Pete Fowler
CONSTRUCTION
Services, Inc.

Random Selection & Extrapolation

Introduction

Extrapolation in construction defect (CD) litigation is a hotly litigated issue. Not to mention, it makes defendants CRAZY! We have been dealing with it since the 1990's, but only in the last couple years have we seen it addressed well.

Here's how we see it: CD litigation is typically driven by the opinions of expert consultants. These experts base their opinions on data they collect during their observations. Experts often don't look at 100% of the locations (the "population") in question; instead they inspect or test a "sample" of locations and "extrapolate" to the remaining "population" to draw conclusions about the entire project. Contrary to the popular opinion of many defendants, there is nothing inherently wrong with this.... At least not in theory.

Scientists in all fields, every day, make observations, develop hypotheses, make predictions, conduct tests, compare their findings against the hypotheses, and draw conclusions. This is called the Scientific Method and it's the foundation of modern technology. And scientists commonly test relatively small samples and extrapolate findings. It's perfectly acceptable... But only if the "sample" is genuinely representative of the population. Here's the rub: Real scientists, including real building scientists, are VERY careful about how they select the "sample." Real scientists know that a poorly selected sample is not extrapolatable. And they know about "biased data." Scientists know that biased data is insidious and ruins otherwise good work.

What we observe in construction defect litigation, is the use of biased data to extrapolate. And this is no bueno. We are going to show you how to select and extrapolate the right way.

Outline

1. Introduction
2. Building "Science"; Really?
3. Random Selection
4. The E Word (Extrapolation)
5. Playing Doctor
6. Do the Right Thing
7. Conclusion

Learning Objectives

- Explain the basics of applying the scientific method to building performance analysis
- Explain the process of randomly selecting inspection and testing locations
- Explain the process of extrapolating findings
- Show examples of good work

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9320 SW Barbur Blvd., Suite 170, Portland, OR 97219 T: 503.246.3744
75 Manhattan Dr. Suite 110, Boulder, CO 80303 T: 303.554.0381

Backup Materials

1. Judge's Order including random selection of residences
2. Motion to Exclude Evidence
3. Daubert Motion to Preclude and Order Denying Extrapolation
4. PFCS Investigation Recommendations, Testing Summary and Testing Map
5. PFCS Random Selection and Inspection (& Testing) Request
6. PFCS Summary of Testing
7. PFCS Scope of Repair

Program Contents

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   - Program Outline
   - Learning Objectives
   - Back-Up Materials
   - Homework


We know buildings
EXPERTISE
PROJECT MANAGEMENT
TECHNOLOGY
STANDARDS
RESULTS
www.petefowler.com
Pete Fowler
CONSTRUCTION
Services, Inc.

Random Selection and Extrapolation of Construction Defects

November 20, 2013

www.petefowler.com

CA 949-240-9971 CO 303-554-0381 OR 503-246-3744

Program Outline

1. Introduction
2. Building “Science”; Really?
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1. INTRODUCTION

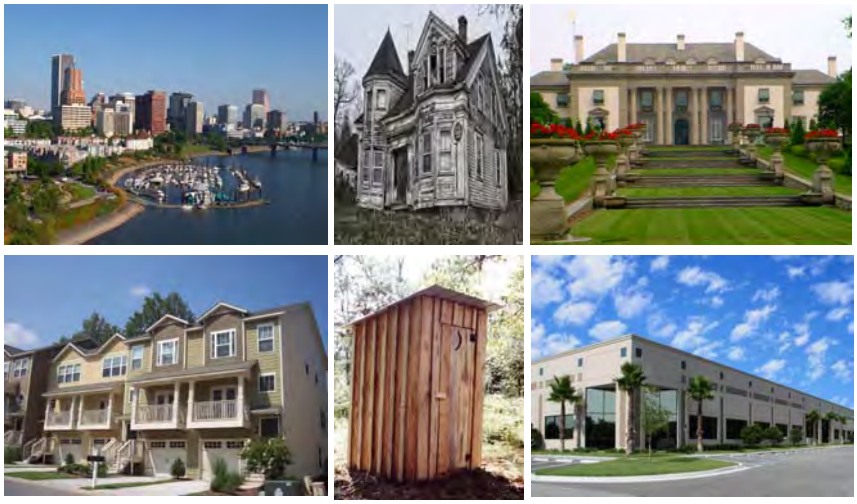
PFCS: Who We Are

SOLUTIONS

Pete Fowler Construction Services (PFCS) specializes in creating REAL PRACTICAL SOLUTIONS for property owners & managers, builders & developers, construction contractors, product manufacturers & suppliers, lawyers and insurers.

1. INTRODUCTION

PFCS: We Know Buildings



1. INTRODUCTION

PFCS: We Know Buildings

CLIENTS

- Property Owners & Managers
- Builders & Developers
- Contractors
- Product Manufacturers
- Insurers
- Lawyers

1. INTRODUCTION

PFCS: We Know Buildings

BUILDING LIFECYCLE MANAGEMENT

EVALUATION: We investigate building performance by inspecting, testing, interviewing and analyzing lots of documents and data.

SPECIFICATION: We consult with the Owners to maximize property value, specifying the right maintenance, repairs, and improvements.

