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Extrapolation: You're Asking Me to Assume What?

I. Understanding Extrapolation in Construction Defect Litigation

Extrapolation means “to estimate an unknown value or quantity on the basis of the known range, especially by statistical methods.” Black’s Law Dictionary (10th ed. 2014). In the context of construction defect litigation, experts often conduct destructive testing of some—but not all—of the units that may have construction defects. From the sample of tested units, the experts then extrapolate that data to the other untested units. This process of extrapolation to the untested units allows the experts to conclude that the untested units share the same construction defect and/or damage as the tested units without the need to conduct destructive testing on all the units.

The problem arises when the sample taken by the experts is unreliable. There are several factors that can result in the sample being unreliable; including sample size and bias in the selection of units. If the sample size is too small it may not be accurate to conclude that the rest of the units share the same defect. For example, if only two units are part of the sample and there are fifty units, the sample of two units is likely too small to be representative of the remaining forty-eight units. Similarly, if the experts are biased in their selection of the units for destructive testing the sample will be unreliable. For example, bias in the sample could result from only selecting units for destructive testing that have observable damage potentially associated with construction defects and excluding units that do not have observable damage. When there is a biased sample, any extrapolation from the sample may be wholly unreliable because the sample is not representative of all other units.

II. Plaintiff’s Perspective on Extrapolation

Plaintiffs have the burden of proving the alleged construction defects. Richardson v. Wilson, 490 So. 2d 1039, 1039 (Fla. 1st Dist. App. 1986) (plaintiffs had the burden to prove that the structures had defects and that the defects were latent). Plaintiffs must establish the structures have defects, and the extent of those defects. Destructive testing is expensive and testing every unit can be cost prohibitive; especially in large commercial or multi-family settings where there may be hundreds or thousands of units at issue. Accordingly, plaintiffs look to extrapolation to avoid what are often significant costs associated with destructive testing.

By only testing a sample of all the units, it is extremely important that the sample is representative of all the units. If the sample size is too small or inappropriately selected, the experts for the defense may have a basis to discredit the plaintiffs' expert opinions. Where it is in the plaintiffs' interest to settle early, testing all the units may not be feasible due to time constraints and/or cost factors. Moreover, a defense party may be less inclined to settle with plaintiffs where excessive investigative costs are part of the settlement demand.

III. Defense Perspective on Extrapolation

From the defense perspective there is a strong urge to oppose the plaintiffs' experts that are extrapolating the construction defects from a sample of units to the rest of the units that were not tested. Plaintiffs have the burden of proving their case. If the defense chooses not to oppose plaintiffs' extrapolation evidence, the defense is essentially assuming defeat on units that have not even been tested.

There are consequences of opposing plaintiffs' extrapolation. If the defense opposes plaintiffs' extrapolation and plaintiff has additional destructive testing performed, the costs for plaintiffs are driven up. With the higher costs the defense may decide the figure is too high for a settlement; even though a settlement may have been preferred by the defense. Likewise, a plaintiff may decide litigation is the only way to recoup those expenses. Plaintiffs are likely to seek recovery of their investigatory costs; including the expense of any additional destructive testing. Stearman v. Centex Homes, 92 Cal. Rptr. 2d 761, 771 (Cal. App. 4th Dist. 2000) (plaintiffs recovered \$37,500 in investigative costs from the defendant as damages).

In challenging extrapolation efforts by plaintiffs, the defense will need to retain a qualified expert in statistics to rebut the plaintiffs' extrapolation evidence. The costs of retaining a qualified expert may vary depending on the qualifications of the expert. Due to the varying evidentiary standards in introducing extrapolation evidence by expert testimony, the defense may want to secure a qualified expert in statistics during the early stages of a case.

IV. Insurance Carrier Perspective

From the perspective of an insurance claims examiner it is important for defense counsel to provide an early cost estimate of the expected expenses in defending the case. The claim examiner will also examine whether the allegations are excluded from coverage under the policy. Expert testimony is expensive and defense counsel should notify the claim examiner if the defense intends to retain a qualified expert to rebut the plaintiffs' extrapolation evidence. Defense counsel retaining a qualified expert at the outset to prepare for plaintiffs' extrapolation evidence may be more cost effective than waiting for plaintiffs to establish their extrapolation evidence. If the defense allows plaintiffs' expert to establish extrapolation evidence uncontested, it may not only be difficult, but also very expensive to rebut plaintiffs' extrapolation evidence.

V. Introducing Statistical Expert Testimony

Expert testimony regarding extrapolation and statistical sampling should be provided by an actual statistician. "[A]n expert must provide an appropriate foundation for the extrapolation to be reliable." 49 No. 8 DRI For Def. 68. It is not uncommon for professors of statistics at major universities to provide this type of expert testimony.

