NAVIGANT

CONSTRUCTION

FRANK GATLIN
AIA
NCARB

navigant.com

About Navigant

Navigant Consulting, Inc. (NYSE: NCI) is a specialized, global professional services firm that helps clients take control of their future. Navigant's professionals apply deep industry knowledge, substantive technical expertise, and an enterprising approach to help clients build, manage, and/or protect their business interests. With a focus on markets and clients facing transformational change and significant regulatory or legal pressures, the firm primarily serves clients in the healthcare, energy, and financial services industries. Across a range of advisory, consulting, outsourcing, and technology/analytics services, Navigant's practitioners bring sharp insight that pinpoints opportunities and delivers powerful results. More information about Navigant can be found at navigant.com.

IDENTIFYING & MANAGING DESIGN AND CONSTRUCTION DEFECTS

INTRODUCTION

In the construction industry, construction defects and failures can occur during the design and construction phases of a project, or after a structure is substantially complete. However, while a design professional is responsible to produce complete, accurate, and well-coordinated design and construction documents that are substantially free of defects; and a contractor is required to adhere to the design and construction documents, nothing built is ever perfect, nor does the law require a perfect design. Furthermore, all buildings have an expected lifespan and even the structures of the ancient world will erode into a mound of sand, given enough time. The eventual failure of a structure is an expected result rather than a manifestation of a construction defect. The question becomes what is a construction defect; how do defects arise; and how can defects be identified and managed?

Construction defects can arise in a multitude of ways. Construction defects can be visible to the eye or concealed deep within the structure. Regardless of the methods and materials used, all structures can fail prior to the end of their useful life and such failure can result in damage to a person and/or to the structure. The premature failure of a component part of a structure that causes damage to a person or property can be considered a construction defect.

Construction defects that directly affect the performance of a structure can be the result of defective design or construction; defects that allow moisture intrusion into the structure; and defects that will render the building structurally unsound. In general, examples of these defects are:

- A design that fails to meet the professional standard of care.
- A design that was not prepared in accordance with the applicable building codes.
- The failure of the contractor to execute the work in accordance with the plans and specifications.
- The failure of the contractor to execute the work in accordance with the acceptable standards of workmanship in the construction industry.
- The improper installation of systems, equipment or materials that are of a lesser quality than required by the plans and specifications.

Construction defects and failures also may result from an owner's poor and misguided decision and/or the design professional's failure to produce complete, accurate and well-coordinated design and construction documents that provide sufficient information for the contactor to construct the building. They can also be caused by a contractor's misinterpretation of the design, poor workmanship, the use of nonconforming materials, and/or the failure to perform the work in accordance with the accepted industry standards.

WHAT IS A CONSTRUCTION DEFECT?

A construction defect is generally defined as a defect or deficiency in the design, the construction, and/or in the materials or systems used on a project that may not be readily observable and results in a building, structure, or component that is not suitable for the purpose intended.

Therefore, the term "construction defect" is broader than just defective construction. The term "construction defect" includes both design and construction defects that result in financial harm to the owner.

DESIGN DEFECTS

A design defect is typically the result of the design professional's failure to produce a complete, accurate and well-coordinated set of design and construction documents. These design defects are categorized as a design error or omission and/or a combination of both.

A design error is defined as a mistake in the design where the design element was either constructed or under construction and required retrofitting and/or replacement of some component to correct the error. Under these circumstances, the entire cost of the change is attributable to the design professional as a result of its design error.

A design omission is defined as scope that was either missed and/or omitted by the design professional in its design and construction documents but was later discovered and added to the scope of work by a change order. A design omission also includes design items that were incorrect, but were corrected after award of the project and before the construction process was materially affected. Typically, it is understood that some premium costs over and above the actual cost of the changed work are paid for the work that was not competitively priced. These additional costs are directly attributable to the design professional as an omission. Typically it has been determined that 15% of the cost of the change order represents the premium costs that are attributable to the design professional as a result of its design omission.

