

Construction Defects Existed Throughout History: *The More Things Change the More They Stay the Same.*

By: Arthur House, *EJD, MBA*
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A case is made that, within the earliest written codes of law, The Code of Hammurabi established legal standards for commercial exchanges, such as home construction, and assessed damage fines and retributive punishment as remedies in justice, where construction defects or deficiencies caused harm to others. The Hammurabi code included 282 rules carved onto a massive pillar stone. His laws date back to about 1792 B.C., in the Babylonian Empire. The original pillar stone was discovered in 1901 in the ancient city of Susa, which is in modern-day Iran.

The Hammurabi code of laws was a major compilation of laws gathered from legal experts throughout the kingdom at that time. Hammurabi stated, “The protecting king, am I. A righteous law and pious statute did I teach the land.” These laws instituted a standard of law, comprised of the universal set of laws or statutes governing the diverse peoples Hammurabi conquered. While there is evidence of singular laws being established earlier, there existed no compilation of laws that could be seen as similar to the statutes and common laws governing construction today. The oldest known evidence of a law code are tablets from the ancient city Ebla, in modern-day Syria, dating back to about 2400 B.C., preceding Hammurabi by about 600 years.

In the days of Hammurabi, the laws were understood as an example of the doctrine of “[lex talionis](#)” or the laws of retaliation or retributive justice, whereby a punishment resembles the offense committed in kind and degree. A famous Hammurabi Code: # 196 calls for “If a man put out the eye of another man, his eye shall be put out.” [“An eye for an eye”] Or # 200 “If a man knocks out the teeth of his equal, his teeth shall be knocked out.” [“A tooth for a tooth”] The more prophetic of the Code is that it laid out the penalty for construction defects, deficiencies and negligent performance, and property damages. They are as follows:

- If a builder builds a house for a man and does not make its construction firm, and the house which he has built collapses and causes the death of the owner of the house, that builder shall be put to death, [#229]
- If it causes the death of the son of the owner of the house, they shall put to death a son of that builder, [#230]
- If it causes the death of a slave of the owner of the house, the builder shall give to the owner of the house a slave of equal value, [#231]

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- If it ruin goods, builder shall make compensation for all that has been ruined, and inasmuch as builder did not construct properly this house which he built and it fell, builder shall re-erect the house from his own means, [#232] and
- If a builder build a house for someone, even though he has not yet completed it; if then the walls seem toppling, the builder must make the walls solid from his own means. [#233]

As laws pertaining to construction progressed, building codes were also established and advanced over thousands of years. Today's building codes are meant to protect health, safety and general welfare in the built environment. The same was true in ancient times. In biblical times, the Israelites utilized a classic form of residence called the four room Israelite house. The Israelites utilized its flat roof as a place to sleep and stay cool at night. Obviously, if the Israelites built a flat roof with no wall around it then they would create a fall hazard where someone could easily fall and be injured. In what may be the earliest evidence of a building code, the Bible addressed this issue directly. Deuteronomy 22:8 states: "When you build a new house, make a parapet around your roof so that [you may not bring the guilt of bloodshed on your house if someone falls from the roof.](#)"

The above surely does depict the ancient principles or laws of retaliation, in that a punishment inflicted should correspond in degree and kind to the offense of the wrongdoer. However, Hammurabi Codes also included the earliest examples of an accused person being considered *innocent until proven guilty*. That leads us to the process used today to settle disputes such as construction defects and deficiencies, whereby there exists a recognized path toward equity and determination of liability when controversies arise. Controversies arising from construction dispute claims are often resolved in a variety of approaches, including negotiation, mediation, arbitration, or litigation.

Perhaps the most famous structural mishap: The Tower of Pisa

The "Leaning Tower of Pisa" in Pisa, Italy is and remains an architectural, structural design, and construction disaster. Constructed near the Pisa Cathedral, and celebrated artlessly as the Tower of Pisa, it was initially intended to house the bell of the Pisa Cathedral complex. The Tower was constructed upon clay, making the woefully inadequate foundation to settle and render the Tower subsurface to be unstable. The Tower leans about 10 degrees even after engineers and construction teams have tried to right the structure with 600 tonnes of counterweights in an effort to mitigate the settling.