QUALITY MANAGEMENT: Manage the scope, budget, schedule and contracts, and verify performance with quality control inspections.

CONSTRUCTION CLAIMS & LITIGATION

EVALUATION: We investigate building problems by inspecting, testing, and analyzing lots of documents and data.

SPECIFICATION: We create real, practical solutions for how the problems should be fixed and how much they will cost.

ALLOCATION: We compare project performance to standards and our experience so we can explain to others what happened, what should have happened and who is responsible.

Pete Fowler

CONNECT WITH PETE

Call 949.240.9971

Email pf@petefowler.com

Find him on LinkedIn!

Read about industry impacts on our blog at **www.petefowler.com**

1. INTRODUCTION

Program Introduction

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1. INTRODUCTION

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1. INTRODUCTION

Case Study

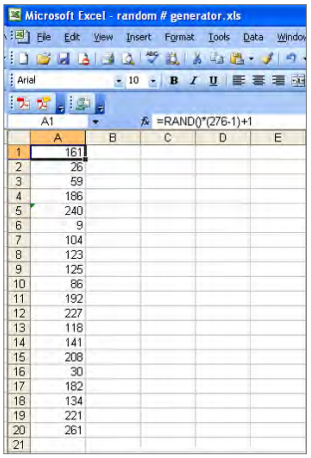
A VERY SIMPLE RANDOM SELECTION

1. INTRODUCTION

Case Study

A VERY SIMPLE RANDOM SELECTION

"…To select the twenty representative properties, the Court first numbered each of the 276 properties, in the order they appear on the list. The Court then used a Microsoft Excel spreadsheet and formula to generate twenty random numbers between 1 and 276. The function used was "=RAND()*(250-1)+1". This function generates a random number from 1 – 276 twenty separate times, to ultimately generate twenty different rows - each with a different random number - in the first column of the spreadsheet…"



UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA

CIVIL MINUTES - GENERAL

Case No. 1:07-cv-00388 DOC (DLBx) Date: January 12, 2012

Title: ABARCA, et al. V. MERCK & CO., INC., et al.

DOCKET ENTRY

[I hereby certify that this document was served by first class mail or Government messenger service, postage prepaid, to all counsel (or parties) at their respective most recent address of record in this action on this date.]

Date:_____ Deputy Clerk: _____

PRESENT:

THE HONORABLE DAVID O. CARTER, JUDGE

Julie Barrera	Not Present
Courtroom Clerk	Court Reporter

ATTORNEYS PRESENT FOR PLAINTIFFS:	ATTORNEYS PRESENT FOR DEFENDANTS:
NONE PRESENT	NONE PRESENT

PROCEEDING (IN CHAMBERS): SELECTION OF FLOOD CASE REPRESENTATIVE PROPERTIES

The Court is in receipt of Plaintiffs' Amended Election of Property Pool for Flood Trial Pursuant to the Court's December 16, 2011 Order (Docket 1537). Defendants' objections, if any, were due by December 23, 2011. No objections were filed, so Plaintiffs' Amended List (Docket 1537-1) sets forth the final two hundred and seventy six (276) potential properties for the flood case. To select the twenty representative properties, the Court first numbered each of the 276 properties, in the order they appear on the list (i.e. 2432 Meadowbrook is #1 and 2184 N. Drake is #276). The Court then used a Microsoft Excel spreadsheet and formula to generate twenty random numbers between 1 and 276. The function used was "=RAND()*(250-1)+1". This function generates a random number from 1 - 276 twenty separate times, to ultimately generate twenty different rows - each with a different random number - in the first column of the spreadsheet. The selected numbers each correspond to a property on the Plaintiffs' list, and those twenty properties will be the representative properties in the flood case.

The selected representative properties are as follows:

Property 1: #161 - 1900 Ashby Road, #27

Property 2: #26 - 2131 Meadowbrook

Property 3: #59 - 2150 Beachwood

Property 4: #186 - 2078 Drake

Property 5: #240 - 2305 Teakwood Court

Property 6: #9 - 2120 Balboa

Property 7: #104 - 2042 Drake

Property 8: #123 - 2306 Meadowbrook

Property 9: #125 - 2363 Lance

Property 10: #86 - 2108 Balboa

Property 11: #192 - 2075 W. Cabot

Property 12: #227 - 2180 Cabot

Property 13: #118 - 1080 Thornton

Property 14: #141 - 2305 Fern

Property 15: #208 - 2305 Mesquite Court

Property 16: #30 - 2163 Meadowbrook

Property 17: #182 - 2151 Cabot

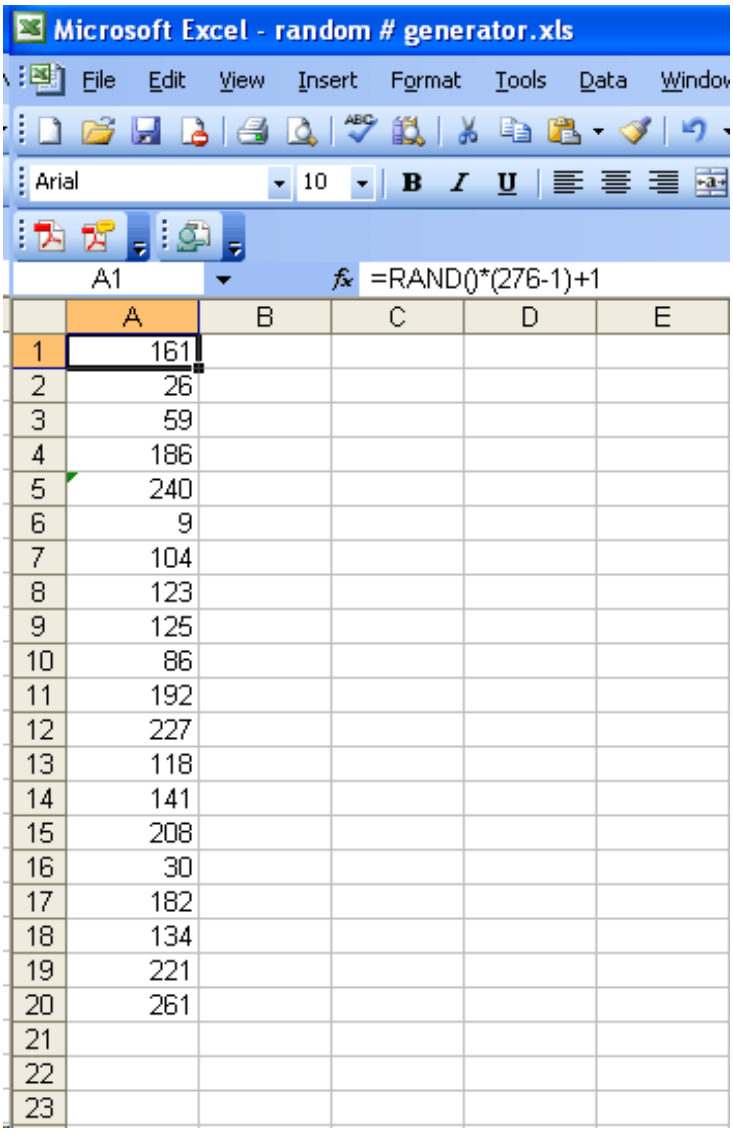
Property 18: #134 - 2352 Lobo Avenue

Property 19: #221 - 1848 Ashby Road, #55

Property 20: #261 - 2291 Wolf

For the parties' information, below is a screen shot of the formula and spreadsheet used to

generate the random number selection.



	A	B	C	D	E
1	161				
2	26				
3	59				
4	186				
5	240				
6	9				
7	104				
8	123				
9	125				
10	86				
11	192				
12	227				
13	118				
14	141				
15	208				
16	30				
17	182				
18	134				
19	221				
20	261				
21					
22					
23					

The Clerk shall serve this minute order on all parties to the action.

2. BUILDING “SCIENCE”; REALLY?

Building “Science”; Really?

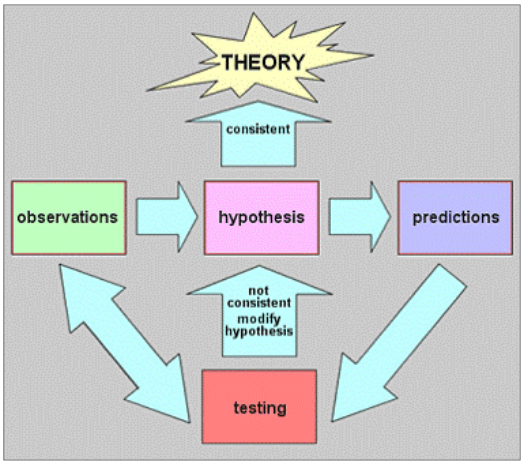
- Thinking Scientifically
- The Basics of “Building Science”
- Hypothesize
- Case Study

2. BUILDING "SCIENCE" REALLY?

Thinking Scientifically

SCIENTIFIC METHOD

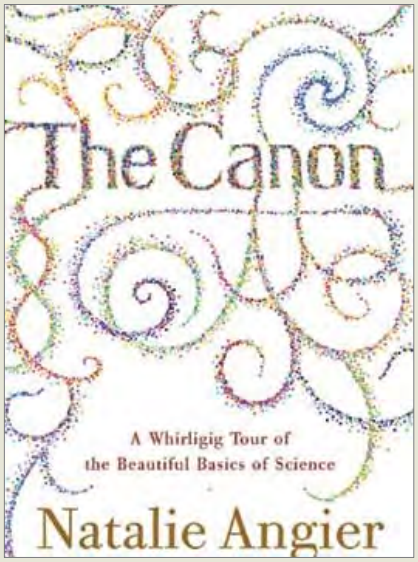
1. Observe
2. Hypothesize
3. Predict
4. Test
5. Repeat
6. Theory



2. BUILDING "SCIENCE"; REALLY?

Thinking Scientifically

The Canon
by Natalie Angier



2. BUILDING "SCIENCE"; REALLY?

Thinking Scientifically

"Science is not a body of facts. Science is a state of mind. It is a way of viewing the world, of facing reality square on but taking nothing on its face. It is about attacking a problem with the most manicured of claws and tearing it down into sensible, edible pieces.