CONSTRUCTION DEFECTS

Basic Categories of Construction Defects

- Site Defects
- Building Envelope Defects
- Structural Defects
- Heating, Ventilating, and Air-Conditioning Defects
- Electrical and Plumbing Defects
- Fire/Life Safety System Defects

Types of Construction Defects

There are two types of construction defects, latent and patent defects. Latent defects are those defects that are concealed and are often not obvious or readily observable upon reasonable inspection. Even with the most comprehensive on-site inspections, sometimes defective construction may go unnoticed. After construction is complete, latent defects are unknown and generally undiscoverable and will only appear after the passage of time.

Examples of latent defects are:

- Soils that were not properly compacted.
- Improperly installed flashing and/or the total lack of flashing within the building envelope assembly.
- Lack of reinforcing in structural concrete footings, walls and/or slabs.
- Lack of brick ties and/or masonry reinforcement in a brick/masonry veneer wall.
- An improperly installed weatherproofing system.
- Improperly installed stucco or Exterior insulation and finish systems ("EIFS") exterior wall system.
- Improperly consolidated concrete.
- Reinforcement not fully embedded in the concrete structure.

Patent defects are those defects that are known or would be readily obvious upon reasonable inspection. Examples of patent defects are:

- Weep holes not installed in brick veneer walls.
- Handrails omitted in stairways.
- Missing control and/or expansion joints.
- Cracking and/or signs of distress in the building envelope.
- Lack of roof drainage and/or roof slope.
- Lack of proper roof/attic ventilation.

An important distinction to understand in the analysis of construction defects is the difference between the "defect" itself and the "manifestation" of the defect, although in general terms, both the defect and the manifestation of the defect must ultimately be corrected. At times these concepts are erroneously considered to be the same and are discussed as if they were synonymous.

In fact, the manifestation of a particular defect is the apparent visible condition of the building, structure, or component that gives the observer notice of the possible existence of, and most likely results from, a defect in construction. For example, a crack in a brick veneer wall may be considered to be a defect, but, in fact, it is only the manifestation of a defect. The actual defect may be the result of the failure of one or more components of the brick veneer wall system, such as improperly installed or missing flashing; improperly installed or missing expansion joints; improperly installed and/or missing reinforcement; lack of or improperly installed vapor barrier; and/or the improper installation of the brick veneer wall itself. Examples of the manifestation of a defect include:

- A total or partial collapse of the structure.
- The inability of the structure to prevent water intrusion.
- Cracking, settling or subsidence of concrete flatwork.
- Cracking, settling, or tilting of walls.
- Doors that are out of plumb and do not fit into the frame.
- Windows that do not operate.
- Foundations that settle, crack, or subside.

The importance of distinguishing between the manifestation of the defect and the defect itself is critical, as the manifestation may provide clues that a latent defect exists and further investigation is warranted and necessary. The manifestation of a defect may be the first indication to the owner of a potential problem. Depending on the length of a warranty and in light of the time limitations imposed by a state's statutes of repose, quick action, notification, and possible litigation may be necessary to protect the owner's rights.

Wear and Tear vs. Construction Defects

Construction defects are by their very nature "time dependent" and not all manifestations of a particular problem are necessarily related to, or a result of, a construction defect. The manifestation and/or evidence of a construction defect must be considered in relation to the time of its occurrence. It is of critical importance to establish the distinction between wear and tear; the results of poor maintenance; and construction defects.

Typically, when the discovery and/or identification of a manifestation of defect occurs, an evaluation of the condition must be performed. The evaluation of the condition and/or problem must be performed in relation to the time it appeared in the life of the building. It must be determined if the condition/problem is beyond the limits of acceptability in relation to the original design, and age of the structure as the breakdown of the building, systems, and components is inevitable and expected.

STANDARD OF CARE – ARCHITECT

An architect has a professional duty and responsibility to meet the standard of care of the architectural profession during the performance of its architectural services.