Other Major Construction Design Defects, or Workmanship Defects or Deficiencies

In reviewing several failures, both in design and construction, we look back about 50-years to the saga of the Somewhat memorable today is the U-Mass, Library Tower, in Amherst, Massachusetts, opened to students in 1973. Within months of the building's official opening, fragments of brick were falling from the building's façade. Preliminary site inspections had to determine what exactly was happening, and then what was the cause of the event? And, who assumes the fault and liability? What is the remedy?

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In 1981 a horrific collapse occurred at the Hyatt Regency in Kansas City, Missouri when a suspended walkway, spanning an open area down below the fourth floor, fell and killed 114 people and injured 200 others. The walkways were anchored by 1.5-inch steel rods, but the real issue lay in the change from a single set of hanger rods threaded through the upper walkways to a double-rod system that was anchored to the upper walkways themselves, [adding immense and undue stress](#). The design was incapable of meeting the minimum safety requirements but had gone unnoticed in the building process.

In 1983 a case decided by the Supreme Judicial Court of Maine, settled a controversy involving a general contractor from Keene, NH, for a roof collapse at a Junior High School, during construction for the City of Waterville, Maine. Speculation hovered around whether the contractor's poor workmanship caused the collapse or whether the truss design was faulty. At the appellate court level, the issue was "whether Commercial Union Insurance Company's comprehensive general liability policy provided coverage to its insured Baybutt Construction Corp. and a duty to defend it for its failure to perform a construction contract in a workmanlike manner and for furnishing work and materials of such poor quality that the resulting product, to wit, the roof of the high school building, was not fit for its intended purpose." [Baybutt Construction Corp. v. Commercial Union Insurance Co.](#) 455 A.2d 914 (Me. 1983)

The [Florida International University pedestrian bridge collapse](#) occurred on March 15, 2018, when a 175-foot-long (53 m) section of the FIU-Sweetwater University City Pedestrian Bridge collapsed while under construction. Federal investigators determined the probable cause of the pedestrian bridge collapse was related to engineers' calculation errors, according to a National Transportation Safety Board ("NTSB") report. An engineering peer review failed to detect the load and capacity calculation errors by the engineering firm of record. Investigators also reported the engineering firm failed to identify the significance of the structural cracking observed before the collapse and to obtain an independent peer review of the remedial plan to address observable cracking. The NTSB report said the Florida Department of Transportation should have ceased the bridgework when the structure cracking reached unacceptable levels. NTSB also reported that the parties involved in the construction should have closed Southwest 8th Street to protect public safety. The bridge collapsed killing six people.

Corrosion and faulty concrete are cited as the likely cause of [a bridge collapse in Genoa, Italy](#) on August 19, 2018. Potential contributing factors mentioned by Italian engineering experts include heavy suspicions that corrosion to the bridge's steel cables contributed to the collapse, saying that it decreased the bridge's overall strength by 20%. Also, a several-ton platform was suspended from the underside of the bridge, which could have also caused the bridging stress. Another potential factor was the use of concrete, which often deteriorates quickly, under certain circumstances.

On June 24, 2021, a 12-story beachfront condominium in the Miami suburb [partially collapsed](#). The underlying contributing factor under investigation is the long-term degradation of reinforced

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concrete structural support in the ground-level parking garage under the housing units, due to water penetration and corrosion of the reinforcing steel. In October of 2018, a consultant warned there was evidence of “major structural damage” below the pool deck of the condo building nearly three years before it collapsed. Reports from the engineering firm were issued to the Condominium Management and Board and made available to the Property Manager, himself an engineer, and the Condo Association’s law firm. The [warnings](#) included such language as there was “[abundant cracking](#)” and crumbling in the underground parking garage of the 12-story building, and “[Failure to replace](#) the waterproofing in the near future [will cause](#) the extent of the [concrete deterioration to expand exponentially](#).”

