

W. Ronald Woods

| Cameron K. Andres

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Principles and Practices of Commercial Construction

TENTH EDITION



Basic Imperial Units and Approximate Equivalents in Metric Units

Length

1 inch = 25.4 millimeters
1 foot = 30 centimeters
1 yard = 0.914 meters
1 mile = 1.6 kilometers

Area

1 square inch = 6.452 square centimeters
1 square foot = 0.093 square meters
1 square yard = 0.836 square meters
1 acre = 4046.9 square meters
1 square mile = 2.59 square kilometers

Volume

1 cubic inch = 16.387 cubic centimeters
1 cubic foot = 0.0283 cubic meters
1 cubic yard = 0.765 cubic meters

Mass

1 ounce = 28.35 grams
1 pound = 0.4536 kilograms
1 ton = 2000 pounds = 907 kilograms

Force

1 pound-force = 4.448 newtons
1 kip = 4448.222 newtons

Force per Unit Length

1 pound-force per foot = 0.0146 kilonewtons per meter

Force per Unit Area

1 pound per square inch = 6895 pascals = 6.9 kilopascals
1 pound per square inch = 6895 newtons per square meter
1 pound per square foot = 4.882 newtons per square meter

Density (mass per unit volume)

1 pound per cubic foot = 16.018 kilograms per cubic meter
1 pound per cubic yard = 0.593 kilograms per cubic meter

Temperature

1 degree Fahrenheit = $1.8 \times (1 \text{ degree Celsius}) + 32$
1 degree Kelvin = $-457.9 \text{ degrees Fahrenheit}$

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To the men and women in the construction industry

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Project teams made up of designers, engineers, project managers, fabricators, contractors, and tradespeople are being asked to be more adaptive, flexible, and visionary in their roles as they deal with new realities of buildings. The construction industry is being challenged by an increased global demand for metals, in particular, copper, nickel, and steel; higher energy costs as demand continues to rise; and the impacts of existing and future climate changes. Climate change alone will dictate new approaches to building design and construction.

These new realities have begun to inform new concepts such as sustainable building policies that are environmentally responsible. Building codes and practice standards will continue to change as project teams learn to adapt to changing conditions such as higher snow and wind loads, rising temperatures, and rising sea levels. As storms become more frequent and severe, project teams will be required to design and implement robust solutions to meet these new challenges. As each new project generates new data, new design strategies and new building techniques become part of the lexicon and are passed forward to be considered in the approach taken in the next project.

Tremendous opportunities exist within the building discipline from research to actualization of the structure in its environment. From concept to operation, new design policies will guide and encourage self-sufficiency in energy, water, and waste systems. Buildings constructed simply to code will become a thing of the past as the project team aims to achieve goals that result in greater levels of environmental responsibility. The first eco-cities designed to achieve zero greenhouse gas emissions are in the planning stages.

Many jurisdictions have adopted the LEED® (Leadership in Energy and Environmental Design) green building certification programs as a regulatory framework. Introduced by the U.S. Green Building Council in the early 1990s, LEED provides a pragmatic blueprint that defines “green building.” As a strategic tool, LEED helps the project team set targets to achieve green project goals that (1) exhibit good stewardship of the environment; (2) provide healthful, comfortable spaces; (3) utilize human and natural resources prudently; and (4) perform efficiently and effectively over the lifespan of the building. To encourage innovative solutions and an integrated approach to design, LEED awards points in five environmental categories and rates projects on their sustainability.

Finding qualified people and expertise for a project remains the construction industry’s greatest challenge. Without skilled designers and practitioners, quality suffers. It is essential that all members of the construction team have a solid working knowledge of time-honored building practices. It is imperative that students entering the construction field as designers, project managers, and construction supervisors have an understanding of the complete construction process; the ability to read and interpret complex drawings and details; and a strong understanding of common industry terms, definitions, and measurements.

The tenth edition of *Principles and Practices of Commercial Construction* continues to provide the reader with a complete overview of traditional building concepts and practices. From site preparation to building layout to exterior finishing, this edition describes and illustrates the various stages of the building process. Each chapter deals with a specific phase in the construction process; related principles, materials, and procedures are illustrated by diagrams and photographs. Basic structural framing materials such as wood, steel, and concrete are discussed in detail to illustrate their requirements, strengths, and limitations.

