the evidence deposition will be submitted to the tribunal as the opinion witness’ testimony.

Arbitration or mediation is desirable for a number of reasons and used more and more often to resolve disputes. The cost to the parties is significantly lower than formal litigation. The discovery process can be streamlined and expedited, saving attorney fees. The time it takes to arrive at an award is reduced. In some tribunals, construction industry personnel hearing the case are more likely to understand the facts than an ordinary jury. The decision to arbitrate or mediate can be a contractual or legal issue, but normally, if not provided for in the contract documents originally binding the parties, the parties must agree to an alternate dispute resolution method.

6.1.2. Forensic Engineers as Experts

The court refers to engineers working within the legal system as expert witnesses or opinion witnesses. An expert is someone who knows considerably

more about a certain topic than an ordinary citizen. Federal Rules of Evidence Rule 702 reads as follows:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

The State Court criteria determining qualification as an expert witness is similar to the Federal Rule in most States. Using those parameters, the judge or arbitrator decides whether the witness is qualified as an expert. If so, the judge will permit the qualified expert to testify and, most importantly, offer opinion evidence on a wide range of topics, including perhaps the ultimate issue: Was the defendant negligent? Ordinary fact witnesses can only testify based on their opinion in a very limited fashion (for instance, “speed of the other car” assuming they are a licensed driver and had a clear view).

The legal forum is the domain of the lawyer. Forensic engineers are relegated to subordinate roles—that of litigation support offering opinion testimony at trial which may further the lawyer’s theory of the case. Forensic engineers are extremely valuable to the legal system; as stated in Federal Rule 702, they “assist the trier of fact to understand the evidence or to determine a fact in issue.”

6.2. ROLE OF THE FORENSIC ENGINEER AS A WITNESS IN LITIGATION

6.2.1. Pre-Trial Elements

6.2.1.1. The Report

Federal Rules of Civil Procedure (2011), Rule 26(a)(2) covers “disclosure of expert testimony.” Sub-section (B) requires the lawyer to disclose a witness who is retained or specially employed to provide expert testimony in the case and with that disclosure, to provide a written report prepared and signed by the witness. The report must contain a complete statement of all opinions to be expressed by the witness, the basis and reasons for those opinions, and the information considered by the witness in forming the opinions; any exhibits to be used as a summary of or in support for the opinions; the qualifications of the witness including a list of all publications authored by the witness within the preceding ten years; the compensation to be paid for the study and testimony; and a listing of any other cases in which the witness has testified as an expert at trial or by deposition within the preceding four years [FRCP 26(a)(2)(B)].

Many state courts follow the Federal Rule, but some do not. A report is not required in every State. The work product of the forensic engineer generally consists of 1) the investigation, 2) the written report, 3) attendance at deposition, and 4) trial testimony. There may be ancillary tasks a forensic engineer will be called upon to render (assisting in preparing written discovery requests or assisting in preparing the retaining attorney for cross-examining the opposing party's retained expert), but for the most part, the investigation, report, deposition, and trial testimony will be the bulk of the forensic engineer's effort, and of those, the written report will almost always be required.

The report allows the attorney to understand the engineering issues and the opinions of the forensic engineer and helps the attorney plan trial strategy. The report will, to a large extent, contain the facts and opinions to be elicited during direct testimony at trial. But it will also be pored over by the opposing attorneys to plan their cross-examination at deposition and trial. While the engineer who is thinking of entering the field of forensic engineering may be accustomed to presenting proposals to a band of leery-eyed corporate project managers and "bean counters" in an industrial setting, the legal forum can be far more demanding, because it may be intrinsically adversarial and confrontational. Any error or omission is seized upon by the opposing attorney and used to attack the credibility of the forensic engineer.

6.2.1.2. The Request to Produce the Forensic Engineer's "File"

It is common for the opposing attorney to request a copy of the forensic engineer's entire investigative file. But "file" no longer is limited to a folder of paper with printing or writing on it. It now includes digital recorded information, whether stored on a mass media device in the forensic engineer's office or "in the cloud" on a remote server accessible through the internet. Rule 45 of the Federal Rules of Procedure states that a subpoena may be issued commanding each person to whom it is directed to attend and give testimony or to produce and permit inspection copying, testing, or sampling of designated books, documents, and electronically stored information ("e-discovery").