Construction Defects or Deficiencies – Demonstrated Above

Some of the most common and high-cost construction defects that could arise from the aforementioned examples include but are not limited to: 1.) Water intrusion, which is speculated as a contributing cause of the 12-story beachfront condominium collapse; 2.) Corrosion and faulty concrete are cited as the likely cause of a bridge collapse in Genoa, Italy, which could involve lack of proper inspection and maintenance or material deficiencies in design regarding the concrete material specifications; 3.) A structural design failure in the FIU-Sweetwater University City Pedestrian Bridge collapse case could call into question potential negligence on the part of the engineering firm, which may have breached its duties under the [Standard of Care for Design Professionals](#). Negligence recovery would attain under a suit in Torts, which is defined as “[a wrongful act other than a breach of contract](#) for which relief may be obtained in the form of damages. Negligence is the failure to exercise the care that a reasonably prudent person would exercise in similar circumstances. Thus, where a contract exists governing the subject matter of the dispute, claims between the parties must be based on the contract terms, and a tort-based claim between the parties will typically be barred, and 4.) In the Waterville Junior High School roof collapse, the allegations contended that the Contractor was liable for the damages incurred: negligent construction, breach of an implied warranty that the contracted services would be performed in a workmanlike manner, and breach of an implied warranty that the product would be fit for its intended purposes; and 5.) The Florida International University pedestrian bridge collapse points to another design deficiency as well as a failure to perform adequate engineering and construction inspections. This particular project failure is likely to expand into the negligence realm of a suit under Torts rather than contracts.

Definition of Construction Defect

According to The International Risk Management Institute (IRMI), “A deficiency in the design or construction of a building or structure resulting from a failure to design or construct, in a reasonably workmanlike manner, and/or under a buyer’s reasonable expectation.” Also, a construction defect is “the failure of the building or any building component to be erected in a reasonable workmanlike manner or to perform in the manner intended by the manufacturer or reasonably expected by the buyer, which proximately causes damage to the structure.” — *Cited in a CA State Jury Instructions*

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As referenced above, construction defects include improperly designed materials, poor workmanship, and failure to follow construction codes. Any deficiency in a building project can be considered a construction defect, including 1.) Defective architectural or engineering designs – such as errors or omissions by the architect or design team; 2.) Construction Product or Material Insufficiencies – such as lack of preventive maintenance and repair – even in the face of knowledge of the danger; 3.) Construction Process Failures, poor quality workmanship or lack of appropriate or sufficient inspection; and 4.) Construction Means, Methods, Materials, or workmanship inefficiencies or deficiencies.

Defective architectural or engineering designs

There are two types of a design defects:

1.) The Patent Defect, which in the construction industry may cause a problem for the owner if the defect was not detected during project inspections. This lack of detection may have been missed by the project architect or engineer during its monthly job site inspections, and if nothing is noticed, and the design team accepts the project as complete, the owner is at a disadvantage. Patent defects are caveat emptor, meaning it's the owner's (or its agent's) responsibility to find and fix them and the contractor is ordinarily not under any responsibility to disclose the defect. Patent defects are typically obvious to the viewer or inspector. Where the contractor endeavors to hide or otherwise conceal the defect, the owner may have an action under Torts fraud.

2.) The Latent Defect, which may be obscured to a point where a typical and routine inspection may not uncover the problem until a much later date. A latent defect may exist at the time of construction but remains unobserved, sometimes until years later. An example would be structural steel columns and beams that meet the specified designed requirements but are found to be insufficiently designed to carry a load – such as the U-Mass Library Tower. In the examples above, where concrete was a component of the project, the defect gradually becomes worse as the structure is subjected to wear and tear or natural forces, such as corrosion of reinforcement steel in concrete structures.

The three natural environmental elements of concrete failure on the coast of Florida are: 1.) Moisture – significant rain and proximity to water and wind, 2.) Salt – the ingredient in the ocean, seawater, and 3.) Air. While these components will contribute to ongoing corrosive behavior, a faulty or insufficient design of a cathodic protection system may contribute to the latent damage as would a design flaw that allowed for settling water to infiltrate the building envelope due to wall penetration that should not be where it is designed to be.

