

Floor Litigation

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By:

Kenneth D. Newson, DABFE, DABFET
Diplomate American Boards of Forensic Examiners and Engineers

“An expert is a man who has made all the mistakes which can be made in a very narrow field”

Niels Bohr (1885-1962)

To clearly understand the following discussion, it would be helpful to understand some broad concepts. Most people think of a floor as the stuff you buy at Home Depot and then get someone to attach it to the floor of the building, it is far more than that.

In the world of Ergonomics a “system” is “Man” and his relationship to specific surroundings. The system under discussion here is a Floor. The components of the system relate to the needs and expectations of the connected “Man”. In order to understand the areas of litigation discussed below, an awareness of the requirement that the system must serve the Man is needed. Any failure of the system to live up to the Man's expectations may require interpretations.

Very simply put, when you get up in the morning, you swing your legs off the bed and stand on the floor. What if the floor isn't there? Or, at least what you expect from the floor isn't provided?

I. IDENTIFYING PARTICIPANTS

Floors and their relationship to litigation is highly specialized. A floor specialty is usually overlooked because it is expected that other disciplines include expertise in floors. The following discussion focuses on the floor, and is only discussion, an overview.

The standard American Institute of Architecture (AIA), Owner/Architect contract specifies an architect's responsibilities as an overseer of the work performed by others based on his specifications. This is different from the AIA “Construction Management” contract. In a floor-related claim an attorney must

be familiar with the degree of difference in the Architect's responsibilities. In both cases the Architect is responsible to inform the owner of any work that is defective at the time of construction. This relationship is so pivotal that in some public buildings the code reads:

CALIFORNIA HEALTH AND SAFETY CODE

SECTION 16015. All drawings and specifications shall be prepared under the responsible charge of an architect, civil engineer, or structural engineer, who shall sign all drawings and specifications for approval of the enforcement agency. Observation of the work of construction shall be under the general responsible charge of the same architect, civil engineer, or structural engineer when feasible, as determined by the enforcement agency, except that if drawings and specifications do not involve architectural or structural conditions, the drawings and specifications may be prepared and the work of construction may be administered by a registered professional engineer qualified in the branch of engineering that is appropriate to the drawings, specifications, estimates, and work of construction.

Every building has a floor, both interior and exterior, allowing room for errors and omissions by several professions/or trades prior to occupancy. The structural floor, which is the raw construction floor, we'll call the sub-floor, and the finished floor, which will have some sort of covering or coating, we'll call the "Floor".

Sub-floors are the product of architects, engineers and contractors. Failures at this level could range from a design flaw, or a patent defect, such as a sub-floor that is out of level, which exceeds the standard of practice. Or, a latent defect where the sub-floor fails to support the intended use. There could also be a breach of contract if professional supervision allowed a substitution of materials that were not of "like kind and quality" as written on the approved plans and specifications. The owner is then injured because the building does not conform to expectation.

An important distinction should be identified between professional misconduct in specifications, job management and poor contractor workmanship. Either is potentially an area for litigation. Contracts and industry "Standards of Care" for each discipline must be considered.

An owner may reasonably expect that the “Building” will service the function it was created for. If the owner wanted a bathroom then, it would have a design that functions like a bathroom. The floor should appear and function as a bathroom floor with consideration of the owner’s expectation of acceptable aesthetics fulfilled. There are several areas of possible failure, to which acceptable aesthetics is now added.

If the final finishes do not satisfy the owner’s expectations there could be a legal issue. Often owners will influence the interior design; therefore questions must be asked. Any approvals of specifications by the owner must be discovered.

So far we have exposed the Architect, the Engineer, the General Contractor, Sub-contractor, and the Interior Designer to litigation over the owner’s expectation of function. As a building’s use becomes more complex, so do the issues that are related to the floor. Can the Interior Designer be sued if the carpet wears out prematurely? The American Society of Interior Designers (ASID) Code of Ethics state:

3.1 *Members' contracts with a client shall clearly set forth the scope and nature of the project involved.* The scope and nature of a project include the financial impact of the design on the expected return on investment made by the owner. It can be considered that a poor decision on the part of the interior designer has put the floor at risk.

Design professionals have a responsibility to the owner to create a product in keeping with the owner’s expectations. A failure to achieve that end product may begin with an inadequate exploration of the owner’s expectations

The floor plays many roles. When the floor is covered it may be expected to perform practically, aesthetically, emotionally, economically and ergonomically. What if it doesn’t work?

A floor and the installed covering must conform to several codes, and industry standards. Thirty-five states have governing bodies that watch over the qualified licensees for floor construction and floor covering installation. In order to get to the underlying failure the attorney must separate the failure into its integral parts and then analyze each. Often, as required by the C.C.P. an expert is hired 70 days before trial, but floors are complex and an expert may be able to assist and provide clarity to the issues and unexpected issues much earlier in the case, including discovery and deposition preparation.

If we isolate the issues of the creation of a sub-floor we can look at a confined group of professions and trades that may have failed. As we look at each of the

expected functions of the floor the number of possible responsible parties increases dramatically. Remember that a floor is a living thing, not necessarily organic, but evolving to an expected end. At the time of creation an economic life is assigned to it and other parts of the building. Insurance adjusters use tables to value and determine depreciation for replacement parts, using an expected economic life. Economic Life is used by accountants for budgeting and taxes.

The selection of the appropriate floor covering begins with a designer's concept. This is then put into the context of initial budget and life cycle cost for the owner's acceptance. Issues in this area can exist. For example, if the function of the building is to make clients comfortable and put them in a mood to conduct business, profitable for the owner, the materials must conform to standard practices of design for such an outcome. If the design fails and business is bad, is the specifier responsible? If the Floor dies prior to the projected economic life, is that someone's fault?

II. TYPES OF FLOOR COVERING

There are many categories of floor covering, and within each category there are qualities and grades created to fulfill almost any economic and aesthetic outcome. The categories are Hard Surface, Soft Surface, and Resilient, Included in Hard Surface are ceramic tile, hardwood, stone, metal, hard plastics, epoxy coatings and concrete sealants. Included in Soft Surface are carpet, rugs, sisal, and fabric with padding. Resilient floors include Vinyl tiles and sheeting, Rubber tiles and sheeting, cork tiles and sheeting, and composite tiles. Each category has governing bodies made up of materials manufacturers for the purpose of setting standards that indemnify the maker from liability caused by improper use or installation of their products. The particular governing body provides testing protocols to the ASTM International, which verify the quality of the product in question.

The failing in this system is the fact that the governing bodies are self-serving. Some groups do not allow outsiders a voice in setting the standards. Because the floor covering industry has annual sales in the 10's of billions of dollars they are self-protecting. There are some industry standards that are almost impossible to meet in the real world. Determining causation of failure is a complicated game of competing disciplines. In some instances the governing standards for labor contradicts the manufacturer's governing standards.