WHAT’S NEW IN THIS EDITION

- Chapter 1 has been expanded to incorporate the review of the contracts that were introduced in the ninth edition. The successful contractor must understand the provisions of construction contracts and have the ability to convey similar provisions in contracts with subcontractors. Further, the contractor must understand the implications that contract terms and conditions impose on his or her personal, legal, and ethical responsibilities.
- Chapter 2 combines some of the content in the eighth edition’s Chapter 1 and Chapter 2. This newly revised chapter illustrates some of the methods used in the testing and evaluation of soils on the building site and focuses on site evaluation and layout. The expanded section on using and understanding moisture–density relationships positions the contractor to accomplish more efficient site preparation and compaction.
- Chapter 3 incorporates Chapter 4 of the eighth edition providing for continuing site preparation including pavements. The pavement information has been expanded to include the basics of pavement design, with the intent to provide an overview of the design principles and their effect on the construction process, but without attempting to make the reader a pavement designer.
- Chapter 9 is the former Chapter 13.
- Chapter 10 is the former Chapter 9, reordered for better flow of the content.
- Chapter 11 is the former Chapter 10, reordered for better flow of the content.
- Chapter 12 is the former Chapter 11, reordered for better flow of the content.
- Chapter 13 is the former Chapter 14, reordered for better flow of the content.
- Chapter 14 is the former Chapter 15, reordered for better flow of the content.
- Chapter 15 has been re-titled and is the former Chapter 12, reordered and revised for better flow of the content.

- Chapters 10 through 14 have been renumbered to accommodate moving Chapters 12 and 13 to provide a flow consistent with the construction process. The remaining chapters have been edited to incorporate new accepted practices or building code influences. Further, there is continued emphasis to introduce the reader to the concept of sustainable building, also known as “green building.”
- Some illustrations have been updated throughout the text to reflect changes in construction equipment and to illustrate current construction practices. Questions at the end review the highlights of each chapter.

It is a continued wish that students involved in all disciplines related to the construction process will find this text beneficial.

ONLINE INSTRUCTOR’S MANUAL

To access supplementary materials online, instructors need to request an instructor access code. Go to **www.pearson-highered.com/irc** to register for an instructor access code. Within 48 hours of registering, you will receive a confirmation e-mail including an instructor access code. Once you have received your code, locate your text in the online catalog and click on the Instructor Resources button on the left side of the catalog product page. Select a supplement, and a login page will appear. Once you have logged in, you can access instructor material for all Pearson textbooks. If you have any difficulties accessing the site or downloading a supplement, please contact Customer Service at **<http://support.pearson.com/getsupport>**.

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The construction industry is a unique collection of planners, design professionals, manufacturing firms, and tradespeople. The success of the industry is a testimonial of the combined expertise of these individuals and firms. *Principles and Practices of Commercial Construction* is only made possible by the contributions, direct or indirect, of every segment of the industry. Organizations such as the Portland Cement Association, the American Concrete Institute, and the Canadian Institute of Steel Construction were instrumental in providing current and relevant information.

As with any good construction project, this text was started with an excellent foundation. I wish to especially acknowledge the contributions of the late Cameron Andres and the late Ronald Smith for constructing the foundation of this text from which they have allowed me to build. My sincere gratitude to all the people at Pearson for their expertise and unwavering effort over the years in the publishing of *Principles and Practices of Commercial Construction* and a continuing thank you to the project management team and editors at Pearson, who kept the whole process running smoothly during the production of this edition. I would also like to thank the reviewers, Daniel Castro-Lacouture from the Georgia Institute of Technology; William Dean from The State University of New York, College of Technology at Alfred; and Jeff Guh from the University of Southern California for their review and comments that made the tenth edition improved.

W. Ronald Woods, P.E.

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THE PRACTICE OF COMMERCIAL CONSTRUCTION

In 2016, the estimated value of construction put in place in the United States was over 1.1 trillion dollars. Nonresidential construction, the segment of construction that can globally be considered to encompass all of commercial construction, accounts for over 60% of the total construction market in the United States. It is the largest single fraction of construction activity. Its companion construction markets—residential, heavy civil, and industrial—are clearly important in their own right; however, they are different in many ways from the commercial construction business.