The basis of e-discovery in the Federal System (discovery of electronically stored information) for the forensic engineer is Rule 45 (FRCP 2011), the rule governing subpoenas. Rule 45 says electronically stored information is added as a category of information that may be sought by subpoena [Rule 45(a)(1)(C)]. The subpoena may specify the form or forms in which electronically stored information is to be produced. The default form of production for electronically stored information is "a form or forms in which the person ordinarily maintains it or in a form or forms that are reasonably usable." The court may specify the conditions upon which such discovery shall proceed. A claim of privilege or protection as trial-preparation material may be made after production of discovery material by notice to the receiving party, and the receiving party must then promptly return, sequester, or destroy the

specified information and any copies, may not use or disclose the information until the claim is resolved, and, if the information has been disclosed before receiving notice, must take reasonable steps to retrieve the information that was inadvertently disclosed. Generally nothing in the forensic engineer's file is privileged against disclosure.

6.2.1.3. The Deposition

Depositions have at least a three-fold purpose: First, they allow the opposing parties an opportunity to fully explore the forensic engineer's opinions that will be offered at trial. Secondly, the deposition gives parties a chance to determine the potential credibility of the witness. Third, the deposition "freezes" the testimony of the engineer. The deposition testimony can be lengthy and usually involves tremendous detail. Some state rules limit the length to a certain number of hours, but often the judge will permit the attorneys to go beyond these set limitations because of the importance of the forensic engineer's testimony. For the forensic engineer, this process can be laborious and stressful. Even under these very taxing circumstances, the forensic engineer should strive to maintain professional decorum.

Ethically, and because the deposition is an examination under oath, the forensic engineer has but one answer—the truth. Forensic engineers should make sure they understand the question being posed. Questions with multiple parts should be addressed one part at a time. Questions that involve conflicting circumstances should not be answered. The forensic engineer should not answer the question the lawyer meant to ask but should answer what has been asked. After answering the question that was asked, the expert might then have an opportunity to expound further on the topic of the question. The forensic engineer can aid this process by asking the lawyer to rephrase or clarify ambiguous, unclear, compound, or nonsensical questions.

6.2.2. Trial Testimony

While the deposition may be lengthy and can focus on intricate detail, trial testimony generally involves key issues and themes. Ideally, litigation is a search for the truth. The trial is a test of the legal team's ability to make complex issues understandable and interesting. The attorney's biggest challenge is to hold the attention of the judge and jury while laying the factual basis for the positions taken in the case.

It is during the trial that the lawyer orchestrates the witnesses and evidence into a plausible and cogent presentation. The sequence of witnesses coupled with tactical considerations will dictate the order of the presentation, although the plaintiff has the burden of proceeding first, the "burden of going forward." The defendant or respondent participates by cross-examining the plaintiff's witnesses, but not until the plaintiff "rests" his case is the defendant required to go forward with the defense. Often times, the forensic engineer is

required to be present in the courtroom waiting to testify or to listen to others (sometimes to assist the lawyer, sometimes to hear testimony of witnesses upon which the forensic engineer's testimony will be based, but often merely because the judge wants the witnesses close at hand so one may quickly follow the other and the trial is not delayed). Such a requirement to be in the courtroom varies from one jurisdiction to another. In some court venues, witnesses may be excluded until they have testified (so they cannot rely on earlier testimony). If the forensic engineer is required or permitted to attend or is allowed to sit with and assist the lawyer during cross-examination of the opposing parties' technical witnesses, the forensic engineer should maintain a professional decorum. The jury will be watching.

While on the witness stand, the forensic engineer should answer truthfully all questions posed. The answers should be given with the level of detail intrinsic to the questions. Because the jury is the finder of fact, the forensic engineer should respond to questions in a way that will be understood by laypersons. If the lawyer properly prepares the case, the forensic engineer witness and lawyer will have discussed the questions that will be asked, and the forensic engineer will have rehearsed the answers. The word "rehearse" is not meant to connote collusion or unethical predetermination and manipulation of testimony. The purpose of the testimony is to assist the trier of fact to understand and resolve an engineering or technical issue of fact. The burden on the lawyer is to fashion the questions so 1) the answers state the expert's opinions and conclusions, and the bases therefore, and, 2) the questions stay within the bounds of the Rules of Evidence. If an engineer entered a production meeting at a plant, the supervisor might say, "Tell us what you did, and tell us what you think and why." The rules of evidence do not allow such informality in court testimony. A question requesting a narrative is not permitted. The forensic engineer's work product is valuable, and it is important that it be presented as fully and as completely as necessary to best inform the jury. The expert witness should insist that the attorney client provide questions (the "direct examination") well in advance of trial.