The determination of standards violations is made more complicated by the sophisticated marketing methods used by manufacturers. The norm for the wholesale representative is that they are neither licensed to install the product nor have they ever installed the product. Their goal is to convince a salesman at a

dealership to sell their product, or a designer to specify the product. The dealership salesman is not required to have a contractor's license or experience with materials installation. California however requires that a dealership salesman be licensed as a salesman and have some level of supervision by a contractor. By law the installer of floor covering materials is required to work for a company that has a managing agent who has a California State Contractor's License. This allows for failures based on poor information distribution, inadequate training, and poor management. The owner of a dealership need not be licensed, but must use a licensed installation company. All of the above requirements are often ignored, and are areas ripe for investigation.

III. PRACTICAL PROBLEMS WITH COLLECTIBILITY

The contractor's license may be held by an employee, and should a dealership incur a large financial loss, it can close its doors and open the next day under a different name, and any debt could be un-collectable. California State Contractor laws are easily side stepped, this is a truly *caveat emptor* area. The "Responsible Managing Employee" is not required to carry liability insurance, merely a \$7,500.00 person Bond.

When all of the gaps between manufacturing and installation are grouped and then given to maintenance personnel, the possibilities for failure grow. When a product is distributed a Material Safety Data Sheet (MSDS) is made available to the product's distributor (as required by the 1972 Clean Air Act). This includes all maintenance materials. The Occupation Safety and Health Administration mandates training maintenance staves on the use of all chemicals. There is room for failure at all levels of floor use.

The following is a list of some topics of litigation concerning sub-floors and finished floors prior to owner occupancy. These topics are generalizations and require case specific data.

1. Improper fabrication
2. Moisture vapor intrusion
3. Inadequate specification
4. Delays in delivery
5. Substitution of materials
6. Material defects
7. Hazardous materials (toxins)

All of the above issues relate to a failure taking place during construction. The life of the floor has just begun, its failure can occur at this stage or later. The damages must be assessed, their cause and compensable failure determined. It

is the consideration of cause when the failure is in the floor or sub-floor that is develed into in this treatise.

IMPROPER FABRICATION:

There are many types of sub-floors, for this example I will reference the most common construction scenario. Consider a typical three-story apartment building, containing subterranean parking and three floors of apartments. The parking floor and ceiling are concrete, making the first floor concrete. The second and third floors are plywood. Over the wood deck walkways, which are exposed to the elements, a polymer waterproof deck coating is applied.

Within two years the polymer decking is beginning to tear, and corners of the plywood sub-floor are protruding through the polymer. Upon investigation it is determined that the framing contractor did not follow the specifications as directed in his contract, nor did the specifier follow the manufacturer's guidelines. The wrong thickness of plywood was used in some areas, the wrong nails were used, also, support members were improperly spaced. Who is responsible? The architect under the standard AIA contract is responsible to the owner to identify faulty workmanship. The general contractor would have had a field superintendent inspect the work prior to approving a request for payment, and therefore approved defective work in violation of the AIA owner/Contractor standard contract form. The city building inspector would have to signoff on the work, as being done to city code standards, and the framing contractor would be responsible to follow industry standards as well as his contract. Therefore, someone is responsible for creating a "Latent Defect", as defined a "Latent Defect is one which is both not readily observable and not discoverable to any but the most searching inspection" (Chadwick v. Fire Insurance Exchange). But, the question comes back to the responsibilities of all the parties during construction.

Interestingly enough the plaintiff included the Waterproof Floor Decking contractor in the litigation. In parts of the project the decking covered the plywood sub-floor. There was a clause in the decking contractor's contract, which made the decking contractor responsible for all resultant damage caused by the faulty framing. The clause read " the contractor will use all means necessary to confirm that all related work that precedes the decking is not defective". The California State Contractors License Board has a code of conduct for licensees, which precludes testing of one sub-contractors work by another. Each contractor's inspection of the previous work is limited to "eyes only" and therefore that clause in the example is in violation of Public Policy.

MOISTURE VAPOR INTRUSION

Throughout the Southwestern United States moisture vapor migration is a major issue. Moisture vapor wicking up through a slab on grade is not the only way moisture gets into the concrete. The natural condition of concrete allows moisture to flow through the slab until it is fully cured. The normal time for a slab to cure completely is 28 days, but this time will increase if there is a vapor barrier below the slab. The vapor barrier does not allow moisture to leave the slab from below. When a slab cures the capillaries constrict to the point where the slab is almost waterproof, this takes 20 years.

Therefore, moisture can migrate through the slab from underneath, from the top and from the sides. An often-missed source of moisture migration is the landscape irrigation system. As the landscaping is watered, and in desert areas, this can be as much as one inch of water per day during the summer, water will migrate through the slab causing all kinds of deterioration, given all the related elements exist.

As water migrates through a young slab it causes alkali salts in the concrete to go into solution and move to the surface of the slab. These alkali salts will damage to the integrity most floor covering adhesives, causing them to emulsify and evaporate.

The standard of practice provides that the type and quality of testing be left to the judgement of the installation contractor, using ASTM F1869 and F 710 as the guideline. There are three steps in the development of this judgement. It begins with a view of the site. If the color of the slab is too pink it may indicate caution. If the exterior irrigation system seems to be hitting the side of the room excessively caution should be used. If in the judgement of the contractor caution is called for then the next step is to qualify the existence of moisture. This is done either by the use of a moisture encounter meter or a mat test. Should this step indicate that moisture is present in the slab then the next step required is a Calcium Chloride test, which will quantify the moisture vapor pressure, although this test is not totally accurate judgments must be made when the reading approaches the tolerance limit.

When buildings leak water will collect on the floor between the walls, as well as come through ceilings and walls. The collected water will be absorbed by the

sub-floor inside the walls and migrate through the pours of the concrete or engineered wood sub-floor. As the water travels it will attack the floor covering.

Also, it must acknowledge that the Calcium Chloride test (a test that quantifies the presence of moisture) is only good for 24 hours. Desert areas are notorious for quick and extreme changes in water table levels. That is why the floor covering industry has declared, in a Position Paper published in 2002, that this quantifying test lies beyond the scope of the floor-covering contractor. Further, the general contractor shall provide findings from a concrete expert prior to the installation of any floor covering which is vapor sensitive, because “Relative Humidity” is an integral part of the testing protocol, along with site temperature.

Moisture Dome (CaCl) tests are controversial due to the complex nature of moisture intrusion. As of today, the CaCl test is the only recognized protocol for quantifying moisture vapor pressure, upon which all limits of the moisture sensitivity for floor covering is based.

INADEQUATE SPECIFICATION

It is the Designer/Specifier’s job to be aware of the owner’s expectations, and the relation of one trade to another. It is possible for the specifier not to be aware that a floor covering may be incompatible with a piece of equipment, or an existing sub-floor condition. A conflict arises when a piece of equipment has special needs. The manufacturer is to provide a product information sheet to the Designer/Specifier before finish specifications are written.

For example; a designer/specifier was the project manager for a complete office interior retrofit. A carpet manufacturer convinced the designer that a particular carpet would meet the needs of this office better than any other. This carpet was then specified. It turns out that this carpet had an unconventional backing, requiring the carpet to be bonded directly to the sub-floor. When the existing carpet was removed it was found that a large portion of the floor had a residue of an epoxy coating. The carpet was installed.