Commercial construction is characterized by the general nature of the facility's use, such as commercial offices, restaurants, hospitals, schools, grocery stores, and shopping malls. The building's size may range from a few thousand square feet to over a million square feet of usable area, and can range from one story to hundreds of stories for high-rise construction. In short, there are no limits on the range or scope of commercial construction. It is responsive to the needs of the respective clients and the public.

Correspondingly, the contractors who participate in commercial construction activities are usually “captive” to that genre of construction. Most commonly, these contractors practice only commercial construction and do not dabble in other areas of construction. Where licensing of contractors is required, the commercial constructor usually is licensed at the highest level of the authority, allowing him or her to build the range of facilities encountered in commercial construction without the encumbrance of separate or additional licensing.

THE CONSTRUCTION OR “PROJECT DELIVERY” TEAM

Each project begins with an owner who has a specific need for a building or considers a building to be a good investment. The owner may be a private citizen, a group of investors, a large corporation, or an elected governing body. The initiative of the owner precipitates the construction process.

To ensure a viable project, the owner must have two important elements in place: (1) appropriate funds for the funding of the project, and (2) a suitable site. Once these items are in place, the owner selects an architectural firm to be responsible for the design of the construction project.

Once commissioned, the architect is responsible for the design of the building and the production and coordination

of all drawings and specifications—architectural, structural, electrical, and mechanical. In many instances, the structural, electrical, and mechanical drawings are sublet to other firms that specialize in these areas. Once all the drawings have been completed, tenders or bids are requested from general contractors. Usually, the general contractors provide a total price for the complete project; however, if the project is large and complex in nature, it may be broken down into several contracts and done in stages.

The foregoing process may take months or even years; moreover, while approval from the various regulatory bodies is being sought, a detailed investigation of the site for the design requirements of the proposed structure can begin. To ensure proper planning and design of the proposed structure, as much information must be obtained above and below the surface of the proposed building site as is practical. Geotechnical experts—individuals specializing in soil sampling, testing, and evaluation—are retained by the owner or architect to establish the parameters that will be used in the design of the building foundations.

The general contractor depends on various subcontractors to supply specialty items such as piling, reinforcing steel, structural steel, precast concrete sections, roofing, cabinets, doors and windows, and electrical and mechanical equipment. The contract is usually awarded to the lowest bidder; however, the owner can select any contractor for any number of reasons.

THE PROJECT DELIVERY PROCESS

The project delivery process, in its simplest form, is the procedural path of a constructed facility from concept to reality. It involves the conceptual agreement of the architect and owner to develop a general idea of a building into the architect's design of the facility, followed by the contractor's physical transformation of the plan into reality through the constructed product.

Each player on the project delivery team has a specific and important role to play in the completion of a building. The architect and its team of engineers, including civil, structural, mechanical, and electrical disciplines, must collectively achieve a coordinated effort, both conceptually and dimensionally, of the completed design in graphic form (the plans) and its corresponding specifications. When a general contractor is awarded a contract, the project then becomes

the sole responsibility of that contractor. All work that is done must be in accordance with the drawings and specifications as prepared by the architect. If additional costs arise from omissions or errors on the drawings or changes in construction are requested, these are negotiated with the owner's representative as extras to the contract.

THE CONTRACT FOR CONSTRUCTION

In order for the contractor to build a facility, it is first necessary to enter into a contract for the construction. The contract offers protection for the contractor and the owner throughout the remainder of the project delivery process, and in its simplest provision, assuring the contractor of payment for the construction, provided the conditions of the contract are met.

There are numerous ways in which a commercial constructor or contractor may be engaged to construct a facility. Most commonly, this is done under one of several standard contracting mechanisms. The method of contracting on most projects in the United States is done under one of the following documents promulgated by the American Institute of Architects (AIA):

- *A101—Standard Form of Agreement Between Owner and Contractor, where the basis of payment is a Stipulated Sum*
- *A102—Standard Form of Agreement Between Owner and Contractor, where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price*
- *A103—Standard Form of Agreement Between Owner and Contractor, where the basis of payment is the Cost of the Work Plus a Fee without a Guaranteed Maximum Price*

A101 is a “fixed price” contract whereby the contractor tenders a bid to an owner and that bid is accepted based on the fixed price. The bids may be competitively procured or noncompetitive, meaning that there may be one contractor or many contractors bidding to the owner for the project.