The 14th edition of *The Architect's Handbook of Professional Practice* ("Handbook") dated 2008, as published by the American Institute of Architects (AIA), defines the standard of care as follows:

> Usually defined as what a reasonably prudent architect, in the same community at the same time, facing the same or similar circumstances would do. It is the measure by which behavior is judged in determining legal duties and rights.

The Handbook also states that a professional who fails to meet the Standard of Care may be held negligent in the performance of its professional duties if injury or damage results because of that failure.

Plans and Specifications

The architect is responsible to prepare drawings and specifications that set forth the requirements for the construction of the building. At a minimum, the drawings and specifications are required to provide the basis for obtaining the contractors bids; provide the form of contract between the owner and the contractor; provide the contract conditions that outline the rights, responsibilities, and duties of the owner and the contractor; establish in both graphic and written form the levels of quality and the standards to be met in construction; and provide all the details necessary to construct the building.

Further, it is the goal of the construction document phase to produce a fully developed and well-coordinated set of documents and specifications that are internally consistent — meaning that the architectural, structural, mechanical, electrical, and plumbing plans, sections, elevations, details, and schedules agree with each other and contain all of the information necessary to construct the project. For example, materials that are shown on

the drawings must be specified. Likewise, the mechanical and electrical systems must fit within the space designed for them. Such coordination of the design is an essential component of work required to produce complete, accurate, and well-coordinated documents.

Building Code Requirements

By definition, building codes are legal requirements established by a local governmental agency to establish the minimum requirements for all types of construction. Building codes have been enacted, in part, to prevent defects in the design and construction of buildings and to establish the parameters within which structures must be built in order to protect the health, safety and welfare of the general public.

The first known building codes were found in the laws of Hammurabi of Mesopotamia, 2285-2242 BCE. The code was a simple performance requirement that stated:

> If a builder has built a house for a man and has not made strong his work, and the house he built has fallen and he caused the death of the owner of the house, that builder shall be put to death.

Typically, modern building codes establish only the minimum requirements for the design and construction of a building, including, but not limited to: general building height and area; the type of construction; fire-resistance ratings for structural members; interior finishes; fire-protection systems; means of egress; exterior walls; roof assemblies; structural design; soils and foundations; concrete, masonry, steel, and wood construction; and mechanical, electrical, and plumbing systems.

It is important to note that regulatory constraints on the design process have increased dramatically and have become a major force that regulates almost every aspect of the design and construction process.

For example, the applicable building code for the State of Connecticut is The State Building Code — Connecticut Supplement, Amended 2009. The 2009 Amendment to the State Building Code adopted the 2003 International Building Code; the 2003 International Plumbing Code; the 2003 International Mechanical Code; and the 2005 NFPA 70 national Electrical Code as amended.

The general intent of the State Building Code is stated in Paragraph 101.3 as follows:

> The purpose of this code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, means of egress facilities, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards attributable to the built environment and to provide safety to fire fighters and emergency responders during emergency operations.

Modern building codes do not provide for penalties as draconian as those proscribed by Hammurabi. Today, rather than facing death, the architect and the contractor are faced with the real possibility of litigation as a result, in part, of their failures to design and construct a building in accordance with the applicable building codes.

STANDARD OF CARE – CONTRACTOR

It is the contractor's duty to perform the work in strict conformance with the contract documents and build a structure in accordance with the design and construction documents.

Typically, AIA Document A201, General Conditions of the Contract for Construction, 2007 Edition, requires the contactor to visit the site and become familiar with the local conditions. The contractor also is required to review the contract documents and field conditions in order to coordinate, review and to facilitate the construction; and perform the work in accordance with industry practices and the acceptable standards of workmanship in the construction industry. Further, the contractor is responsible to supervise the work using its best skill and attention; is solely responsible for and has control over the construction means, methods, techniques, sequences, and procedures; and also is responsible to supervise the work. The contractor also warrants that the work will be free from defects and that the work conforms to the requirements of the contract documents. However, the contractor is not required to ascertain that the contract documents were prepared in accordance with applicable laws, statutes, ordinances, codes, rules, and regulations, or to warrant the adequacy of the design work. However, if the contractor becomes aware of such violations, the contractor is obligated to bring the violations to the attention of the architect.