Throughout the process of construction there ought to have been scheduled periodic meetings between the Designer, the general contractor and the needed sub-contractors. After the carpet was installed it was discussed at some of these meetings that the carpet was not holding to the sub-floor. Also, it turns out that the backing on this carpet was different from any other carpet ever made. The manufacturer sent a substantial amount of carpet to be used for replacement. The designer allowed replacements to take place as needed. It was discussed in subsequent meetings that the new carpet was de-bonding like all of the other

carpet. The designer did not stop the job, or order an investigation. The client was never informed and moved in.

For a period of four years the owner paid the carpet sub-contractor for continued repairs to the carpet. The carpet manufacturer went out of business, it was a foreign firm, also, the floor-covering contractor went out of business.

The expected economic life of carpet is seven years, and a practical life of ten years, the physical life is 20 years. This carpet was degenerating from the first day, and the buyer was never informed.

At year five the owner was preparing to replace the carpet. In this case, when the cost of moving furniture and business interruption are factored in it became a seven-figure cost of replacement. Was the owner damaged?

The California Uniform Commercial Code. –
ARTICLE 1- GENERAL PROVISIONS
.PART 2
§ 1-203. *Obligation of good faith.*

Every contract or duty within this Act imposes an obligation of good faith in its performance or enforcement.

There are many questions here. Did anyone act in bad faith? Was there a patent or latent construction defect?

The California Business and Profession Code states;

7091. (a) A complaint against a licensee alleging commission of any patent acts or omissions that may be grounds for legal action shall be filed in writing with the registrar within four years after the act or omission alleged as the ground for the disciplinary action.

An accusation or citation against a licensee shall be filed within four years after the patent act or omission alleged as the ground for disciplinary action or within 18 months from the date of the filing of the complaint with the registrar, whichever is later.

*(b) A complaint against a licensee alleging commission of any latent acts or omissions that may be grounds for legal action pursuant to subdivision (a) of Section 7109 regarding **structural defects**, as defined by regulation, shall be filed in writing with the registrar within 10 years after the act or omission alleged as the ground for the disciplinary action. An accusation and citation against a licensee shall be filed within 10 years after the latent act or omission alleged as the ground for disciplinary action or within 18 months from the date of the filing of the complaint with the registrar, whichever is later.*

7109. (a) A **willful** departure in any material respect from accepted trade standards for good and workmanlike construction constitutes a cause for disciplinary action, unless the departure was in accordance with plans and specifications prepared by or under the direct supervision of an architect.

A chain of events leads to a specification. Usually, a wholesale representative will visit a designer, or a dealer/contractor will bring this wholesale agent to the designer who will get his product specified. The designer, taking the agent's word for the product writes the specification, which is either bid or selected by the General Contractor. Often the designer will present the selection to the owner for approval. When approved, the manufacturer gives the dealer/contractor a proprietary price on the product so as to eliminate competition when the project goes to bid.

The facts present as follows:

1. The carpet began to fail at the time of installation.
2. The sub-contractor informed the General Contractor and the Designer.
3. The designer contacted the manufacturer.
4. The agent for the manufacturer arranged for additional materials.
5. The failure continued.
6. The work was completed and the owner moved in.
7. The carpet continued to fail.
8. The owner was never informed that a defect existed in the carpet.

Where does counsel for the owner begin? How counsel for the defense find the issues?

Another example of a complex floor covering issue is *Alfredo Annino Const. v. Decking Dynamics*. In this case the owner's representative did not provide the specifier with the specifications of some equipment, to be provided by the owner, that reached high temperature. The specifier did not inform the general contractor when specification called for a floor covering that would not withstand the extreme environment. Additionally; the specifier of the floor coating did not pay attention to the incompatibility of the coating with parts of the specified plumbing. The floor coating failed, and the plumbing leaked. The floor coating contractor was sued. Who was at fault?

DELAYS IN DELIVERY

It is not uncommon for decisions on finishes to be made after the construction is underway. Often contracts are written with a "Time is of the Essence" clause, floor covering materials manufacturers will not take a purchase order from a dealer that has delivery penalties. It is not uncommon to hear that a truck was caught in a snow storm and was delayed, or the most often used reason for delay is the "the truck broke down". In reality the manufacturer or the contractor had a problem and the fabrication took longer than expected.

The smart sub-contractor indemnifies himself against delayed material deliveries. This can be a major issue. Floor covering, particularly carpet, is the last trade to complete their work before move-in. But, floor covering installation must rely upon other surfaces preceding it. If the carpet is not in on time then move-in can be delayed causing financial damage to the occupant.

The California Uniform Commercial Code, section

2510. (1) Where a tender or delivery of goods so fails to conform to the contract as to give a right of rejection the risk of their loss remains on the seller until cure or acceptance.

(2) Where the buyer rightfully revokes acceptance he may to the extent of any deficiency in his effective insurance coverage treat the risk of loss as having rested on the seller from the beginning.

Because the buyer has the right to obtain other materials and reject the original order (under the circumstances described above), the contractor can be damaged by the manufacturer.

2616. (1) Where the buyer receives notification of a material or indefinite delay or an allocation justified under the preceding section he may by written notification to the seller as to any delivery concerned, and where the prospective deficiency

substantially impairs the value of the whole contract under the provisions of this division relating to breach of installment contracts (Section 2612), then also as to the whole,

(a) Terminate and thereby discharge any unexecuted portion of the contract; or

(b) Modify the contract by agreeing to take his available quota in substitution.

(2) If after receipt of such notification from the seller the buyer fails so to modify the contract within a reasonable time not exceeding 30 days the contract lapses with respect to any deliveries affected.

(3) The provisions of this section may not be negated by agreement

except insofar as the seller has assumed a greater obligation under the preceding section.

SUBSTITUTION OF MATERIALS

The California Business and Profession Code states;

7109. *(b) A willful departure from or disregard of plans or specifications in any material respect, which is prejudicial to another, without the consent of the owner or his or her duly authorized representative and without the consent of the person entitled to have the particular construction project or operation completed in accordance with such plans or specifications, constitutes a cause for disciplinary action.*

It is one thing to be delayed in construction due to a delivery problem, and then expose yourself to liability for such a delay. It is another to be delayed and substitute a similar product without disclosing the delay.

Manufacturers of floor covering make so many styles of products that it is difficult to differentiate between grades of similar products. Also, in some industries, manufacturing tolerances allow for an overlap of grades in which a substitution could take place and the difference would be unperceptible. Yet the performance would be different.

Cases in point, #1, The difference between a Stripwood Floor and a Plank wood floor is 1/4 inch in width and a quality difference in the density and quantity of soft grains. To the layperson they look alike, yet stripwood is 1/2 the cost of plank. The buyer purchased Stripwood and Plank was installed. Once found the dealer closed his doors. But, there was a liability carrier.