The bane of the forensic engineer's trial testimony is cross-examination by opposing counsel. Cross-examination at trial is likely to be less onerous than cross-examination during the discovery deposition. The deposition likely exposed the weak points in the forensic engineer's presentation, and the lawyer who hired the forensic engineer will have attempted to lessen their impact by admitting the problems during direct examination in a manner which suggests to the jury the witness is candid and truthful. The opposing lawyer cannot meander about at trial, wandering up and down blind alleys as may have been his strategy during the deposition, but must in most jurisdictions limit cross-examination to the areas covered in direct testimony. So here again, preparation is key. The forensic engineer witness and the attorney client can fashion direct examination in a way to highlight all the engineer's best work, and perhaps leave other less important opinions "on the cutting room floor."

But the forensic engineer as an expert witness should be aware that the attorney who took the expert's deposition may have been the young associate. The attorney facing you in the courtroom may be the crafty, experienced trial partner, who may be quite aware of what is on cutting room floor, because it may have been brought up during deposition or otherwise learned during discovery. It is the duty of the cross-examiner to attempt to undermine the credibility of the forensic engineer. Cross-examination is intended to test a witness's knowledge and recollection or disclose bias or prejudice. Cross-examination of an expert witness is intended to test and probe the witnesses' opinions and the bases for those opinions. Courts have held counsel should be permitted to attempt to discredit or demonstrate weaknesses in the expert's offered opinions and be granted the widest latitude in the process. The Rules of Evidence are intended to allow only the "best evidence" to reach the jury, and there is a school of thought that argues that if the expert's testimony holds up after being tested by the crucible of cross-examination, the jury benefits.

A resourceful opposing attorney may want to "pull out all the stops" in this endeavor. Cross-examination can be extremely stressful. A forensic engineer (or any witness) has no control over what questions may be asked. The witness is obligated, however, only to answer those questions that he or she feels qualified to answer.

Forensic engineers do not win or lose trials; lawyers do. The forensic engineer's role at trial is to present opinions in an understandable and credible way and to assist the trier of fact in resolving technical and scientific issues by providing them with the benefit of the forensic engineer's knowledge. That is the ultimate determination of success as an expert witness, not the outcome of the litigation.

6.2.3. *Rebuttal Testimony*

During trial, the attorney may elect not to call the forensic engineer as a witness on direct examination. This is a legal decision and is driven by strategy. It is not unusual in those circumstances for the forensic engineer to be asked to serve as a rebuttal witness. Usually this involves listening to other expert testimony and then being called as a witness.

A forensic engineer should agree to serve in this capacity only if the engineer has complete knowledge of the engineering aspects of the case. To agree to testify on the spur of the moment with a very limited knowledge of the facts creates a situation conducive to an appearance of unethical practice. The testifying engineer can attempt to avoid that appearance by limiting the testimony to be based only on the available facts and by incorporating the extent of that knowledge of the facts in the answers.

Testimony on rebuttal follows the same format as direct and cross-examination, with one exception. That is, no new facts are allowed to be placed

into evidence. The forensic engineer's rebuttal testimony must be based on information previously offered, including testimony by opposing experts.

6.2.4. Arbitration Testimony

A multi-judge or multi-person panel known as a tribunal usually hears construction cases that go to arbitration. Most often, at least one of the arbitrators has technical expertise pertaining to the contested issues.

Arbitration is somewhat more relaxed than a trial in a courtroom with a judge and jury. A stenographic record is optional. The court-established rules of evidence are suspended, and a set of rules is adopted.

Because the tribunal is both judge and jury, the forensic engineer should gear the answers to the technical level that is appropriate. Once the direct and cross-examinations are completed, the tribunal will often engage in further questioning. It is not unusual for the tribunal to decide a case based on the technical merits. The forensic engineer should therefore prepare for testimony accordingly.

6.2.5. Relationship to the Legal Team

It is the function of the legal team to present the best possible case to the court. To do less is to perform a disservice to the client. In the development of strategy, often the lawyers will want to discuss the issues with the forensic engineer. These may include discovery requests, interrogatories, technical issues, and even the approach to cross-examination of opposing experts.

These types of services by the forensic engineer are ethical only if the engineer maintains objectivity. There is nothing wrong with assisting the non-technical attorney in both understanding the complex issues and helping expose the weaknesses of adversarial experts.