A102 and A103 are not fixed price contracts. The total amount of the construction cost will depend on the amount the contractor must pay for materials and labor, plus an amount to cover the contractor's overhead and profit. The contractor may or may not guarantee a maximum amount for the construction under such an agreement. As one might expect, this is certainly a “friendly” contract form for the construction company, but leaves the owner with a potentially open budget for the construction.

Each of these contract forms is done under AIA Document A201—*General Conditions of the Contract for Construction*. The general conditions outline the contractual obligations of the architect, the contractor, and the owner during the course of the construction.

Another prominent, but less common method of contracting for construction is through a similar series of forms promulgated by the Engineers Joint Contract Documents Committee (EJCDC), a joint venture of four major organizations of professional engineers and contractors including the following:

- The American Council of Engineering Companies (ACEC)
- The National Society of Professional Engineers/Professional Engineers in Private Practice (NSPE/PEPP)
- The American Society of Civil Engineers (ASCE)—Construction Institute
- The Associated General Contractors of America (AGC)

As with the AIA documents, the EJCDC documents include the following:

- *Standard Form of Agreement Between Owner & Contractor, Cost-Plus*
- *Suggested Form of Agreement Between Owner & Contractor, Stipulated Price*

These forms of contracts are governed by the EJCDC Document *Standard General Conditions of the Construction Contract*, similarly outlining the contractual obligations of the design professional, the contractor, and the owner.

In 2007, another group of standard contracting documents was introduced. These are called *ConsensusDocs*. *ConsensusDocs* are intended to combine many of the better aspects of the previous two systems, particularly with respect to fairness to the general contractor. While the *ConsensusDocs* authoring group touts itself as being broadly based and including those organizations that would represent the best interests of contractors, engineers, architects, and owners, it is predominantly a group of contractor trade organizations. At this writing, there is only one group of the 20-plus *ConsensusDocs* groups who represent anyone other than contractors and they are not a “mainstream” professional group such as AIA, NSPE, ASCE, or ACEC, thus there seems to be consensus only with respect to the contractor.

As one might expect, since most projects are designed by architects, the most common form of agreement would be the agreements provided under the AIA contract documents umbrella.

After a contract is “awarded,” meaning that the owner and contractor have reached an agreement, the contractor then initiates a series of subcontracts to various specialty contractors who will perform specific parts of the construction under the general guidance and overview of the prime contractor. The prime contractor is commonly called a “general contractor” and the secondary contractors are termed “subcontractors.” The days of having a single contractor perform all the functions necessary for successful completion of a construction project have long passed. The construction process is too complex for a single entity to hire and maintain all the necessary tradesmen to complete the construction.

For a single construction project, there might be a need for several hundred skilled and unskilled tradesmen to complete all the tasks. Most general contractors do not want to maintain such a large staff and have found that the subcontracting process is more conducive to efficient construction and profitability. Further, at least in concept, it allows the specialty subcontractor to foster the training and competence of its staff in a narrow area of specialty rather than having a cadre of generalists who would often have to learn new tasks from job to job.

It is important that contractors pay close attention to the provisions of contracts. Standard contract forms, such as the AIA forms, should be reviewed by an attorney to determine if their provisions comport with the standard practices of the contractor. If not, the provisions should be negotiated to achieve parity and concurrence. Quite often, the contractor is mostly concerned with the payment terms, and the other terms and conditions of the contract will receive less scrutiny than would be appropriate. Each term and condition of a contract should be reviewed for its applicability to the project, its applicability to the parties of the contract, its adherence to applicable and enforceable legal principles, its liability implication, and the relative protection of risk that it provides to the contractor.

A provision of a contract that often causes consternation on the part of the contractor is that of **bonding**. There are generally three types of bonds that are applicable to construction projects. The first and more important is the **performance bond**. Perhaps second in importance is the **payment bond**. Finally, the third bond type is a **bid bond**. A bond is a guarantee of completing a specific promise from the contractor to the owner. In the case of a **performance bond**, the promise is to perform the construction in accordance with the contract, which includes the plans, specifications, and building codes. For a **payment bond**, the contractor promises to pay its subcontractors so that the owner will not incur liability to those subcontractors for the work they have performed but were not compensated by the contractor. The subcontractor's financial position is often protected by having statutory lien rights on the project for nonpayment. If the owner is not protected by a payment bond, the owner might end up paying twice for the same work, if he or she pays the contractor and the contractor does not pay the subcontractor for the work performed. The **bid bond** protects the owner by guaranteeing compensation for additional expenses incurred by having to rebid a project in the event that the first successful bidder does not enter into a contract with the owner.