WHY CONSTRUCTION DEFECTS ARISE

Design defects have become prevalent as a result of the trend to abandon the traditional design approach where the architect would utilize established architectural standards and details for the construction of a building that were similar and consistent, i.e., "tried and true." The introduction of computer-aided design with its dependence on stock details, coupled with the rapidly evolving new building materials and systems, has had a dramatic impact on the design and construction detailing of new buildings and has greatly increased the potential for defective design. The new materials and systems, many of them untested over time, have limited applications and in many cases are not ideally suited for a particular application, building type, and/or geographic location. Architects, in lieu of employing time-tested materials and assemblies, rely on the information, literature, and details supplied by the manufacture for the new materials and/or assemblies without a full understanding of these limitations and the proper application of the new materials and systems. The vast array of new materials and systems has played a critical role in the increase in design defects claims.

Architects also have tended to reduce the level of details they provide in the design and construction documents in a conscious and misguided effort to leave the construction detailing to the imagination and creativity of the contractor. This lack of adequate detailing may also be due to the lack of experience and understanding by the architect of the basics of a particular assembly and/or material.

The incidence of construction defects has increased due to a fundamental change in the role of the contractor. The "master builder" has become the master broker, whose goal of low initial cost and higher profits has overridden the goal of providing a defect-free product. Speed and profit have become the contractor's primary considerations and goals.

Construction contracts have evolved from being the written agreement that facilitated the construction process to becoming the centerpiece of the construction process. The emphasis in the contract has shifted from the contractor ensuring quality construction to protecting oneself through indemnity and insurance clauses. The contractor now engages in "bid shopping" in order to buy out a project with little or no concern about the proper coordination and sequencing of the work.

Further, the lack of quality assurance and quality control on the part of the contractor, coupled with the overall lack of coordination of the work has resulted in scheduling and sequencing problems. The lack of site supervision by the contractor and the lack of adequate inspection of the work by both the architect and the contractor have allowed design and construction defects to go un-noticed.

PREVENTION OF DEFECTS

It is evident that all of the parties involved in a design and construction project want to minimize and prevent the incidence of design errors or omissions and/or defective construction. Prevention of design and construction defects can be accomplished by the implementation of one or all of the following.

Design Phase

Production Management

During the design phase of a project it is important for the architect to implement procedures that will subject the design to extensive review and analysis before it is released for construction. This process must involve all of the design team members and sub consultants in order to provide a complete assessment of the design components with the goal of minimizing the risk of design defects.

One of the most important strategies to implement during the design phase is for the architect to commit to a program of quality management during the both the design and construction document production phase of the project. Proper management of the construction document production phase will ensure the overall quality, accuracy, and completeness of the construction documents.

Design changes and revisions to the documents are inevitable and the preparation of a complete and well-coordinated set of design development documents and specifications, approved by the owner, is critical and will provide a sound foundation for the preparation of a complete, accurate, and well-coordinated set of construction documents and specifications. Proper management of the preparation of the construction documents will ensure that the technical references, material and systems details, and building code requirements included in the construction documents are correct and up-to-date.

The coordination of the construction documents and specifications is always a critical step necessary to ensure the quality and completeness of the construction documents and specifications. Further, the importance of implementing an ongoing process by which the construction documents are reviewed and checked cannot be overemphasized. At the very least, the construction documents and specifications must be comprehensively checked and reviewed at one or more production milestones before completion of the construction document production phase.

Peer Review

Performing a detailed peer review of the design and construction documents will serve to provide another level of review to assist in the development of complete, accurate, and well-coordinated design and construction documents that are internally consistent and contain all of the information necessary for the contractor to construct a building without design defects. The peer review will be an aid in identifying design deficiencies, particularly in cases where a new and/innovative material and/or system has been incorporated into the design and construction documents. The peer review also will provide the owner and the architect with the benefit of different design perspectives and experience. It will provide "another set of eyes" to help improve the overall quality of the design and construction documents.