People do not need a lab to follow a scientific game plan. For example, trying to fix a DVD player. They will do experiments and controls.

Step 1 is the observation: What is the picture quality, what are things that could be wrong, is it the player or the TV set? Then you come up with the hypothesis and start testing it. Borrowing a neighbor's DVD player and testing it with your TV, checking your A/V cables, etc. You can possibly track down the problem without knowing how a DVD player works."

2. BUILDING "SCIENCE"; REALLY?

Thinking Scientifically

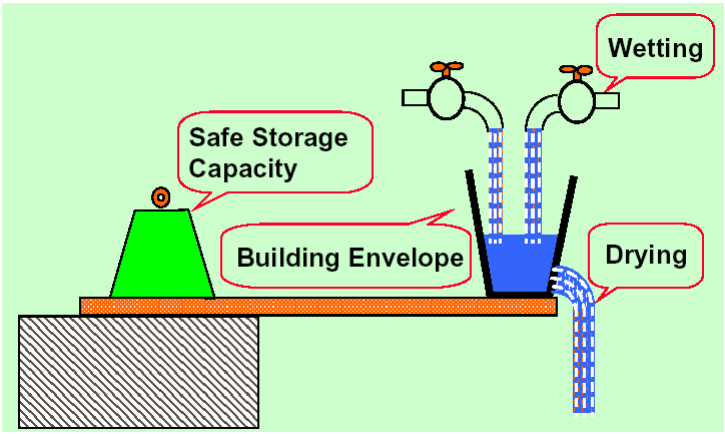
"Critical Thinking: Part of critical thinking includes the understanding that science doesn't deal with absolutes. Nonetheless, we can make statements that are quite powerful and have a high probability of being correct.

Barriers to critical thinking include cynicism (negative and dismissive reactions due to preset notions) and the habit of believing we already understand how many things work, especially simple things we were supposed to have learned in elementary school."

Read about industry impacts on our blog at **www.petefowler.com**

2. BUILDING "SCIENCE"; REALLY?

The Basics of "Building Science"



2. BUILDING "SCIENCE"; REALLY?

The Basics of "Building Science"

ASTM E2128: Standard Guide for Evaluating Water Leakage of Building Walls

Designation: E 2128 – 01a

Standard Guide for Evaluating Water Leakage of Building Walls[1]

1. Scope

1.1 This guide describes methods for determining and evaluating causes of water leakage of exterior walls. For this purpose, water penetration is considered leakage, and therefore problematic, if it exceeds the planned resistance or temporary retention and drainage capacity of the wall, is causing or is likely to cause premature deterioration of a building or its contents, or is adversely affecting the performance of other components. A wall is considered a system including its exterior and interior finishes, fenestration, structural components and components for maintaining the building interior environment.

1.2 Investigative techniques discussed may be intrusive, disruptive or destructive. It is the responsibility of the investigator to establish the limitations of use, to anticipate and advise of the destructive nature of some procedures, and to plan for patching and selective reconstruction as necessary.

1.3 *This practice does not purport to address all of the safety concerns, if any, associated with its use. Establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Awareness of safety and familiarity with safe procedures are particularly important for above-ground operations on the exterior of a building and destructive investigative procedures which typically are associated with the work described in this guide.*

2. Referenced Documents

2.1 *ASTM Standards:*

E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference[2]

E 514 Test Method for Water Penetration and Leakage Through Masonry[3]

E 547 Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential[2]

E 631 Terminology of Building Construction[2]

E 1105 Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls and Doors by Uniform or Cyclic Static Air Pressure Difference[2]

2.2 *American Architectural Manufacturers Association (AAMA) Standards:*

501.2 Field Check of Metal Storefronts, Curtain Walls and Sloped Glazing Systems for Water Leakage[4]

502 Specification for Field Testing of Windows and Sliding Doors[4]

503 Specification for Field Testing of Metal Storefronts, Curtain Walls and Sloped Glazing Systems[4]

3. Terminology

3.1 Refer to Terminology E 631.

3.2 *Definitions:*

3.2.1 *incidental water*—unplanned water infiltration that penetrates beyond the primary barrier and the flashing or secondary barrier system, of such limited volume that it can escape or evaporate without causing adverse consequences.

3.2.2 *water absorption*—a process in which a material takes in water through its pores and interstices and retains it wholly without transmission.

3.2.3 *water infiltration*—a process in which water passes through a material or between materials in a system and reaches a space that is not directly or intentionally exposed to the water source.

3.2.4 *water leakage*—water that is uncontrolled, exceeds the resistance, retention or discharge capacity of the system, or causes subsequent damage or premature deterioration.

3.2.5 *water penetration*—a process in which water gains access into a material or system by passing through the surface exposed to the water source.

3.2.6 *water permeation*—a process in which water enters, flows and spreads within and discharges from a material.