A performance bond is a surety device, or guarantee, that is issued by an insurance company (called a **surety**), to protect the owner from a contractor's failure to perform to the terms of the contract. The bond guarantees to the owner that the contract will be completed in its specific performance requirements. If the contractor fails to perform in accordance with the contract, the contractor and surety become jointly obligated to the owner to complete the contract and all of its terms. Often, when a performance bond claim is made, the

surety will take over and complete the project or provide a financial settlement to the owner so that the project may be completed by a separate contractor. One problem with bonds is that a contractor will likely have a limited bonding capacity, depending on past performance and current and projected financial resources and stability. As an example, suppose a contractor is the successful bidder on a 10 million dollar project, requiring a full performance bond, and the contractor's bonding capacity is determined by the surety to be 12 million dollars. The contractor would then be prevented from bidding on another "bonded" project that exceeds 2 million dollars in contract amount because of a lack of sufficient bonding capacity. Bonding requirements limit the ability of a contractor to bid and acquire multiple projects, particularly when the contractor is in a growth mode and becomes successful at bidding and acquiring projects. Bonding capacity often lags behind the success of a contractor.

CONTRACT MECHANISMS AND THEIR REVIEW

In order to understand the implication of your involvement in a contract you must first know what a contract entails. By its legal definition, a contract is

an agreement with specific terms between two or more persons or entities in which there is a promise to do something in return for a valuable benefit known as consideration.

This is a contract in its simplest, bare form. It is usually a bit more complicated than this, as a variety of conditions are interjected into the contract in an effort to "protect" one side or the other. The law of contracts is at the heart of most business dealings and it can, and usually does, involve numerous variations on circumstances and complexities.

The existence of a contract requires the following factual elements:

- An offer—This is usually in the form of our proposal to provide services, but may also come in the form of a phone call response ("Sure, Bob. We'll help you with this project.") as an implied offer.
- An acceptance of that offer which results in a meeting of the minds—Preferably by signature of the client on your contract form, but again, might come in some other form (oral agreement).
- A promise to perform—Usually this is contained in a statement of the scope of services and other proposal statements, but as with other implied or oral statements can be something of significantly less apparent importance such as a casual conversation.
- A valuable consideration—This means that you expect to get something in return for your services (preferably cash!), but it can be in the form of another promise.
- A time or event when performance must be made (meet commitments)—"We will complete our services for you in three weeks from the date of this agreement."

- Terms and conditions for performance, including fulfilling promises—Preferably, these would be your standard terms and conditions.
- Performance, if the contract is “unilateral.”—You have to do what you say you will do or you will be in breach of the contract. (A unilateral contract is one in which there is a promise to pay or give other consideration in return for actual performance. A bilateral contract is one in which a promise is exchanged for a promise.)

In the business of contracting, you have to be careful that you do not create a contract by your actions, modify a contract by your actions, or breach a contract by your actions. Each of these is easy to do. Contracts can be either written or oral, but oral contracts are more difficult to prove from either side, once a dispute is evident. There are also different statutes of limitation on the time to sue for oral and written contracts. It is important to know the requirements in your business locale. If the business operates in different locales, it is important to note the requirements in each of the locales, or force by contract language the jurisdiction under which contract interpretation is to be done.

In some cases a contract may consist of several documents, such as a series of letters, orders, offers, and counteroffers. The variations are almost limitless. It would be ideal to see contracts consist of a simple, clear, and concise proposal, with the client accepting the proposal by signature of the construction firm’s contract. This offers the contractor the greatest opportunity to manage risk. Notice that it only serves to help better manage the risk; it does not negate the risk.

In the order of preference, the following are typical mechanisms of contracting for construction activities:

1. Your firm’s proposal and signed acceptance with your terms and conditions intact.
2. Standard forms of agreement such as the AIA Contract Documents or the EJCDC Standard Documents or similar professional association standard agreements.
3. Client-generated contract, appropriately reviewed and modified by you or your attorney.
4. Client-generated contract, signed, but documented as egregious by you.
5. Task order against a reviewed, agreed master agreement.
6. Purchase order.
7. No contract.