Owner Involvement

Involving the owner in a formal and structured design review process will serve to enhance the final design process, particularly in terms of the layouts, maintenance concerns, circulation patterns, and material and systems selection and desired performance. The inevitable design changes and coordination that will occur throughout the design phase will be more effectively accomplished prior to the start of the construction documents phase and will potentially limit the effect of changes on the design and construction documents.

Design Schedule

It is critical that the owner allow the architect sufficient time to completely develop the design. An accelerated and/or shortened design phase will most likely result in design defects due to insufficient time to perform adequate coordination, review, and checking of the design and construction documents to ensure that they are complete, accurate, and well-coordinated. Typically, reduced time equals increased potential for design deficiencies.

In some cases the owner will elect to adopt a program of sequential design package releases, or "fast-track," for different components of a building in order to compress the overall schedule of a project. This scenario will dramatically increase the potential for defective design and the overall lack of coordination of the design packages.

Design and Construction Coordination

If possible, it is important to ensure that the architect and contractor collaborate in order to address design and construction issues related to a particular design component or system in order to minimize the potential for design and construction defects. The project delivery systems discussed above will rely heavily on early collaboration and coordination during the initial stages of the project. It is essential that the architect and contractor establish and maintain open lines of communication throughout the project.

Construction Manager

Engaging a construction manager to perform a "constructability review" of the design and construction documents during the design phase of the project will help to minimize the potential of design defects. It will also help to verify that the construction details supplied by the manufacturers of various systems and components have been coordinated with the architect's construction details. The constructability review could also identify the completeness and accuracy of the information depicted on the documents; dimensional inconsistencies and/or "busts;" lack of coordination between the design disciplines; and an overall lack of coordination between the drawings and specifications.

Value Engineering

While the value engineering ("VE") process can offer potential savings to the owner, it is important to be very cautious when applying those changes to the design and construction documents. The VE changes will have the potential to result in significant design changes that the architect must incorporate into the design and construction documents and also coordinate the revisions with the other design disciplines. The proposed VE changes could cause a ripple effect through the design and have the potential to cost more to implement than the savings derived. Therefore, it is of critical importance to study all of the implications associated with the proposed VE suggestions in order to determine that the opportunity to save a sum of money does not result in a design deficiency.

Construction Phase

Quality Management

The implementation, by the contractor, of a comprehensive quality assurance ("QA") and quality control ("QC") program is critical throughout the construction phase of the project. Although it is the main goal of a contractor to complete the work quickly and efficiently, and receive prompt payment, it is the owner's goal to have a defect-free building. However the QA/QC programs are implemented, their application to the project will serve to minimize the potential of defective work that will ultimately be rejected. The QA/QC programs will provide opportunity to repair non-conforming or defective work prior to the completion of the project, which will protect both the contractor and owner from future litigation.

New Building Technology

The introduction of new materials and systems in the construction industry has resulted in the installation of such by contractors who lacked the required experience. The potential for construction defects is dramatically increased when work is performed by contractors with such limited experience. One of the prime examples of the defective installation of a new construction system occurred when EIFS was introduced. Initially, the use of this system resulted in numerous instances of defective design, as a result of the inexperience of the architects in the proper application of the construction details. The installation of the EIFS by inexperienced contractors also resulted in numerous instances of defective construction.

When installing new materials and/or systems, the contractor should utilize the following control measures in order to ensure that its work is installed without defects.

- Require that the manufacturers' representatives are on-site to observe the initial installation of the new materials and/or systems in order to verify and document that the contractor's work is correct.
- Conduct in-depth inspections of the work by both the architect and the contractor.
- Use experience and trained workers.
- Use the same crew throughout the project.
- Require pre-certification and/or training of the workers by the manufacturer prior to the commencement of the project.
- Limit overtime and shift work where possible.