4. Significance and Use

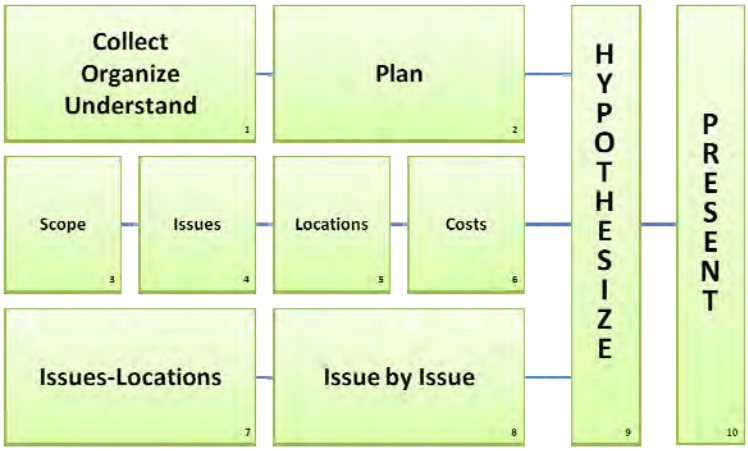
4.1 This guide is intended to provide building professionals with a comprehensive methodology for evaluating water leakage through walls. It addresses the performance expectations and service history of a wall, the various components of a wall, and the interaction between these components and adjacent

The Basics of "Building Science"

From ASTM E2128

1. Review of Project Documents: Observe.
2. Evaluation of Design Concept: Observe.
3. Determination of Service History: Observe. Hypothesize. Predict.
4. Inspection: Observe. Hypothesize. Predict.
5. (As Necessary) Investigative Testing: Test.
6. Analysis: Theory (Opinion or Opinions)
7. Report Preparation

Hypothesize



2. BUILDING "SCIENCE"; REALLY?

Case Study

This project consists of two six-story buildings with a total of 96 one story units built in 2008.

2. BUILDING "SCIENCE"; REALLY?

Case Study

2. BUILDING "SCIENCE"; REALLY?

Case Study

1. Elevators were not working reliably.
2. Owner's mechanical engineering expert was told by the elevator company there was condensation problem in the elevator closets causing the problems, and assumed it was true.
3. Owner's engineer specified a $100,000 solution to prevent condensation.
4. PFCS found no evidence of an on-going condensation problem, and lots of evidence of other potential causes for the failures.
5. PFCS tested by measuring the temperature and humidity in the closets over many months and found no opportunity for condensation.
6. The PFCS solution saved the builder more than $50,000 and saved the owners the maintenance of mechanical equipment over the life of the project.

IN THE CIRCUIT COURT OF THE STATE OF OREGON

FOR THE COUNTY OF WASHINGTON

[redacted] HOMEOWNERS ASSOCIATION, an Oregon Homeowners Association,

Plaintiff,

v.

[redacted]

Case No. C093539CV

DEFENDANTS [redacted], INC. AND [redacted]'S OEC 104 MOTION TO EXCLUDE PLAINTIFF'S ANTICIPATED EXTRAPOLATION EVIDENCE

Oral Argument Requested

[redacted]

Defendants.

UTCR INFORMATION

Oral argument is requested on this motion. The estimate time for argument is 1-2 hours. Official court reporting services are not requested.

MOTION

Defendants [redacted] (collectively "[redacted]") anticipate that plaintiff's construction defect expert, [redacted]"), will seek to extrapolate the results of its limited forensic investigation to offer opinions about the [redacted] project as a whole. [redacted] hereby applies to the court for an order, pursuant to Rules 104, 401, 402, 403, 702 and 703 of the Oregon Evidence Code, precluding plaintiff from offering this evidence because the anticipated extrapolation testimony will lack scientific validity and will thus be irrelevant and will result in unfair prejudice to [redacted] if presented to a jury.

This motion is based on the points and authorities below. It is anticipated that this motion will be supplemented with exhibits prior to argument. The undersigned counsel will seek to work with opposing counsel to arrive at an agreed-upon set of exhibits for the motion.

INTRODUCTION

[redacted] anticipates that plaintiff will argue that because [redacted] found what they believe to be evidence of water intrusion and/or damage at certain specific locations, that this water intrusion and/or damage must exist across the entire project, even in areas that have not been investigated. However, principles of statistics dictate that if sampling is not random, it is not representative and thus cannot be used as a basis to extrapolate. Any attempt by plaintiff to draw conclusions about the project as a whole – based on non-representative samples – would be

speculative and contrary to well-settled principles of statistics. [redacted] has retained a statistician that will opine as follows:

- [redacted] Used an Insufficient Sample Size: Because [redacted] selected a small sample, it is nearly impossible to conclude that the sample selected is representative of the entire [redacted] project. In Phase 1 of the [redacted] project, for example [redacted] sampled openings in only 14 out of 41 possible buildings. Especially with regard to Phase 1, and possibly with regard to Phases 2 and 3, there were simply not enough buildings sampled from which to form a reliable conclusion about the entire development.
- [redacted]'s samples were not random, and thus not representative: Because [redacted] only sampled a small cross-section of buildings, it appears likely that [redacted]'s samples were not randomly selected. [redacted]'s statistician will testify that without random selection, the samples cannot be considered to be representative of the whole project.
- [redacted] did not appear to follow acceptable "sampling design and procedures": It does not appear that [redacted] followed acceptable "sampling design and procedures" – a necessary predicate to reliable sampling. Without sampling procedures in place, [redacted] can offer no assurance that it's samples are representative.