Construction Product or Material Insufficiencies

Construction material or materials implies any component, system, or supplies utilized for the construction of any building or structure, and either installed or incorporated in the structure by the Contractor or any of its subcontractors. The term also includes any component delivered to the site preassembled from materials, or supplies, such as prefabricated modular homes, panelized building structure components such as Mass Timber or Cross Laminated Timber partitions, floors, or walls. Here, the Contractor is expected to furnish and install or erect, or cause to be installed, any of the

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implied components according to the design specifications. A failure in a product or material component could likely place liability on the design team and or the manufacturer of the product itself.

Construction Process Failures

The construction industry is booming, projects are costing more, the lack of a skilled construction workforce leads to labor shortages and delays, and as a result, the industry is seeing an increase in construction defect claims amounts even if the number of claims remains steady. A major area of concern is poor workmanship, such as the skill and quality expended to make a product or complete a project. When contractors or their employees and subcontractors perform poorly and or they do not adhere to the plans and specifications of the project, the finished product can be compromised. Where construction industry management, professionals, and employees are responsible for adhering to standards of quality, care, and expertise; failures of building structures can arise from workmanship negligence and the lack of quality control processes. Any shortcoming could become the proximate cause for costly repairs, leading to a construction dispute or worse, to litigation. Poor or inadequate workmanship, insufficiencies in equipment and materials, ineffective project management oversight, or slipshod inspections or disciplines can lead to serious disputes.

Construction Means, Methods, and Materials

A sustained inclination towards fast-track construction management and design-build methods demands an ever-increasing level of knowledge of construction means, methods, and materials. As indicated above, the fast-track building method, if made significantly important to a project's success; then it may satisfy one out of three expectations, but at the expense and to the detriment of the other expectations of cost containment and heightened quality. A correspondingly faster schedule may lead to a more indistinct or ambiguous set of specifications or designs. Dispute obstacles are best avoided by certitude in design. Any deficiency of finalized design, necessitating continual design development during construction, will portend a risk of a legal difficulty. Fast-track arrangements impose the strict implementation of best practices of timely design document preparation, quality work product, good communication – all leading to claims avoidance.

Alternative Dispute Resolution (ADR) through Negotiations, Mediation, and Adjudication:

Every owner wants or expects three things from their architectural, engineering, and construction (AEC) team when contemplating and implementing a project. They want the project to be built at 1.) The lowest cost possible, 2.) The quickest schedule possible, and 3.) The highest quality design and construction level attainable. The problem is, the three are not exactly compatible expectations. At least one out of three cannot be achieved without affecting the other two expectations. This dilemma sets a course for compromise where decisions have to be made that can lead to shortcuts being used that create or enhance opportunities for deficiencies and or inadvertent inaccuracy or misunderstandings during construction. The result may produce a dispute or controversy as to a.) What went wrong? b.) Are there damages? c.) Who is liable, and d.) What is the remedy?

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According to [Arcadis of Colorado](#), a leading global Design & Consultancy organization for natural and built assets; “the average value of disputes increased significantly across the globe, while the average length of disputes continued to drop. The consensus was that the overall number of disputes remained relatively the same.” Statistics provided by Arcadis reveal that the number one cause of construction disputes is Owner/contractor/subcontractor failing to understand and/or comply with its contractual obligations. Next are Owner-directed changes, and third-party or force majeure events respectively.

The average global dispute value increased from \$30.7 million in 2019 to \$54.3 million in 2020 for an increase of approximately 43%. At the same time, the duration of global construction dispute resolution dropped from 15-months to 13.4-months with a drop of approximately 11%. In the U.S. during the same time frame, the average value of the dispute increased from \$18.8 million to \$37.9 million per case, or a 50% escalation, and dispute duration dropped from 17.6 months to 14.2 months for a 19.3% drop. With these shifting statistics, the number of construction disputes, both globally and in the U.S. has remained steady.

The most common methods of dispute resolution are respectively 1.) Negotiations, 2.) Mediation, and 3.) Adjudication by arbitration, or litigation. Construction professionals should be familiar with the methods of contract dispute resolution techniques, as presented by [Allan H. Goodman](#), an experienced mediator and arbitrator of construction disputes, a Judge on the U.S. General Services Administration Board of Contract Appeals, and the author of *Basic Skill for the New Mediator and Basic Skills for the New Arbitrator*.