In conclusion, the major challenge for the architect, the contractor, and the owner to avoid design and construction defects is to eliminate the possibility of human error from the design and construction process. Proper planning and coordination of the design and construction phases of the project will help to mitigate the risk of design defects and defective construction. The tools to accomplish these goals are simple: 1) institute policies and procedures aimed at reducing the potential for defects during the design and construction phases, (2) exercise care during the VE process, 3) take a prudent approach to the design and installation of untested materials and/or systems, and 4) be prompt and prudent in response when a potential design and/or construction defect is identified.

HOW TO RESOLVE POSSIBLE CONSTRUCTION DEFECTS

There is a six-step process for managing construction defects. Those six steps are as follows:

- Awareness
- Investigation
- Discovery
- Evaluation
- Treatment or remedy
- Financial recovery

This process can be termed as the life cycle of the investigation and resolution of a construction-defect issue.

Awareness

The identification of the manifestation of the defect represents the initial step in the process of awareness. Confirmation and cure is the methodology by which the defect will be properly addressed and remedied.

Initially, the manifestation of the defect is usually the first clue that something is not quite right with the building and is an indication that further investigation is warranted. It is important to understand that any defect in a building is most likely the result of a failure of a specific building system. Failure can be broadly defined as the breakdown in the operation, function, quality, or appearance of a structure, system, component, or material. Furthermore, it is important to understand that a failure is not synonymous with a defect. A defect causes something to become unsuitable for the purpose it was intended. A defect

is often a condition, quality, characteristic, or component that caused the failure. Failure is the term that is applied to the "inner mechanism" of the defect, that is the process by which the defect becomes manifest. This is called the failure mechanism and determining the failure mechanism is an essential element in the understanding of how a construction defect manifests itself.

It is critical to understand the relationship between the defect and the failure mechanism when you become aware of the possibility of the existence of the construction defect.

Investigation

After you have become aware of the construction defect, a preliminary investigation of the building should be performed. This investigation would involve a detailed walkthrough inspection of the building for the purpose of observing the manifestation(s) of the defect(s). This preliminary investigation is performed without destructive demolition and is performed in order to identify any condition(s) that may indicate the presence of defect(s). This inspection should result in recommendations concerning the ramifications of the observed problems and any recommended actions the owner might take to remedy the potential defect.

During this investigation, it is important to distinguish between defects of academic value and defects of practical value. Cracks in the concrete pavement, or small shrinkage cracks in the structure, which are within allowable structural tolerances and do not result in damage, can be categorized as defects of academic value. Defects of practical value would be those conditions that, if not repaired, would directly result in major damage to the structure.

This preliminary investigation is not an exhaustive or comprehensive investigation and does not involve destructive or invasive testing. The primary function of the preliminary investigation is to provide as much information as possible to the owner without incurring a great expense so that an informed decision can be made about what further action is required and/or recommended.

Discovery

After the preliminary investigation is performed, and additional discovery is recommended, identifying the parties responsible for both design and construction of the building and when the building was constructed is essential. An older structure may have been completed beyond the statute of repose, so that recovery from the architect and/or constractor may be barred. Likewise, in a new project, a determination should be made whether the failed item or component is covered by a warranty issued by the contractor, subcontractor, or supplier. Further investigation regarding the owner's insurance coverage also is recommended. The necessary design documents and relevant contracts should be identified and preserved for future use. In addition, necessary parties should be identified and notified so they can participate in the remaining steps of evaluation, treatment and remedy, and possible financial recovery.