To a layman, choosing at random may simply mean closing one's eyes and pointing to select. To an expert of statistics, "a simple random sampling design is one in which every sample of a given size is equally likely to be chosen." Fritz Scheuren, What Is a Survey? 2nd ed., American Statistical Association, 2004.

As an example of the type of factors an expert statistician will consider in creating a sample, suppose there is an ongoing building project composed of 100 units that is completed in four stages over a period of ten years. The project uses different subcontractors to build the units at each stage of the construction. The materials used by the subcontractors over the years also differ slightly. Further, during the first stage of construction the builders were required to abide by the building code for that year; which was subsequently updated before stage three began. Now suppose some units have construction defects. This demonstrates the complexity and difficulty in determining the appropriate sample to represent the entire project. It is not uncommon for plaintiffs to overlook this complexity to enhance damages by extrapolating construction defects to untested units that are not represented by the sample. It would not be a reliable sample if, for example, a plaintiff was to test only units constructed after stage three when the building code was changed and attempt to retroactively apply that building code to units constructed earlier.

Plaintiffs often cite ASTM E122 Standard Practice for Calculating Sample Size to Estimate, With a Specified Tolerable Error, the Average for a Characteristic of a Lot or Process as a standard for their sampling and extrapolations. Included in the scope of this standard it is stated:

If the process is not in a state of statistical control, the result will not have predictive value for immediate (future) production. The practice treats the common situation where the sampling units can be considered to exhibit a single (overall) source of variability; it does not treat multi-level sources of variability.

The failure by the plaintiff to account for the complexities of the overall construction process as well as additional factors such as exposure conditions, usage, and maintenance creates multi-level sources of variability which would prevent the results obtained by the sampling from being extrapolated out.

a. The Daubert Standard

The Daubert standard came into existence in 1993 and overruled the Frye standard for federal courts. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). Daubert held that "the trial judge must determine at the outset . . . whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue." *Id.* at 592. The trial judge is also "task[ed] [with] ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand. Pertinent evidence based on scientifically valid principles will satisfy those demands." *Id.* at 597. Daubert also provided some factors, but not a definitive list, that the trial judge should consider in determining whether expert testimony is reliable. The factors included: testability of the scientific methodology; "whether the theory or methodology has been subjected to peer review and publication;" the "known or potential rate of error;" and after examining these factors, among others, the trial judge then determines whether the science has met general acceptance. *Id.* at 593-94.

Reliability is important for the admissibility of the expert testimony. In jurisdictions that follow the Daubert standard or allow for trial courts to protect the jury from bad science, a trial judge can deny an expert from testifying if the science behind their testimony is unreliable. In an unpublished case out of California, an appellate court upheld the trial court's decision to deny admissibility of extrapolation evidence because the expert did not establish that the sample was reliable to extrapolate to other untested houses. *Ayala v. Pardee Const. Co.*, E028639, 2002 WL 31160551, at *2 (Cal. App. 4th Dist. Sept. 30, 2002).

b. The Frye Standard

The Frye standard came into existence in 1923. *Frye v. U.S.*, 293 F. 1013 (D.C. Cir. 1923). In *Frye*, a criminal defendant appealed his conviction arguing that the lower court improperly excluded expert testimony. *Id.* The defendant in *Frye* wanted to present evidence of a "systolic blood pressure deception test." *Id.* Essentially, the defendant wanted an expert to explain to the jury how this test demonstrated the defendant's innocence. The defendant argued scientific experiments found that during an examination blood pressure would rise when the examinee consciously deceived or stated a falsehood to the examiner. *Id.* The court held that the deception test "ha[d] not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made." *Id.* at 1014.

Frye established a general acceptance test where courts must allow expert testimony to be presented to the jury when the subject matter the expert is testifying to "ha[s] gained general acceptance in the particular field in which it belongs." *Id.* The Supreme Court of Florida adopted the Frye standard in 1952. *Kaminski v. State*, 63 So. 2d 339, 340 (Fla. 1952). Most states followed the Frye standard prior to Daubert. Kenneth W. Waterway & Robert C. Weill, *A Plea for Legislative Reform: The Adoption of Daubert to Ensure the Reliability of Expert Evidence in Florida Courts*, 36 *Nova L. Rev.* 1, 9 (2011). There is a four-step process for trial judges to perform under Frye in Florida:

- (1) the trial judge must determine whether such expert testimony will assist the jury in understanding the evidence or in determining a fact in issue;
- (2) the trial judge must decide whether the expert's testimony is based on a scientific principle or discovery that is "sufficiently established to have gained general acceptance in the particular field in which it belongs;"
- (3) the trial judge must determine whether a witness is qualified as an expert to present opinion testimony on the subject in issue;
- (4) the judge may then allow the expert to render an opinion about his or her expertise, and it is then up to the jury to determine the credibility of the expert's opinion, which it may either accept or reject.