Case #2, one of the measures of quality in carpet is the amount, by weight, of yarn per square yard. The industry tolerance in manufacturing is 10% in the face yarn. So a 32-ounce carpet can be 29 to 35 ounces of yarn per square yard. One of the most commonly specified carpets is a 32 ounces plush, usually used in offices. It is conceivable that a 30-ounce version of a carpet could be installed and no one would know. The difference would be that the carpet would lose its original appearance 2-years sooner. The average savings to the contractor would be \$1.00/ yard.

The discovery of the above issues requires educated eyes and hands, along with knowledge of the industry paper trails. These business practices are common to the floor covering industry.

MATERIAL DEFECTS

Naturally every manufactured product comes with a warranty backed by the manufacturer. But, there is a sequence of events in construction that puts the buyer at a disadvantage. Often, time of completion is the first priority. If defective materials are delivered the completion date is now in jeopardy. The buyer is squeezed because there are business considerations contingent timely occupancy.

It is common for the contractor to say to the buyer that the defective portions of the materials will be either repaired or replaced after occupancy. The common practice in the floor covering industry to take several approaches toward resolving the issue. The question comes up as to the rights and damages of and to the buyer.

The California Uniform Commercial Code, section

2601. Subject to the provisions of this division on breach in installment contracts (Section 2612) and unless otherwise agreed under the sections on contractual limitations of remedy (Sections 2718 and 2719), if the goods or the tender of delivery fail in any respect to conform to the contract, the buyer may

(a) Reject the whole; or

(b) Accept the whole; or

(c) Accept any commercial unit or units and reject the rest.

2602. (1) Rejection of goods must be within a reasonable time after their delivery or tender. It is ineffective unless the buyer seasonably notifies the seller.

(2) Subject to the provisions of the two following sections on rejected goods (Sections 2603 and 2604),

(a) After rejection any exercise of ownership by the buyer with respect to any commercial unit is wrongful as against the seller; and

(b) If the buyer has before rejection taken physical possession of goods in which he does not have a security interest under the provisions of this division (subdivision (3) of Section 2711), he is under a duty after rejection to hold them with reasonable care at the seller's disposition for a time sufficient to permit the seller to

remove them; but

(c) The buyer has no further obligations with regard to goods

2608. *(1) The buyer may revoke his acceptance of a lot or commercial unit whose nonconformity substantially impairs its value to him if he has accepted it*
- (a) On the reasonable assumption that its nonconformity would be cured and it has not been seasonably cured; or*
- (b) Without discovery of such nonconformity if his acceptance was reasonably induced either by the difficulty of discovery before acceptance or by the seller's assurances.*
- (2) Revocation of acceptance must occur within a reasonable time after the buyer discovers or should have discovered the ground for it and before any substantial change in condition of the goods which is not caused by their own defects. It is not effective until the buyer notifies the seller of it.*
- (3) A buyer who so revokes has the same rights and duties with regard to the goods involved as if he had rejected them.*

2613. *Where the contract requires for its performance goods identified when the contract is made, and the goods suffer casualty without fault of either party before the risk of loss passes to the buyer, or in a proper case under a "no arrival, no sale" term (Section 2324) then*
- (a) If the loss is total the contract is avoided; and*
- (b) If the loss is partial or the goods have so deteriorated as no longer to conform to the contract the buyer may nevertheless demand inspection and at his option either treat the contract as avoided or accept the goods with due allowance from the contract price for the deterioration or the deficiency in quantity but without further right against the seller.*

If the defect is extensive, the manufacturer may offer to repair the material on site. They offer this with the understanding that other remedies remain in tact. The questions arises as to whether an item repaired is "As Good AS New"? Also, it is common for owners to accept a repair that is unknowingly temporary, and forget. In the original manufacturing process, synthetic materials are formed using high temperature and high pressure. Field repairs are done without the availability the sophisticated techniques used in a factory. Some methods of repair will only mask the damage, and after time the defect will return. So as the material prematurely degrades the owner thinks it's normal. Is this adequate for the buyer to accept the repaired materials as conforming to the purchase agreement?

HAZARDOUS MATERIALS

Although the floor covering industry mandated that all of its products and related sundries conformed to a policy of being “Green”, this is not always the case. Certain applied products require a period of time to cure. During this period of time they can be classified as hazardous.

The following is a redaction of the OSHA guide on hazardous materials. The products listed and discussed below are all found in floor installation related chemicals.

SECTION III: CHAPTER 1

POLYMER MATRIX MATERIALS: ADVANCED COMPOSITES

I. INTRODUCTION.

The composites industry in the United States includes three Manufacturing areas: Polymers, metals, and ceramics.

II. OVERVIEW OF THE INDUSTRY.

B. Advanced Composites:

4. Advanced composite systems are divided into two basic types, thermosets and thermoplastics. Thermosets are by far the predominant type in use today. Thermosets are subdivided into several resin systems including epoxies, phenolics, polyurethanes, and polyimides. Of these, epoxy systems currently dominate the advanced composite industry. Both thermoset and thermoplastic systems will be discussed in more detail in Section IV of this chapter.

B. MAJOR PROCESSES.

Diagrams of the major processes used in the advanced composites industry are provided in Section A of this chapter. The processes vary widely in type of equipment and potential worker exposure. Several of the processes are automated; however, some are manual and require worker contact with the part during manufacture. The basic process types are described below.

1. Formulation is the process where the resin, curing agent, and any other component required are mixed together. This process may involve adding the components manually into a small mixing vessel or, in the case of larger processes, the

components may be pumped into a mixing vessel. The potential hazards involve skin, eye, and respiratory contact with the ingredients or final formulation.

B. THERMOSETS.

1. Thermoset resins require addition of a curing agent or hardener and impregnation onto a reinforcing material, followed by a curing step to produce a cured or finished part. Once cured, the part cannot be changed or reformed, except for finishing. Some of the more common thermosets include:
 - + epoxies
 - + polyurethanes
2. Of these, epoxies are the most commonly used in today's PMC industry. Epoxy resins have been in use in U.S. industry for over 40 years. The basic epoxy compounds most commonly used in industry are the reaction product of epichlorohydrin and bisphenol-A. Epoxy compounds are also referred to as glycidyl compounds. There are several types of epoxy compounds including glycidyl ethers (or diglycidyl ethers), glycidyl esters, and glycidyl amines. Several of these compounds are reactive diluents and are sometimes added to the basic resin to modify performance characteristics. The epoxy molecule can also be expanded or cross-linked with other molecules to form a wide variety of resin products, each with distinct performance characteristics. These resins range from low-viscosity liquids to high-molecular weight solids. Typically they are high-viscosity liquids.
3. Since epoxies are relatively high molecular-weight compounds, the potential for respiratory exposure is fairly low. The potential for respiratory exposure is increased when the resin mixture is applied by spraying or when curing temperatures are high enough to volatilize the resin mixture. The potential for dermal exposure is typically much greater than respiratory exposure when working with epoxies. Several advanced composite processes involve some worker contact with the resin mixture. These and the other processes are discussed in more detail in Section V of this chapter.
5. Some of the most commonly used curing agents in the advanced composite industry are the aromatic amines. Two of the most

common are 4,4'-methylene-dianiline (MDA) and 4,4'-sulfonyldianiline (DDS). Like the epoxies, these compounds have a very low vapor pressure and usually do not present an airborne hazard unless in a mixture that is sprayed or cured at high temperatures. However, potential for dermal exposure is frequently high. The aromatic amines may permeate many of the commonly used protective gloves and thus may be particularly difficult to protect against.