APPLICABLE LEGAL STANDARDS

OEC 104(1) requires the court to determine preliminary questions concerning the qualification of a person to be a witness and the admissibility of evidence. OEC 401 defines relevant evidence, requiring that evidence must tend to make a fact more probable or less probable than it would be without the evidence. OEC 402 prohibits admission of evidence that is not relevant. OEC 403 prohibits admission of evidence if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, requiring the court to balance the probative value of the evidence against the harm likely to result from its admission. "Unfair prejudice" means an undue tendency to suggest decisions on an improper basis. 1981 Conference Committee Commentary to OEC 403. OEC 702 permits

expert testimony if the expert's specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue. OEC 703 limits the facts or data upon which an expert bases an opinion to those types reasonably relied upon by experts in the field.

A. Trial Judge's Vital Gatekeeper Function

"To be admissible, expert testimony must be relevant under OEC 401, must assist the trier of the fact under OEC 702, and must not be subject to exclusion under OEC 403 because its probative value is outweighed by the danger of unfair prejudice." *Blake v. Cell Tech Int'l, Inc.*, 228 Or App 388, 399-400, 209 P3d 992 (2009) (citing *Marcum v. Adventist Health System/West*, 345 Or 237, 243, 193 P3d 1 (2008)). "In applying OEC 401, 702 and 403, the court must identify and evaluate the probative value of the proffered scientific evidence, consider how that evidence might impair rather than help the trier of fact, and decide whether truth finding is better served by admission or exclusion." *Id.* at 400 (quoting *State v. O'Key*, 321 Or 285, 299, 899 P2d 663 (1995); *see also Marcum*, 345 Or at 242, *Jennings v. Baxter Healthcare Corp.*, 331 Or 285, 301-02, 14 P3d 596 (2000) (involving a differential diagnosis ruling out all other possible factors and a 95% correlation rate between the alleged exposure and symptoms.)

The court must play the "vital role" as "gatekeeper" in screening proffered scientific testimony. *O'Key*, 321 Or at 307.

B. Evidence Must Have Legitimate Scientific Basis

In accordance with *State v. O'Key,* trial courts must function as gatekeeper by screening evidence to determine whether it will *legitimately* assist the trier of fact. *Blake v. Cell Tech Int'l, Inc.*, 228 Or App at 400 (citing *State v. O'Key*, 321 Or at 303).

> "In performing its role as 'gatekeeper,' the trial court ensures that the trier of fact does not attach an undue aura of reliability to 'scientific' evidence that is not scientifically valid. Evidence that purports to be based on science beyond the common knowledge of the average person that does not meet the judicial standard for scientific validity can mislead, confuse, and mystify the jury."

State v. O'Key, 321 Or at 303 n. 20.

> The trial court's gatekeeping role is particularly important "because of the persuasive power of scientific evidence" as "[e]vidence perceived by lay jurors to

> be scientific in nature possesses an unusually high degree of persuasive power. The function of the court is to ensure that the persuasive appeal is legitimate. The value of proffered expert scientific testimony critically depends on the scientific validity of the general propositions utilized by the expert." *Blake*, 228 Or App at 400 (quoting *State v. O'Key*, 321 Or at 291).

Importantly, in *State v. O'Key*, the Oregon Supreme Court held: (i) "[u]nless the proffered evidence is supported by appropriate validation, it cannot qualify as "scientific knowledge;" and (ii) "'appropriate validation' refers to scientific validity;" thus (iii) "admissibility of scientific evidence requires a showing that it is based on scientifically valid principle." 321 Or at 301-303 (discussing and quoting *Daubert v. Merrell Dow Pharmaceuticals*, 509 US 57 (1993) ("*Daubert*")). In so holding, the Oregon Supreme Court discussed at length the United States Supreme Court's holding in *Daubert*, finding that "the Oregon Evidence Code "is modeled on the federal paradigm" and that "[t]he decisional process to be applied for admission and exclusion of scientific evidence articulated" in *Daubert* is "an appropriate further development of the decisional process" for the admission and exclusion of expert testimony. *State v. O'Key*, 321 Or at 306. Likewise, in *Marcum v. Adventist Health System/West*, the court held that the alleged cause of damages must meet the test of scientific validity. 345 Or 237, 242 (2008).

Here, as noted, it is anticipated that [redacted] will seek to introduce extrapolation testimony. To do so, [redacted] must root its testimony in reliable statistical evidence that is scientifically valid. [redacted] should not be permitted to proffer general conclusions about the project as a whole unless their conclusions are based on samples that are truly representative.

C. Burden of Proof is on Plaintiffs, Who Must Show Admissibility by Preponderance

The burden of laying the proper foundation for the admission of the expert testimony is on the party offering the expert, and must be shown by a preponderance or the evidence. OEC 305, 307; *State v. O'Key*, 321 Or at 303; see also *Siharath v. Sandoz Pharma. Corp.*, 131 F Supp 2d 1347, 1351 (N. D. Ga. 2001).