It is, however, considered unethical for a forensic engineer to "craft" opinions to benefit the case in the absence of valid, reliable evidence. Conversely, it is acceptable for the forensic engineer to modify the language needed to communicate opinions such that the non-technical public may more easily understand it. There is a distinction that should not be overlooked. The forensic engineer should not alter, expand, contract, or develop technical opinions to aid a client's position in the absence of valid, reliable, truthful technical evidence to support those opinions. The forensic engineer should base opinions on knowledge gained by valid, reliable methods of investigation, testing, evaluation, and analysis. The forensic engineer may ethically substitute more basic or even non-technical language if it assists in understanding.

Although most attorneys will develop their own legal strategy, they lack sufficient knowledge to fully understand the technical engineering or scientific concepts. Consulting with lawyers on strategy is a perfectly acceptable undertaking by a forensic engineer. What experts are needed and helping the attorney to find the most knowledgeable expert, what discovery should be undertaken and helping to design the written and oral discovery to best advantage, how the courtroom case should be structured, or even how to attack an opposing expert's conclusion, opinions, qualifications, or credibility at deposition or trial (In this case, ethically means based on a sound factual and scientific basis, suggesting genuine and germane questions on those elements of the opposing expert's work product as set forth in 6.2.6., below.) are all examples of questions the forensic engineer can ethically address.

6.2.6. Relationship to Adversaries

It is perfectly legitimate for different engineers to draw different conclusions and opinions from the same facts. Different levels of education and professional experience often guide forensic engineers in somewhat different directions. It is unethical for an expert to ignore facts that are contrary to the expert's opinions. The forensic engineer must maintain objectivity throughout the process and is obliged to reevaluate opinions when new facts are discovered.

It should be obvious that the dispute is between the litigating parties—not between the experts. That is, the forensic engineer is retained to aid the trier of fact and is not a party to the dispute. The forensic engineer should establish and maintain a professional demeanor and respectful interface with both the attorneys and experts for the other side.

It is not unusual during depositions or even at trial for an attorney to assail a witness. In depositions, this tactic can be used to test whether the witness will get angry or lose composure. The forensic engineer is well served to handle such an attack with poise and aplomb. Attorneys who attempt this tactic in the courtroom are risking their own credibility with the jury. Although the direct affront can be taxing, the forensic engineer must always refrain from even the appearance of arguing with opposing lawyers. By taking part in the debate, the forensic engineer seemingly becomes part of the dispute rather than fulfilling the obligation to aid the trier of fact.

The forensic engineer's relationship with opposing experts should be that of equal respect. Simple disagreement of opinions is not justification for unprofessional behavior. Opposing experts are no more part of the dispute than the forensic engineer is. Cordiality and decorum are to be expected and are due.

6.3. ROLE OF FORENSIC ENGINEERS IN MEDIATION

Mediation is a non-adjudication method of dispute resolution. The parties jointly hire a neutral third party to assist in the process. The primary difference

between adjudication forums and mediation is that of decision. In adjudication (trial or arbitration), a third party finds fault and awards accordingly. In mediation, the parties define the resolution.

The mediator's role is central to the process. It is the mediator's function to hear both sides and without finding fault, assist in structuring a resolution. "Interests" rather than "positions" are defined. The successful mediator is an accomplished negotiator who attempts to help the parties choose an immediate and certain reconciliation in lieu of a distant and uncertain adjudication outcome.

The forensic engineer can play an important role in mediation. Settlement of construction cases often includes concerns regarding the cost of the repair. The forensic engineer, without attributing blame, can analyze the problem, help both sides to understand what happened and focus the discussion on why it happened. Assuming it is within the scope of the forensic engineer's engagement and area of expertise, the forensic engineer can also give parties a preview of what the positional debate at trial will look and sound like when the question of fault is explored.

Often, the issues of a construction case are clear and the culpability can be easily established. The problem simply boils down to money. That is, the defendants recognize their liability but are without the resources to respond accordingly. Mediation may offer the prospect of devising a repair that the defendants can reasonably pay for. The forensic engineer can aid this effort by identifying what is absolutely essential, what is necessary, and what could conceivably wait.

The forensic engineer called upon to participate in mediation may be of help in advising the parties where it is safe and appropriate to make concessions. To provide that input, however, the forensic engineer must be prepared to consider and help the parties fairly evaluate a full range of alternatives including those which may contradict the forensic engineer's own opinions.

6.4. ADMISSIBILITY OF TESTIMONY BY FORENSIC ENGINEERS

Admissibility of expert testimony and qualification of expert witnesses are defined and changed as a result of case law which is cited by a court or is included in rules of evidence or procedure. This section discusses Federal Rules of Evidence (2011) 702 and 703, and three cases, *Frye* (1923), *Daubert* (1993), and *Kumho* (1999).