7. Polyurethanes are another group of resins used in advanced composite processes. These compounds are formed by reacting the polyol component with an isocyanate compound, typically toluene diisocyanate (TDI); methylene diisocyanate (MDI) and hexamethylene diisocyanate (HDI) are also widely used. While the polyols are relatively innocuous, the isocyanates can represent a significant respiratory hazard as well as a dermal hazard.

8. Phenolic and amino resins are another group of PMC resins. With respect to the phenol-formaldehyde resins, the well-known hazards of both phenol and formaldehyde must be protected against. In addition to traces of free formaldehyde, they may also contain free phenol, and contact with these resins in the uncured state is to be avoided. The urea- and melamine-formaldehyde resins present similar hazards. Free formaldehyde, which is present in trace amounts and may be liberated when their resins are processed, can irritate the mucous membranes.

TABLE III:1-1. ORGAN SYSTEM TARGET.

| Composite component | Organ system target (possible target) | Known (possible) health effect |
|---------------------|---------------------------------------|---|
| Resins | | |
| Epoxy resins | Skin, lungs, eyes | Contact and allergic dermatitis, conjunctivitis |
| Polyurethane resins | Lungs, skin, eyes | Respiratory sensitization, contact dermatitis, conjunctivitis |

Phenol formaldehyde Skin, lungs, eyes As above (potential carcinogen)

4. The OSHA permissible exposure limits (PEL'S) for MDA are 10 ppb (parts per billion) expressed as an 8-hour time-weighted average, and a short-term exposure limit (STEL) of 100 ppb averaged over any 15-minute period for either general industry or construction uses of MDA. The FR 57(154): 35630 (August 10, 1992) issue published the Final Rule for 29 CFR Parts 1910 and 1926: Occupational Exposure to 4,4'Methylenedianiline (MDA).

OSHA Standards and Workplace Hazards

Under the OSH Act, employers have a general duty to provide a workplace free from recognized hazards. OSHA may issue citations when violations of standards are found and for violations of the general duty clause, even if no OSHA standard applies to the particular hazard.

The employer also must display in a prominent place the official OSHA poster that describes rights and responsibilities under the Occupation Safety and Health Act.

From OSHA Manual

“Because of the seriousness of these safety and health problems, and because many employer and employees know little or nothing about them, OSHA issued the Hazard Communication Standard”.

The Hazard Communication Standard establishes uniform requirements to make sure that the hazards of all chemicals imported into, produced, or used in U.S. workplaces are evaluated, and that this hazard information is transmitted to affected employers and exposed employees.”

“ Basically, the hazard communication standard is different from other OSHA health rules because it covers all hazardous chemical. The rule also incorporates a “downstream flow of information,” which means that producers of chemicals have a primary responsibility for generating and disseminating information and transmit it to their own employees.

Chemical manufacturers/Importers communicate the hazard information and associated protective measures downstream to customers through labels and MSDSs.

Employers; identify and list hazardous chemicals in their workplaces. Obtain MSDSs, and employee training, on the list of chemicals, MSDSs and label information. Communicate hazard information to their employees through labels, MSDSs, and formal training programs.

OSHA’S standard, Title 29, Code of Federal Regulations, part 1910.2100, 1915.99, 1917.28, 1918.9, and 1926.59 applies to construction employment.

As seen in Table III, the possible damage can be very serious. Unfortunately, the following two examples are real.

9. Installation of two part epoxy.

This was not the buyer’s first experience with this floor-covering product, but the conditions under which it was installed were different. Two inert chemicals were combined, and installed in a closed facility while employees continued to work at their stations, adjacent to the installation. This product requires eight hours to cure, and the off gassing of that process produces the following. The contractor’s personnel ignored the warnings to work in a well-ventilated area.

| | | | |
|---------------------|-------------------|---|--|
| From above | | | |
| Epoxy resins | Skin, lungs, eyes | Contact and allergic dermatitis, conjunctivitis | |
| Polyurethane resins | Lungs, skin, eyes | Respiratory sensitization, contact dermatitis, conjunctivitis | |
| Phenol formaldehyde | Skin, lungs, eyes | As above (potential carcinogen) | |

Six people hospitalized, one death, a long slow one. Who was at fault?

1. The installation of glue down carpet.

An Acrylic adhesive was used in a closed space during normal working hours. This was an office filled with workers. The carpet installers moved people closer together. The work was done on one half of the area and then the other. They removed very old existing carpet, spread adhesive allowed it to cure, and laid the carpet. They then did the other side. The contractor’s personnel ignored the warnings to work in a well-ventilated area.

Eight people hospitalized two with long term respiratory damage.

TOXIC MOLD

Different species of fungi have probably been present in human suffering since the dawn of time. In fact, the adverse health effects of fungal exposure are mentioned in the book of Leviticus. However, it wasn't until recently that the scientific community has identified mold and other fungi as a possible cause of adverse health effects in humans. Today, certain fungi and molds are known to the scientific and medical world to be responsible for allergies, hypersensitivity pneumonitis, humidifier fever, infections, mushroom poisoning, mycotoxicoses, mucous membrane irritation, and many other ailments. A few examples of fungi/mold species that can be hazardous to the health of humans include:

- Penicillium
- Aspergillus
- Stachybotrys
- Paecilomyces
- Fusarium

Mycotoxins

Mycotoxins are poisonous substances that are produced by fungi. They are one reason for the adverse health effects that molds have on humans. They occur when humans inhale or ingest fungal spores. Mycotoxins tend to concentrate in fungal spores, and thus present a potential hazard to those who inhale these airborne spores. Toxicogenic spores can have a significant affect on the function of the alveolar macrophage and be a health hazard to those exposed. Dangerous mold species include *Stachybotrys atra*, *Aspergillus versicolor*, and several toxigenic species of *Penicillium*.

Health Effects of Toxic Molds

Although mold affects individuals differently and to differing degrees, the following are some of the most common adverse health effects.

- Respiratory problems---wheezing, difficulty in breathing
- Nasal and sinus congestion
- Eyes-burning, watery, reddened, blurry vision, light sensitivity
- Dry, hacking cough

Sore throat
Nose and throat irritation
Shortness of breath and lung disease
Chronic fatigue
Skin irritation
Central nervous system problems (constant headaches,
loss of memory, and mood changes)
Aches and pains
Fever
Headaches
Diarrhea
Immune suppression

Research on Toxic Mold

There has been quite a lot of literature detailing specific case studies of mold contaminating homes and other structures. However, there has been relatively little work on the specific conditions and surroundings that allowed this growth. Beginning in the early '90s, the Environmental Protection Agency (EPA) began to study material properties, temperatures, and ecological niches that allowed fungi and mold to thrive, expand, and then eventually die. One of the results discovered was that humidity played a direct role to the growth of mold. Small amounts of moisture can foster the development of certain mold cultures. Other types of mold require much greater levels of moisture.