Evaluation

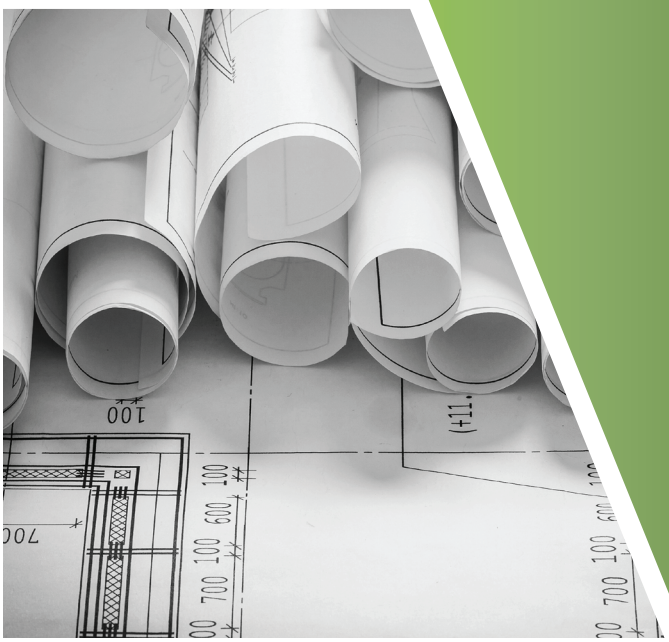
The individual who performed the preliminary investigation is not only required to observe, identify, and assess the conditions at the building, but also is required to inform the owner of the implications of the conditions observed and determine if they are of academic or practical value, and whether the conditions observed are of a progressive nature and will only get worse over time. If it is determined that defects of a practical value are present in the building, a more in-depth investigation and report should be completed. If the contractor and/or architect are still available, it is advisable to invite them to participate in the process so they are afforded the opportunity to be part of the solution.

The evaluation should include at least some destructive and/or invasive testing to confirm the existence of the conditions identified in the preliminary investigation. The main goal is to gather enough additional data and information to confirm the observations of the preliminary investigation and to observe any resultant damage. This investigation should include a review of the original contract documents related to the specific problem in question. The construction details should be compared to the actual as-built conditions in order to isolate the cause of the defect and possibly suggest a simple repair. This investigation should also provide additional findings directly related to the problems and conditions in question, the possible consequences of the as-built conditions, and the cost of correcting the defects. Based on this information, the owner should be equipped to make an informed decision whether to allow the condition to remain unchanged; perform minor repairs; correct the problem; and/or to seek compensation for damages from another party through the preparation of a claim. Any defect that might compromise health, safety, and welfare of the public must be dealt with immediately.

Treatment and Remedy

The primary objective when confronted with construction defects is to rectify the problem while expending the least amount of money. An important goal is to prevent additional damage. Some type of repair, whether temporary or permanent, should be initiated to ensure that any potential damages are kept to a minimum. If the defect poses a possible safety hazard to building occupants or the public, this step must be pursued with great urgency. The owner should contract the services of a design professional to develop a design for both the short-term and/or long-term repairs. A simple, rational, and direct approach of repairing the defect is the wise and prudent solution.

In some cases, the "remove and replace" approach may not be the most cost-effective solution. It will be important to consider a creative approach to the possible remedy of the defect. It is also important to realize that not all construction defects are repairable.



Financial Recovery

If the owner decides to initiate a claim to recover its damages, the first place to look should be its own insurance coverage. Most insurance policies only cover the cost to repair damages that are the direct result of the defect but do not cover the cost to repair the defect itself. If coverage exists and payment is made, the carrier then has the right to subrogate against the responsible party for the cost to repair the damages caused by the defect.

If there is no insurance coverage, the owner should make a business-based decision whether to proceed against the responsible parties. This decision should only be made after assembling complete information related to the costs of the potential repairs vs. the cost of litigation. There are two major points for the owner to consider. First, how much money will the owner be required to expend to fund the cost of the claim, where will that money come from, and what will be the likelihood of success? Secondly, it is critical to understand which costs are not recoverable by law, such as attorney's and possibly consultant's fees, and will have to be funded by the owner. These costs will reduce the net settlement or recovery costs to an amount that could render the claim process unwise. A careful assessment must be made in order to arrive at a course of action that is most appropriate and an advantageous approach to pursuing a claim.

In conclusion, it is important to remember that design documents are not perfect and that construction is not performed perfectly. Buildings have a finite useful life and wear and tear are inevitable. It is essential that a systematic and organized approach be utilized in order to successfully identify and manage suspected construction defects.