Negotiation is the most informal method of dispute resolution. The only participants in the negotiation process are the parties to the contract and their designated negotiators. The goal of a negotiator is to resolve the dispute on the best terms for the party that he or she represents. When parties attempt to resolve a dispute by negotiation, it is not certain that the process will result in a resolution. The parties and their negotiators must deal face to face with each other in a manner that promotes the parties’ interests, yet preserves the parties’ relationship. In a successful negotiation, the parties and their negotiators resolve the dispute based on the party's interests.

Mediation is often referred to as “assisted negotiation.” In this process, the parties select a neutral person, the mediator, to help them arrive at a settlement of the dispute. A mediator is not a negotiator, as the mediator does not represent the interest of either party. The mediator is a facilitator, who helps the parties explore the strengths and weaknesses of their cases and assists them to frame and transmit settlement offers. The mediator spends the majority of the time meeting privately with each party. The mediator does not have authority to bind the parties, but can only help the parties resolve their dispute by agreement. In a successful mediation, the parties will settle their dispute with the aid of the mediator.

The caveat is, negotiation and mediation are both non-binding processes that will resolve the dispute only if the parties agree to a settlement. A settlement may be based upon compromises,

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promises of performance, and agreements to continue to do business in the future. By using these processes, the parties retain control of the resolution. Also, both negotiation and mediation can provide for a much faster resolution of the dispute, and a much-reduced cost to settle.

Alternatively, adjudication by arbitration or litigation is binding. The parties select a neutral person, the arbitrator, who acts as a private judge. The arbitrator conducts a hearing, similar to a trial in court, and issues a decision, known as an “award,” that binds the parties. Unlike a mediator, the arbitrator cannot meet privately with the parties but must come to a decision based upon his or her understanding of the evidence submitted at the hearing and the law. Though arbitration is similar to litigation in court, it is private, the parties can choose an arbitrator that has particular expertise in the subject matter of the dispute, and the scheduling of the arbitration proceeding is not dependent on delays usually associated with a court’s docket.

Arbitration is the favored method for dispute resolution, such as shortened dispute time, specialized knowledge of the subject matter by the mutually chosen arbiter, the ability to contain the dissemination of the dispute events or exposure to the industry, and the definiteness of the awards. Additionally, because there is no appeal in arbitration awards the dispute resolution process and longevity can be significantly curtailed.

While construction defects have been recognized since Hammurabi, the penalties for defects and deficiencies have turned away from the laws of retaliation or retributive justice, whereby a punishment resembles the offense committed in kind and degree; today the unfortunate underdog in a dispute may not lose an eye or tooth, but any failure can still cost and ‘arm or a leg’ in the figurative sense. Be mindful of any potential for negligence or failure to exercise the care that a reasonably prudent person would exercise in similar circumstances. And, if not, be prepared to seek advice from construction professionals, dispute resolution firms, and construction lawyers as may be needed.

Arthur House, *EJD, MBA* is a Construction and Engineering Management consultant, with over 40-years of construction industry experience. He serves the construction and engineering industry from Florida to Maine from project concept to turn-key; with a project resume that includes an extensive background as a General Contractor or Construction Manager on projects ranging from housing developments, multi-family, apartment complexes, and high-rise restoration, and redevelopment of historic structures; Mr. House has served as a Board Advisor; Board Director and Chair; New Venture Start-ups; International Business Development; Served as a Pro Bono, rehabilitation emissary to Ministers of Economics and Environment to Haiti during the 2010 earthquake. Humanitarian & Disaster Relief; Haiti Reconstruction & Social Housing Development. Mr. House is a long-term Adjunct Faculty in Construction and Engineering programs – recently teaching Construction& Contract law. He may be reached at: <https://www.arthurhouse.com/> - advisor@arthurhouse.com - <https://www.linkedin.com/in/arthur-house-ejd-mba-9220175/> or by telephone at +1 (207) 930-5168

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