The fairly toxic species, *S. atra*, needs a lot of moisture and lots of materials that contain cellulose in order to foster growth.

Recent studies and cases have revealed greater rates of poisonous fungal species in poorly maintained offices/homes with water damage or moisture problems. While only a small number of molds and fungi are considered toxic and allergenic, species such as *Stachybotrys atra* (*S. atra*) have been directly linked to numerous cases of hemorrhagic lung disease in infants.

Within the last two decades, there has been significant recognition on the part of government agencies, communities, families, and individuals regarding the dangers associated with damp, moist, and wet indoor environments. At one time it was thought that bacteria or viruses were responsible for many of the health problems within buildings. Today, many home and workplace-related ailments are now being properly attributed wholly or, in part, to fungi and mold. As science and medicine continue to expand our knowledge of the effects of toxic mold, individuals are becoming much more aware of indoor

air quality issues. For example, only relatively recently have individuals and families had enough education on the effects of mold to begin making cases for mold contamination.

Molds produce tiny spores to reproduce. Mold spores waft through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they are growing on in order to survive. There are molds that can grow on wood, paper, carpet, and foods. When excessive moisture or water accumulates indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or un-addressed. There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.

Recognizing that mold can live in the center layer of a cushioned vinyl floor, Armstrong changed its warranty to include ONE complete change in the floor covering should discoloration from mold occur. The construction of cushioned sheet vinyl allows moisture to be absorbed by the craft paper first layer and be stored in the second layer of foam rubber. This moisture home for mold then feeds off of the organic materials used by other trades in the construction.

ASBESTOS

Asbestos is classified as a hazardous material. In 1986, all use of asbestos was finally eliminated from floor covering products, but not until 1988 was it removed from all floor covering bonding agents. Stockpiles of asbestos containing floor products were to be eliminated by 1989.

HEALTH AND SAFETY CODE SECTION 25925-25926

25925. (a) "Asbestos" means naturally occurring fibrous hydrated mineral silicates, including chrysotile, crocidolite, amosite, fibrous tremolite, fibrous anthophyllite, and fibrous actinolite.

(b) "Asbestos materials" means materials formed by mixing asbestos fibers with other products, including, but not limited to, rock wool, plaster, cellulose, clay, vermiculite, perlite, and a variety of adhesives, whether sprayed on surfaces or applied to surfaces in the form of a plaster or a textured paint.

(c) "Public building" means any structure, facility, or building owned or leased by the State of California, the University of California, or any local agency as defined in Section 54980 of the Government Code. "Public building" does not include any building or

structure used for a primary or secondary school.

25926. The Legislature finds that:

(a) Substantial medical and scientific evidence indicates that human exposure to asbestos fibers significantly increases the risk of contracting cancer and other debilitating or fatal diseases, including, but not limited to, asbestosis.

(b) The Legislature has taken measures to reduce the risk of asbestos exposure for school children and school employees by creating a statewide program to rid schools of asbestos (Chapter 1751, Statutes of 1984).

(c) Asbestos materials were commonly used in public buildings for fireproofing, soundproofing, decoration, thermal insulation, and other purposes.

(d) When these materials deteriorate or become loose, damaged, or friable, they release asbestos fibers into the ambient air. This may result in exposure of employees and the public to potentially dangerous levels of asbestos.

(e) It is vital for the safety of the public to identify the precise location and condition of asbestos materials in public buildings in order to institute abatement and control procedures as needed and to ensure that when repairs or renovations are undertaken that any asbestos materials present are properly handled.

With the courts allowing for new areas of asbestos litigation, some issues must be clarified. Prior to 1984 asbestos was an integral part of many building materials. In the areas of floor, asbestos could be found in asphalt tile, vinyl asbestos tile (VAT), sheet vinyl backing materials, and adhesives used with many resilient floor materials and carpet. VAT was introduced into the market in 1929, and left the market in 1982. It took longer to identify and remove hazardous adhesives.

VAT became the leading floor covering material in 1946 when FHA specified it as an underlayment for all new floor surfaces in FHA funded housing. Although rescinded, this specification fostered a boom in the manufacture of VAT. Almost a dozen manufacturers had facilities around the United States until the late 1960's when the market declined. This caused consolidation and closures in the industry. The majority of manufacturers sold their products to local distributors. Over the years most of the early distributors have closed, or been consumed.

But the courts are still very active.

Judge Rules for Armstrong in Asbestos Property Damage Case

LANCASTER, Pa., Oct. 24, 2002 -- U.S. Bankruptcy Judge Randall J. Newsome has issued a major ruling in Armstrong World Industries' favor

regarding the "type of science" plaintiffs can use in trying to prove their property damage claims related to asbestos-containing flooring in homes and public buildings.

Following a two-day Daubert hearing that began on September 26th in Wilmington, DE, Judge Newsome granted Armstrong's motion to exclude evidence presented by the plaintiffs' expert witnesses. Judge Newsome's ruling, announced Wednesday, is a second setback for the plaintiffs. On July 2nd, Judge Newsome denied the plaintiffs' request to file a class action lawsuit.

"Judge Newsome's ruling represents another big step forward for Armstrong in the Chapter 11 process," said Ken Jacobs, Armstrong's deputy general counsel for litigation. "The court has accepted Armstrong's argument that a significant group of asbestos claims are based on speculation and not sound science."

Armstrong requested the Daubert hearing, which is used to determine what type of expert testimony regarding scientific testing is allowable under the Federal Rules of Evidence. The issue at the hearing was to decide what expert opinions could be used to prove or disprove claims that asbestos-containing flooring cause building contamination. Judge Newsome ruled that the methodology offered by the Asbestos Property Damage Committee in support of its claims is not a scientifically valid method of quantifying the level of asbestos contamination in a building.

The Asbestos Property Damage Committee alleges that asbestos-containing floor tile presents a health risk and, at Armstrong's expense, the flooring should be removed from the buildings of property damage claimants. The committee asked the court to approve "settled dust sampling" as the appropriate measure for establishing that asbestos-containing floor tile releases asbestos fibers. The test is designed to count asbestos fibers in dust found inside buildings and to extrapolate those findings to determine how much asbestos is in the air people breathe.

Armstrong argued that settled dust sampling produces wholly inflated and unreliable results. Armstrong's expert witnesses told Judge Newsome that "air monitoring," which measures the number of asbestos fibers actually found in the air, is the most scientifically valid method of determining whether the presence of asbestos-containing floor tile poses a health risk. Armstrong maintains that air monitoring results in claimants' buildings accurately reflect very low or no levels

of asbestos which are equivalent to "background levels" (the amount of asbestos normally in the air).