D. Causation and Damages

In the construction defect context, plaintiff must prove actual, current water damage to the [redacted] Project, as opposed to mere construction defects or the threat of future water damage. The recent Oregon Supreme Court case of *Harris v. Suniga* makes clear that negligence claims for construction defects and resultant water intrusion brought by building owners against non-privity contractors are driven by actual water damage, such as dry rot, and the costs necessary to repair such damage. 344 Or 301 (2008). Further, a party is not entitled to recover for speculative future damages. *See, e.g., Burrough v. Twin Oaks Memorial Garden, Inc.*, 110 Or App 325, 330 (1991); *California-Pacific Utilities Com. v. Barry*, 254 Or 344, 348 (1969); *Lowe v. Phillips Morris USA, Inc.*, 207 Or App 532 (2006). As such, plaintiff's negligence claim depends upon proof of actual, current water damage caused by the contractors' allegedly negligent construction practices (i.e., construction "defects").

ARGUMENT

In this lawsuit [redacted] anticipates that plaintiff will seek to draw conclusions about the [redacted] project as a whole based on [redacted] limited forensic investigation. Because [redacted] found what they believe to be evidence of water intrusion and/or damage at certain openings in a small, subset of buildings, it will seek to offer extrapolation testimony that the same degree of water intrusion and/or damage occurred in *all* buildings. That is, [redacted] will ask the jury to assume that its sample is representative of the entire project, and thus award damages accordingly.

[redacted] has retained a statistician who will opine that [redacted]s sample openings do not form a statistically reliable basis to extrapolate to the remainder of the project. The rules of statistics dictate that in order to extrapolate, the sample *must* be representive. Here, [redacted] did not meet this requirement. In all three phases, [redacted] investigated only a limited number of buildings, many of which are clustered together. As discussed previously, [redacted]'s statistician will opine that based on the number of openings in a limited subset of buildings [redacted]'s samples were not random, and

thus not representative. Indeed, it is possible, if not likely, tha[redacted] selectively "cherry-picked" the "worst" homes in which there may have been homeowner complaints, or conspicuous signs of water damage. As such, plaintiffs lack a scientific basis to introduce extrapolation testimony.

The Supreme Court of the United States, in a case utilizing the *Daubert* standard for expert testimony, expressed in general terms the limitations of using such extrapolation evidence:

> Trained 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.*

General Elec. Co. v. Joiner, 522 U.S. 136, 146 (1997) (emphasis added). As noted in *Joiner*, courts that wrestle with questions about the admissibility of extrapolation evidence are particularly concerned with whether the analytical gap is too great for admission of expert testimony. To cross this analytical gap, an expert must provide an appropriate foundation for the extrapolation to be reliable. The requirement for an appropriate foundation to establish reliability ensures that the expert's opinion is "based on a scientifically valid principle." *State v. O'Key*, 321 Or at 301-303.

In the construction defect context, for example, courts have excluded extrapolation testimony when the proper foundation is *not* provided to ensure reliability of that testimony. For example, in *Harbor House Condominium Association v. Mass. Bay Insur. Co.*, 703 F. Supp. 1313, 1321 (N.D. Ill. 1988), plaintiff, a condominium association, which had experienced freeze damage to a portion of its hot-water pipes, employed an expert who investigated and repaired pipes in 23 units of a 278-unit building. *Id.* at 1316. Plaintiff's expert's selection of units was admittedly "non-random" as it investigated units along the north section of building which "contained the most obvious leaks" and "had more complaints than others." *Id.* at 1315 & 1316 n.4. Plaintiff urged the court to allow the expert who examined the leaks to extrapolate damages to the remaining portion of the building despite the fact that the remaining units had not been

examined. Significantly, the court responded to this argument by denying admissibility of the extrapolation evidence, noting that the relevant inquiry was the reliability of the sample and whether it was "representative":

> When Air Comfort performed the air pressure test on an additional six units, those units were ***not randomly selected***. . . . Therefore, plaintiffs established freeze damage in only twenty-three units without locating pipe damage in any of the remaining 255 units. The fact that freezing caused damage to a portion of the heating System is probative of the cause of damage to the entire System ***only if the record evidence indicates that the damaged portion is representative*** of the entire heating System. The record contains no such evidence.

Id. at 1318 (emphasis added). The court again – when squarely addressing the issue of extrapolation – emphasized the importance of a representative sample:

> Plaintiffs do not argue, and the ***Court does not conclude, that such a small portion of the System is representative of the entire System***. Thus, plaintiffs attempt to prove the extent of their damage by extrapolating from the cost to repair past damage which is not the subject of this dispute. . . . It is undisputed that plaintiffs' experts failed to locate additional damage to the pipes when plaintiffs elected not to pressure test the System. Without locating the damage, the ***expert opinions are mere speculation***; therefore, their cost estimates prove nothing.

Id. at 1321 (emphasis added). Thus, the court's paramount concern when addressing the admissibility of extrapolation evidence was the reliability of that evidence.