Ramirez v. State, 651 So. 2d 1164, 1167 (Fla. 1995)

There are many critics of the Frye standard because it limits trial judges "in their ability to keep junk science and unreliable or irrelevant expert evidence out of court." *Waterway*, *supra* at 7.

The relaxed standard of general acceptance allows parties to put forth expert testimony that could confuse or even mislead the jury. This is especially apparent in construction defect litigation. Purported experts can confuse jurors by providing testimony that extrapolates construction defects based on junk science. Under the Frye standard it is left to the jury to determine which expert is more persuasive and the trial judges cannot act as gatekeepers to prevent misleading expert testimony based on unreliable methodology.

Florida has long followed the Frye standard. *Id.* at 2. Florida is among a minority of states that follow the Frye standard. *Id.* In Florida the Frye standard does not apply to an expert testifying based solely on their opinions. *Marsh v. Valyou*, 977 So. 2d 543, 548 (Fla. 2007) (“Experts routinely form medical causation opinions based on their experience and training.”) In Florida, courts have permitted experts to testify regarding their conclusions based solely on their personal experiences; even when that conclusion is “not generally recognized in the scientific community.” Neil D. Kodsi, *Confronting Experts Whose Opinions Are Neither Supported nor Directly Contradicted by Scientific Literature*, 80 Fla. B.J. 80, 81 (June 2006).

Recently there has been uncertainty in Florida regarding whether the courts should apply the Frye standard or the Daubert standard to determine the admissibility of expert testimony. In 2013 the Florida legislature enacted the Daubert Amendment which amended Florida’s Evidence Code by changing Florida Statute Section 90.702 and Section 90.704 to adopt the Daubert standard. *In re Amendments to Fla. Evid. Code*, 210 So. 3d 1231, 1236 (Fla. 2017). However, the Florida Supreme Court declined to adopt the purported changes made by the legislature under the Daubert Amendment. *Id.* at 1238.

The Florida Supreme Court may provide clarity as the court has granted jurisdiction to review *Delisle v. Crane Co.*, SC16-2182, 2017 WL 3484484, at *1 (Fla. July 11, 2017). In *Delisle*, the appellate court applied the Daubert standard finding most of Plaintiff’s expert testimony inadmissible, quoting *General Electric Co. v. Joiner*, 522 U.S. 136, 118 S. Ct. 512, 139 L.Ed.2d 508 (1997)

[t]rained experts commonly extrapolate from existing data. But nothing in either Daubert or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the ipse dixit of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered.

Crane Co. v. DeLisle, 206 So. 3d 94, 102 (Fla. 4th Dist. App. 2016), review granted, SC16-2182, 2017 WL 3484484 (Fla. July 11, 2017). The appellate court also mentioned that “if the *Frye* standard applied, most of the expert testimony clearly would be inadmissible as the experts failed to show that the methodology was generally accepted in the scientific community.” *Id.* at n.7.

c. Why the Different Evidentiary Standards Matter

There are significant consequences of applying the Daubert standard versus the Frye standard in Florida with respect to statistical evidence. In construction defect litigation, under the Daubert standard the trial judge will have greater discretion to protect the jury from considering expert testimony based on unreliable methodology. This will change the status quo in Florida where expert testimony based on bad science or pure opinion is readily admitted under the lenient Frye standard. Under the Daubert standard, the parties will have a greater ability to challenge the admissibility of expert testimony.

Parties opposing experts can file a motion contesting the reliability of the expert's extrapolation under Daubert and resolve these issues earlier in the case rather than having the jury weigh which expert was more persuasive.

Cases on Point

- a. **Robert Dillon Framing, Inc. v. Canyon Villas Apartment Corp.**, 55897, 2013 WL 3984885 (Nev. Apr. 17, 2013)

In Canyon, the defendant appealed on the basis that the trial court improperly "den[ie]d its motions to exclude extrapolation evidence and allowing [the statistician] to give an expert opinion during trial." Id. at *3. The defendant argued the extrapolation was "inappropriate where multiple units are involved because of the potential for variance." Id.