Armstrong maintains its floors meet all safety regulations and that properly maintained, in place, asbestos-containing floors are non-friable, which means

they will not release asbestos fibers under normal use. Armstrong stopped making asbestos-containing floors in the U.S. in 1982.

Prior to filing Chapter 11, Armstrong had only six unresolved property damage claims pending based on asbestos in floor products. Since filing Chapter 11, Armstrong now faces about 600 individual property damage claims, filed mostly by a handful of law firms. The claims allege more than \$852 million dollars in damage related to asbestos-containing flooring. Armstrong believes these claims are opportunistic and have no merit.

Resolving these property damage claims is part of the effort to move Armstrong toward a plan of reorganization, which details how the company will emerge from Chapter 11 bankruptcy protection. Armstrong filed for Chapter 11 reorganization in December 2000 to resolve the tens of thousands of claims alleging personal injury from exposure to asbestos insulation.

The construction is completed; the owner has signed off, except for a few unresolved issues.

California Civil Code

3260 (3) The date of completion as defined in Section 3086.

However, release of retentions withheld for any portion of the work of improvement which ultimately will become the property of a public agency, may be conditioned upon the acceptance of the work by the public agency. In the event of a dispute between the owner and the original contractor, the owner may withhold from the final payment an amount not to exceed 150 percent of the disputed amount.

The following is a list of many of the topics for litigation concerning floors and floor coverings while in use through their economic life. These topics are generalizations and require case specific data.

1. Slip & Fall
2. Latent Defect
3. Product Failure
4. Bait & Switch

SLIP, TRIP & FALL

Premises Liability encompasses many issues. As seen above Asbestos was the king of floors and now a pariah. Thanks to the Americans With Disabilities Act, the minimum Static Coefficient of Friction went from .5 to .6. The Clean Air Act changed the entire construction of floor covering products. Materials longevity has been reduced, and sensitivity to environmental conditions has increased.

Consider liability for negligence in the manner in which a floor is managed. Could it be looked at as a cause or defect? This subject must be kept in the realm of a public space. It is incumbent upon a manager of a public space to keep it free of dangerous conditions and defect. In the 8th edition of Baji,

3.13

Every person using ordinary care can assume others will perform their duty, and they need not anticipate harm.

As a matter of industry standard, the National Board of Realtors governs the Institute of Real Estate Management. In order to complete the educational requirements to become a Certified Property Manager a person must take classes that include guidelines for proper management practice. These guidelines are specific with respect to deferred maintenance. Under these guidelines it is improper to keep a dangerous condition and all codes are to be complied with. It is considered prudent, that when a hazardous exists, that a warning is inadequate and that a barrier be erected along with a monitor until the conditions is remediated.

The prevailing guidelines for lawful operation of a floor can be found in the American with Disabilities Act (Public Law 101-336). This act has far reaching effects and is greatly misunderstood.

In many circles it is believed that the American with Disabilities Act covers people with disabilities. Other than as it relates to discrimination against disabled people, the ACT covers the physical needs of the disabled and the nation's responsibility to adequately prepare to meet those needs.

The ADA should not be thought of a covering disabled people, but covering facilities where disabled people might require access and use. Title II covers all facilities owned or run by public agencies. Title III covers public facilities operated by private agencies. Title III identifies those facilities it considers as public and is basically all encompassing. In California this is covered in Title 24

part 2 of the California code of Regulation (the Uniform Building Code) as “Occupancy B”.

The specifics of the act come in two forms as prepared by the Access Board. The first form is embodied in the act itself and contains specifications for many items that provide equal public access to all. The Access Board recommends modifications, which are given as Access Guidelines. This is known as the Americans with Disabilities Act Access Guideline (ADAAG). These guidelines are in the appendix to the Law. The Department of Justice (DOJ) and the Department of Transportation (DOT) manage the ADA. These agencies oversee the certification of all State Codes of Regulations, which must meet or exceed the Public Law. California addresses the ADAAG in Title 24 of the State Codes of Regulation.

The ADAAG does not require that all pathways meet the guidelines, it allows for the existence of a reasonable alternative path available to the disabled. Additionally there are matters discussed in the act that are open to Expert Interpretation. As of 1996 all public buildings were to comply with the Public Law, except when to do so would create an undo financial hardship on the owner. The guide gives the example of the small motel owner who’s property does not provide proper access to the second floor, as called for in the Law. The Law requires an elevator, deems that the cost would be prohibitive. Therefore this owner would be granted an exemption.

Static Coefficient of Friction (SCOF) is a quantification of slip resistance. ADAAG requires that all walking and rolling surfaces be slip resistant. In fact the guidelines identify a coefficient of friction of .6 for level areas and .8 for ramps. There are extensive specifications related to ramps in the body of ADA. Also, there is a extensive design specifications for ramps and stairs in a 1976 guide published by the Department of Commerce, all of which extol the dangers of ramps and the need for “Slip Resistance”, as well as what constitutes a ramp.

Although occupational safety standards have stated for 45 years that a safe coefficient of friction of .5 for level surfaces is adequate, this standard is superseded by the ADAAG. Additionally, the term slip resistance based upon expert opinion may exceed ADAAG. The Department of Justice has not recognized any field testing of Coefficient of Friction as being credible.

The part of the ADA that impacts resilient flooring in commercial facilities is that floor surfaces must be firm and "slip resistant." A static coefficient of friction of 0.6 is recommended for level surfaces and 0.8 for wet or dry ramps. There is an opening in the law that can lead to litigation and that is the standard for "Firm", which is not quantifiable. These recommendations were based on a research project sponsored by the United States Architectural Transportation Barriers Compliance Board (ATBCB). The ATBCB published a brochure in September 1990 entitled "Slip Resistant Surfaces Advisory Guidelines." The following quotes are extracted from that brochure.

"A variety of devices are available for measuring slip resistance. In a recent study conducted at The Pennsylvania State University three slip resistance testers -- the NBS-Brungraber Tester, the Horizontal Pull Slipmeter, and the PTI (Pennsylvania Transportation Institute) Drag Sled Tester -- were evaluated."

"Based on the results of this study, the NBS-Brungraber Tester was recommended as the best device currently available for measuring slip resistance."

The discussion of SCOF is now clouded by the claims of many reputable scientists that Dynamic Coefficient of Friction (DCOF) is a more accurate measure of friction than the SCOF. These arguments fall short and the Scientific Community has stated that there are too many variables for proper, consistent field-testing of DCOF and all results are unreliable. All of the safety standards are based on SCOF. However, beware of the arguments on both sides of the protocols. The trap is that all of the ASTM protocols for field-testing require changing the actual site conditions to a measurable ideal condition. Also, the standard is based on the false premise that all shoes react alike, and all people walk alike.

Another issue concerns the floor and the expectation that the floor will support the act of transportation safely. It must be understood that the floor serves many functions other than providing a décor that fits the system. The floor is an information system. The wear patterns in the floor (including concrete) can tell your feet where to move. Arguments can be made that the floor conditions are culpable in whatever the case may be.