6.4.1. Rule 702, Testimony by Expert Witnesses

In Federal Court, the Rules of Evidence are the first thresholds any expert witness must pass before testifying, and one of the first of these rules is Federal Rule of Evidence 702 (FRE 702). This rule addresses the sufficiency of the basis of an expert's testimony and states:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education, may testify in the form of an opinion or otherwise, if:

- a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;*
- b) the testimony is based upon sufficient facts or data;*
- c) the testimony is the product of reliable principles and methods, and*
- d) the witness has reliably applied the principles and methods to the facts of the case.*

6.4.2. Rule 703, Bases of an Expert's Opinion Testimony

Expert witnesses may provide opinion testimony based on three general sources: firsthand observation by the witness, presentation at trial proceedings, and data presented to the expert outside of the court setting and other than from the expert's own firsthand observation. Some of that third source may be in itself inadmissible in court. Federal Rule of Evidence 703 states:

An expert may base an opinion on facts or data in the case that the expert has been made aware of or personally observed. If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted. But if the facts or data would otherwise be inadmissible, the proponent of the opinion may disclose them to the jury only if their probative value in helping the jury evaluate the opinion substantially outweighs their prejudicial effect.

The Rule addresses the bases of opinion testimony by experts and allows the expert to form an opinion by reasonably relying on inadmissible information, facts, and data gathered by other practitioners in the field, but does not then allow that information to be admitted simply because the expert reasonably relied upon it. The information may be disclosed to the jury,

however, only for the purpose of assisting the jury to evaluate the expert's opinion.

6.4.3. *Frye*

In 1923, the Court of Appeals for the District of Columbia affirmed a lower court's decision, holding that, in order for expert testimony to be admissible, "the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs." *Frye* was a criminal case in which the defendant sought to introduce expert testimony concerning the results of a polygraph examination. The court held that the scientific community did not generally accept the polygraph examination. As a result, the polygraph examination did not rise to the level of information upon which an expert could render an opinion.

Although inconspicuous in its beginning, as the Court cited no authority to support its decision, *Frye* is an example of common law springing into reality. *Frye* became the common law relied upon by the Federal Courts concerning whether specific information was a proper basis for expert testimony. Seeking to control the scientific communities of which their products were a part, some parties held fast to the *Frye* doctrine in order to keep plaintiffs' legitimate evidence out of court.

Even if a party's expert was highly qualified, under *Frye* the party seeking to introduce the expert testimony had to prove that the information the expert relied upon in formulating his or her opinion was something collectively agreed upon by the scientific community. The *Frye* test became the threshold requirement for the admissibility of expert testimony in federal courts. *Frye* is no longer the standard used by the District Courts to evaluate opinion testimony, but does remain the law in many states, including, for instance, Illinois.

6.4.4. *Daubert*

In *Daubert*, two mothers alleged that the drug Bendectin, which they ingested while pregnant, caused limb reduction birth defects in their children. The defense presented an affidavit of their expert purporting that use of Bendectin was not causally connected to human birth defects. In response, the plaintiffs presented eight affidavits from experts delineating the causal connection between the ingestion of the drug and birth defects. Applying the *Frye* test, the trial judge found that even though the plaintiffs' experts may be highly knowledgeable, the subject matter of their testimony was not generally accepted in the scientific community. The Ninth Circuit Court of Appeals affirmed. Vacating and remanding the case, the United States Supreme Court held that the Federal Rules of Evidence superseded the *Frye* "general acceptance" test. The court reasoned that "nothing in the test of this Rule establishes 'general acceptance' as an absolute prerequisite to admissibility."

After answering the very narrow question at issue, the Supreme Court continued to analyze Rule 702 in a somewhat advisory fashion and developed a two-prong test that must be met for admitting expert scientific testimony in a federal trial court. The first prong requires that the expert testimony be based on scientific knowledge, while the second prong mandates that the testimony help the trier of fact in understanding the evidence or determining a fact in issue.

Next, to further assist the trial judge, the Court set forth four nonexclusive factors that federal judges ought to consider in carrying out their “gate keeper” function under Rule 702; 1) whether the theory or technique has been tested; 2) whether the theory or technique has been subjected to peer review and publication; 3) the known or potential rate of error, and the existence and maintenance of standards that control the technique’s operation; and 4) the “general acceptance” of the scientific theory.