The Supreme Court of Nevada noted that they have not "prohibited extrapolation evidence except where it was used in a pre-litigation notice of constructional defects or to certify a class." Id. The plaintiff was not suing in a representative capacity and its suit was based on construction defects in the installation of windows in the apartment building. Id. The statistician was qualified as an expert in statistics. Id. The statistician examined only 2% of the windows of the building; however, due to the testing procedure the court held that the "data based on the small sample was reliable and provided the jurors with helpful information." Id.

The statistician testified that he examined equal numbers of "one-, two-, and three-bedroom apartments, as well as an equal number of apartments on the first and second stories." Id. The statistician generated "a list of apartments of each type . . . by a random-number formula." Id. "[A]s an added level of randomness, experts in the field used random numbers to determine which window to test in each apartment." Id. The statistician testified that "it was statistically insignificant that the field experts only examined 2% of the windows" and that "a survey of larger or smaller size would have yielded the same result and the same margin of error." Id.

- b. **Ayala v. Pardee Const. Co.**, E028639, 2002 WL 31160551 (Cal. App. 4th Dist. Sept. 30, 2002)

In Ayala, the plaintiffs argued that "in a construction defect case involving mass-produced housing, expert testimony based on a sufficient sampling of houses may be applied to all the other houses by extrapolation." Id. at *10. (internal quotations omitted). The plaintiffs argued they did not need to provide expert testimony. Id. The court held that on the record there was no way to know "whether the alleged defects in the [plaintiff's house and another house] were so similar as to make expert testimony regarding the latter unnecessary." Id. at *11.

- c. **In re City center Const. and Lien Master Litigation**, 2012 WL 3919757

City center concerned construction defects in a hotel in Nevada and the plaintiffs sought to introduce extrapolation evidence. Id. During an evidentiary hearing, the plaintiffs' expert testified that while he "was aware that the construction process changed from level 20 and up [he] chose only to test one out of 70 columns above level 20." Id. There were "1469 elements"

tested by plaintiffs' expert, "a sub-set of the 1680 total elements in the building." Id. From the "1469 elements, 397 (27 percent) were destructively tested." Id.

In City Center the district court precluded the extrapolation evidence, holding that "without better assurances of randomness in the sample selections, statistically extrapolated data would be inappropriate to present to a jury." Id. The court noted that the "standard for the use of extrapolation evidence requires a statistically valid and reliable representative sample" and that the court "must employ . . . wide discretion in determining whether a valid and representative sample has been utilized." Id.

The case involved over "\$400 million dollars in damages claims" and it was anticipated that the trial would last over a year. Christine Garritano and Christopher Bondra, CONSTRUCTION DEFECTS: CAUTION Should Be Taken When Proving Defects Using Extrapolation Roetzel's Construction Law Watch., <https://www.ralaw.com/> (2015). The case settled before trial commenced. Id.

d. **Wyndham Intern., Inc. v. Ace Am. Ins. Co.**, 186 S.W.3d 682 (Tex. App.--Dallas 2006)

In Wyndham, the appellate court affirmed the trial court's decision to grant the defendants' motion to exclude extrapolation evidence prepared by the plaintiff. Id. at 689. The plaintiff, a hotel owner, sued "ten insurance companies" seeking recovery of "business income loss" plaintiff allegedly suffered because of the September 11, 2001 terrorist attacks. Id. at 684. Plaintiff claimed over \$66 million in losses. Id. Plaintiff's expert was "a C.P.A. and consultant." Id. In the defendants' motion to exclude, they asserted that plaintiff's expert "base[d] his entire calculation on a comparison of monthly hotel forecasts of hotel room revenue which are demonstrably unreliable." Id. Further, the defendants asserted that plaintiff's expert "improperly extrapolate[d] his already unreliable calculation for the 101 hotel properties to an additional sixty-two hotel properties; and" failed to account for other factors. Id.

The court found that the forecasts were unreliable because the reports "were not prepared pursuant to any company-wide 'hard and fast' rules . . . [and] fewer than 1/3 of the August 2001 forecasts for 101 properties were within [plaintiff's] own liberal, 5% accuracy tolerance standard." Id. at 689. Further, "the extrapolations of revenue projections for sixty-two properties were drawn from the forecasts for the other 101 properties." Id. The court held that "extrapolated projections premised upon unreliable and flawed forecasts merely compounds the unreliability of [plaintiff's expert's] opinion." Id.

Plaintiff argued that the "extrapolated projects only account for 13% of the \$66 million damage claim", however the court held that this "does not cure the unreliability of the damage calculation." Id. The failure of plaintiff's expert to consider "any other causes which could have affected [plaintiff's] profitability other than the events of September 11, 2001, render[ed] the [expert's] opinion little more than speculation. Id. Texas follows the Daubert standard and in this case the trial court exercised its discretion to protect the jury from bad science.