The guidelines contained in this document are advisory only and are

intended to supplement requirements of state, local, and federal design standards. They are based on limited testing and cannot necessarily be generalized to the population as a whole."

Federal guidelines for safe level change on a flat walking surface for both a 1/4-inch change and a 1/2-inch change from flat. Also, part of the ANSI standardized building code.

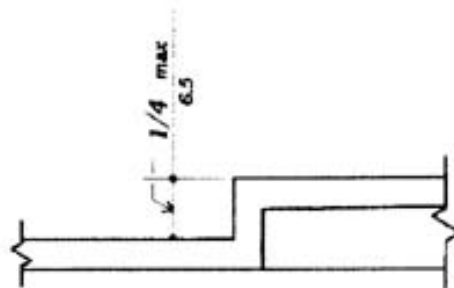


Figure 7(c)
Accessible Route
Changes in level

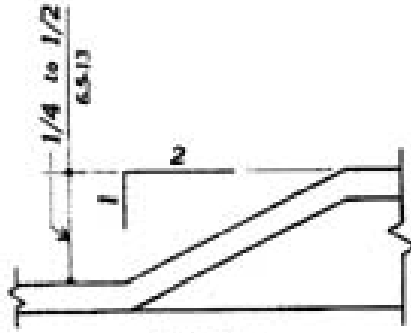


Figure 7(d)
Accessible Route
Changes in level

HANDBOOK OF HUMAN FACTORS & ERGONOMICS
2ND Edition
A Wiley-Interscience Publication 1997

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3.4 Higher level properties & perceptions

8. *Preceptual organization is particularly important for the design of any visual display. “if a warning signal is grouped perceptually with other displays then its message may be lost. The concept of “Gestalt” who’s basic idea of this law is that the organizational process will produce the simplest possible organization. “Many sources of information come into play in the perception of distance and spatial relations, and the consensus view is that the perceptual system constructs the three dimensional representation using this information.*

Studies have shown that it is common for people to see when they walk but not look.

Baji 8th edition

3.51

In some instances a person forgets that a danger exists even though they have been warned. This may not be negligence.

As we lose awareness of our surroundings and get caught up in our thoughts, there is an expectation of safety, particularly when doing an activity we perform repeatedly. The design, construction and materials are expected to take into account our dependency on the good faith performance of those that provided the space we travel in.

However;

Baji 8th edition

3.10

Action or inaction of a reasonable person which is prudent or failure to use ordinary care, ordinary care is prudence one uses to avoid injury to themselves, is negligent.

Some of the most common site conditions, seen as usual and customary, can be proven to be hazardous. Real Estate manager routinely implement management protocols that are inherently dangerous. “Walk-off” mats and runners around commercial property can be proven to violate national safety standards. Abrupt changes in level have specific guidelines, yet there is contradictor case law to some of the conditions. It is not enough for the Accident Reconstructionist to recreate the conditions and opine as to cause. He must judge the condition as it relates to safety standards and opine as to fundamental acceptance based on Ergonomic functions.

LATENT DEFECT

The California Court of Appeal, in Scott v. Continental Insurance Company concluded that the definition of a “Latent Defect” is one which the defect is both not readily observable and not discoverable to any but a most searching inspection.

The issue can relate to the design of a sub-floor that is not suitable for the loads it's to carry and there-by damages the floor covering. It can relate to sub-floor preparation suitable for the covering applied. Only a most searching inspection would uncover this as in the case mentioned earlier.

How often have you seen a tile floor with raised lumpy edges? This usually can be seen in floors that are large and flat, such as a supermarket. Is this a defect? Is this ordinary wear and tear? If it is a defect, is it latent?

This particular situation is common in areas with fluctuating water tables, or expansive landscaping or hillsides adjacent to the building. Water will flow through the slab and then percolate to the surface by way of the capillaries in the slab. When it reaches the slab below the tile it emulsifies the material used as a floor patch and moves to the tile seams. Additionally, the disappearance of the

floor patch allows the tile to loosen their support and break under foot and wheel traffic from above.

The conclusion is that this is a latent defect. The fact that water is migrating through the slab is a common occurrence and not reasonably corrected during construction. The fact that the floor patch is moving is the defect. The floor patch materials that succumb to water are gypsum-based materials fortified with a latex-bonding agent. In 1992 this type of material was deemed unsuitable by the floor covering industry for use as a floor patching material, and to be used only on walls. To discover this condition would have required demolition testing which would meet the Court's definition of Latency.

PRODUCT FAILURE

Each floor covering material has a performance warranty. In most cases this warranty is based on the manufacturer's estimate of 50% of the actual performance test in a lab. There is a major difference between a wear warranty and an appearance retention warranty for floor covering.

Several manufacturers have begun to give "Appearance Retention Warranties", but the restrictions may not be reasonable from a practical point of view. It can be argued that what is written can never be achieved in the real world. "Appearance Retention Warranties" are filled with ambiguities and contradictions.

Products may fail. A class of products that have high failure rates are adhesives. The primary reason is installation error. The floor-covering contractor is required, to use the adhesive recommended by the manufacturer. Also, insufficient preparation of the sub-floor as required by the adhesive manufacturer can cause failure, and the presence of moisture vapor.

DISCUSSION

Case preparation is founded on the attorney's knowledge and experience. From this he advises his client as to a strategy he will follow. As the body information increases the historical concepts related floors are changing. Test protocols for moisture vapor and SCOF will have a hard time when new definitions are used. The qualifications of Experts in the field must be more closely defined and scrutinized by the attorney, as well as the judge under the demands of Daubert.

The death of a floor (premature economic or physical failure) can come from the lack of understanding, by the floor's creators, of many ancillary conditions. For example, a common cause for debonding of a wood floor from the sub-floor is a failure of the contractor to follow the published guidelines for a properly leveled sub-floor, primarily because the tolerances are so small that they believe them to be imperceptible, and they are not.

Litigation today is filled with floor related issues. There are many experts using credentials that defy legitimacy. Today, the craft of floor covering, floor safety, and floor contracting has become a science, not a trade. Floor related litigation requires an investigation based on scientific methods, foundational documentation for the expert opinions presented. Case in point, an agglomerated (this a reconstituted stone using fragments and a bonding agent) floor tile warped. Tiles are tested and found on average to be below the specified tolerance. A statistical analysis of the data shows the findings to be the opposite, shifting the liability for the failure away from the tile, and increasing the scope of the investigation to the installation.

SUMMARY

Floors are rarely looked at as a reason for failure. Usually they are part of a group issues and very little attention is paid to them. Slip and Fall cases are the primary place floors are held responsible, considered by many attorneys as the hardest plaintiff's cases to win. What is investigated is, did the accident take place as recalled by the plaintiff, instead of, could the accident have taken place on *that* floor?

It is important for counsel on both sides of the issue to understand floors at the time of discovery and deposition. It is important to know the chain events that relate to a floor as well as the responsibilities of the parties and products within the chain of events.

The floor itself can die, was it murder?

The above was prepared to heighten the reader's awareness of the issues at the time of discovery.