The above factors are merely suggestions of the Supreme Court for consideration by the federal trial judge to test the proffered evidence. In going beyond the issue presented, the Supreme Court eliminated the “general acceptance” test employed in *Frye*, making it difficult for attorneys to bring cutting-edge science into the courtroom, and, by establishing the *Daubert* criteria, required the expert witness to provide far more substantiation of his opinions than under *Frye*. Some District Courts and Appellate Circuit Courts did not believe that the Supreme Court’s suggested factors for admissibility were sufficient and added an additional factor: whether the expert testimony is based on research conducted independently of litigation or expressly for the purpose of litigation. This factor poses a potential problem for the plaintiff in that the testimony is considered suspect if the research was conducted in anticipation of litigation, which is the reason the retained expert was hired—because the plaintiff intends to sue the defendant. So, the expert must defend the decision to commission testing or research, regardless of the methodology of the investigator, and it places an additional burden on the forensic engineer (in addition to the other *Daubert* tests) to maintain objectivity, not pursue research with a desired outcome in mind, and keeping an open mind and “letting the chips fall where they may.”

Under Rule 702, the trial judge serves as the “gate keeper” charged with the duty of warranting that the expert’s testimony “both rests on a reliable foundation and is relevant to the task at hand.” In short, after the trial judge qualifies a witness as an expert in a particular field, the *Daubert* case instructs the trial judge to determine whether the expert’s testimony is reliable.

Federal Rules of Evidence only apply in the Federal Courts. The *Daubert* pre-trial hearing to evaluate a potential expert witness’ testimony only applies in the Federal Court. Every state has its own Rules of Evidence. Many follow the Federal model closely. The judge is always the “gate keeper” regarding the

evidence going to the jury, consistent with the state's rules. Many State Courts adopted the Daubert methodology to test the value of a potential opinion witness' testimony, but not all. Some states remain "Frye" states.

6.4.5 Kumho

In March 1999, the US Supreme Court, in *Kumho Tire Co. Ltd., et al., versus Patrick Charmichael, et al.*, settled the issue of whether *Daubert* applies to engineers. The court ruled that judges can apply the same four tests, previously targeted at medical and scientific professionals, to expert testimony by engineers. A close reading of the decision however, suggests the District Court Judge recognized the inherent differences between opinion testimony advanced by a medical or scientific professional, and technical opinion testimony offered by an engineer. The Court said that not all the tests need to be applied to technical opinion testimony, and not as rigorously. Mr. Justice Breyer, writing for the majority, essentially said that the District Court Judge knows the difference between the two and can be trusted to make the proper distinction. Nevertheless, *Kumho Tire* made clear that an engineer's testimony may be tested by a pre-trial hearing and may be deemed inadmissible if the methods used as bases for the testimony differ from standards of practice or is not consistent with generally accepted methods.

6.5. CONCLUSION

This chapter earlier suggested that the legal forum is the domain of the lawyer, that the forensic engineer is merely litigation support, a witness whose sole task is to inform the judge and jury as to the engineering or scientific basis for a disputed fact so they can reach a verdict. Is that entirely correct? The preceding sections demonstrate forensic engineers may play far more expansive roles. They can assist in resolving the dispute without the parties bringing their case into the legal forum. In the legal forum, they can offer opinion testimony based on their own investigation. They can offer opinion testimony based upon facts and data that would be otherwise inadmissible if the value of those facts and data outweigh their possible prejudicial effect on the jury. They can offer opinion testimony that embraces an ultimate issue to be decided by the jury. They can help inform counsel and assist in shaping the litigant's case.

Many variables exist within the litigation system and within the actual process of the prosecution or defense of a lawsuit, so many that the testifying forensic engineering expert witness is unlikely to "win" or "lose" the case for the attorney and the attorney's client. But clearly the role of a testifying forensic engineer witness is extremely important, perhaps vital. The practice of forensic engineering, the forensic engineer's preparation, focus, and adherence to the ethical and professional standards advocated throughout this text must be consistent with that important role.

6.6. REFERENCES

- Daubert v. Merrill Dow Pharmaceuticals, Inc.*, 509 U. S. 579, 113 S. Ct. 2786, 125 L. Ed. 2d 469 (1993).
- Kumho Tire Co., Ltd. v. Carmichael*, 131 F.3d 1433 (1999).
- Federal Rules of Civil Procedure (FRCP), U.S. Government Printing Office, Washington: 2011.
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- Frye v. United States*, 54 App. D. C. 46, 293 F.1013 (1923).