Cases decided in the class action context are also consistent with this view. For example, in *Shuette v. Beazer Homes Holdings Corp.*, 124 P.3d 530 (Nev. 2005), the court refused to grant class certification to homeowners who bought homes from the same developer in a particular subdivision, stating:

> [A]s a practical matter, single-family residence constructional defect cases will rarely be appropriate for class action treatment. . . . [C]lass actions involving real property are often "incompatible with the fundamental maxim that each parcel of land is unique." . . . [W]e recognize that, where specific characteristics of different land parcels are concerned, "these uniqueness factors weigh heavily in favor of requiring independent litigation of the liability to each parcel and its owner."

Id. at 844-45 (citations omitted).

Likewise, in *Hicks v. Kaufman & Broad Home Corp.*, 107 Cal.Rptr.2d 761 (2001), another construction defect case involving multiple units, the court found that class certification was inappropriate for the plaintiff's negligence claims because negligence requires the proof of actual property damage, unlike warranty claims, which required only generalized proof of damages. *Id.* at 767-75. As the court held, the plaintiffs were not allowed to proceed on their negligence claims because "to recover under [negligence] theories of liability each class member would have to come forward and prove specific damage to her home . . . ." In other words, the court in *Hicks* held that the plaintiffs were not allowed to extrapolate their individualized property damage to support their negligence claim from the property damage suffered by others.

Outside the construction law context, courts have similarly utilized their gatekeeping function to bar extrapolation testimony that is based on statistically unreliable data. For instance, in *Dunn v. Sandoz Pharmaceuticals Corp.*, the court denied plaintiff's expert witness from extrapolating on studies that were "statistically insignificant and inconclusive on causation due in part to a sample size that was inadequate." 275 F.Supp.2d 672, 681 (M.D.N.C. 2003). The court noted that unreliable scientific methodology, markedly small sample size and selective use of insignificant data were insufficient to support an opinion on whether the drug in question caused the plaintiff's injury. *Id.* As *Dunn* demonstrates, allowing experts to extrapolate based on data that is insignificant in volume, or specifically does not satisfy reliability standards required for admission, can create an impermissible gap between the evidence presented and the opinion proffered. *See also Wyndham Intern., Inc. v. Ace Am. Ins. Co.*, 186 S.W.3d 682 (Tex. App. 2006) (plaintiff's expert extrapolated forecasts of revenue for 163 hotels by sampling 101 hotels; defendants argued such extrapolation was insufficient and failed to address the "myriad factors" that affect the financial condition of each hotel; court agreed with defendant, holding that "extrapolated projections" were "premised upon unreliable and flawed forecasts").

In this case, [redacted] anticipated extrapolation testimony should also be excluded due the "impermissible gap between the evidence presented and the opinion proffered." [redacted]'s proposed extrapolation testimony should be barred for the following reasons:

- [redacted]*'s samples were non-random, and thus non-representative.*

The rules of statistical inquiry dictate that the sample *must* be representive in order to extrapolate. Because [redacted] only sampled a small cross-section of buildings, [redacted]'s statistician will opine that it is virtually certain that [redacted] samples were not random and therefore *not* representative. As indicated, [redacted] sampled openings in only 14 out of 41 possible buildings in Phase 1; 13 out of 30 possible buildings in Phase 2; and 18 out of 28 possible buildings in Phase 3. Such a small cross-section of sampling does not serve as reliable basis to extrapolate.

- [redacted] *did not create or follow a "sampling design and procedures"*

[redacted]'s statistician will opine that in order to conduct reliable representative sampling, the sampling party must create and follow acceptable "sampling design and procedures." Such procedures ensure that the sampling method generates a sample that is truly representative and serves as an accurate representation of the remaining whole. There is no evidence [redacted] produced any such sampling design and procedure, and thus its extrapolation testimony lacks a proper scientific foundation.

- [redacted] *"cherry-picked" the "worst" homes to investigate*:

Similar to plaintiff's expert in *Harbor Homes*, [redacted] has, in all likelihood, selected homes and structures that contained the "most obvious" defects and experienced "more complaints than others." [redacted]s sampling is not spread out evenly across the development as one might expect with random sampling. Rather, the sampled units are clustered together in a small subset of buildings.

- *Each parcel of land at* [redacted] *is unique*

As the *Shuette* and *Hicks* courts recognized, there are characteristics and criteria by which each piece of construction differs from every other. The same logic applies in this case. For

instance, at [redacted] there are confounding variables that can impact the condition of a home. These might include, for example, a home's orientation toward weather patterns and a homeowner's maintenance and upkeep. Extrapolating general damages to all structures – even those structures that were not investigated and where no damage was found – would be "incompatible with the fundamental maxim that each parcel of land is unique."

➢ *Construction defect negligence claims require proof of actual damage:*

Plaintiff, as discussed previously, has the burden to prove the existence of actual, current water damage caused by the contractors' allegedly negligent construction practices. Plaintiff cannot rely on speculation or conjecture. Here, plaintiff's expert, [redacted], has only investigated and found damage at a small subset of structures. Plaintiff cannot say, with any degree of certainy, whether the remaining structures experienced similar damage; and if so, to what extent. As such, plaintiff cannot satisfy its burden to prove actual damage for those structures not investigated.

CONCLUSION

For all of the foregoing reasons, [redacted] requests this court issue an order excluding [redacted]s anticipated extrapolation testimony, and grant such other relief as this court deems just.

DATED this 15th day of July, 2010

[redacted]