Some would put forth that having no contract is better than having a bad contract. There is some merit to this consideration; however, its testing is costly as it would ultimately have to be litigated with the risk of principal loss, damages, and expenses. A contract with bad terms can sometimes be moderated through negotiation or mediation, thus lessening its impact.

It is important to have a written contract, and preferably one with such clarity and finality that it falls within the “four

corners of the document” interpretation concept. This means that if the language of the contract is unambiguous and all of its factual elements are in place, then only the document itself is necessary for interpretation and those interpreting such a document do not have to venture outside the document for extrinsic evidence as to its intent or the intent of the parties when the agreement was reached. Keep in mind that the intent in all your contracts is to avoid an invitation to the litigation party, even if you think you can win.

For basic construction, there are at least six essential items to consider with regard to contractual liability. These items are inextricable to the scope of services, yet the scope is irrelevant to their meaning.

The items are the following:

1. Standard of care
2. Limitation of liability (and mutual or consequential damages)
3. Indemnification
4. Site operations
5. Site safety
6. Dispute resolution

It should also be noted that changes could occur to a contract through seemingly innocent means. A statement on the jobsite, a letter of “clarification,” third-party reliance statements (secondary client agreement), purchase orders, or lien releases are all forms of potential change to an established contract. The change might be incidental or overt, innocuous or harmful. You, in your review capacity for your contracts, are the first line of defense.

Standard of Care

While the concept of “Standard of Care” is often applied only to those in a “professional” capacity such as the design professionals on a project, there has been a trend toward applying a similar standard to construction contractor professionals. As a construction contractor, you have a duty to provide the contracted services in a manner consistent with the “standard of care” of your competitors or others of similar practice. A good working definition of the standard of care of a technical professional is

that level of service ordinarily provided by other competent members of the construction profession, providing similar services in the same locale and under the same or similar circumstances.

These services need not be perfect, and that expectation should never be conveyed to a client or potential client. For this reason try to remove references to the firm’s services as being “the best” or implying that the firm is “the best” at what it does or that the services are “error free.” Contractors are required to build in accordance with plans, specifications, industry standards, and building codes. These are minimum requirements; however, the type and character of construction might dictate a higher standard. While some variation

in construction is expected due to variations in techniques, means and methods, and materials, defective construction is neither expected nor tolerated. However, when a contractor is hired for a service, the client purchases service, not insurance, so they are not justified in expecting perfection or infallibility, only reasonable care and competence. The concept of the standard of care may be considered as the line between negligent and nonnegligent error.

Further, it is important to review your statements regarding standard of care from time to time, as there might be changes in the construction industry, or more likely, changes in your practice that should be reflected in the Standard of Care clause of your contract terms and conditions. One example of this is a construction firm that starts its business in a specific area of construction, but diversifies its practice with time. If the original Standard of Care clause is too specific to the practice area, it does not sufficiently cover the diversified areas of practice.

Limitation of Liability (to Include Mutual or Consequential Damages)

You should always attempt to limit your liability through quality work practices, but you must also limit your potential contractual liability. This can extend to damages arising out of negligence, breach of contract, or any other legal cause of action. A limitation of liability clause in your contracts allows predictability with respect to your potential liability. If you are not permitted to contractually allocate and quantify these risks, the fee for your services should increase due to the uncertainty of exposure from future claims. While this is difficult to do in a strict bid situation, it should be considered. To leave the limitation of liability open ended (“going silent” on the issue) allows direct access to your assets, your company’s, or both.

The mutual liability clause within a limitation of liability is one that should be limited such that you are liable only to the extent of your own negligence, but not for the negligence of others. This helps to define the sharing of liability, such that if one party is at least partly responsible there is some sharing of that liability to the extent of each party’s adjudged negligence. As with the standard of care, this requires a determination of negligence and is known as “comparative negligence.” This is particularly important when subcontractors are employed, as you do not want to assume liability for their negligent acts, even though as a general contractor, you are likely liable for the entire project. Being careful with this clause in the development of subcontract agreements can reduce your liability as you may then activate a claim against your subcontractor on the basis of the subcontract agreement.

Consequential damages should be included in your limitation, but excluded to you in other contracts in every possible case. Confusing? The attempt here is to limit your liability and include all potential damages in your limitation, but conversely, you do not want to be the recipient of exclusion on the other side of the contract. Almost anything can

be claimed as being consequential to the act. The difficulty is that when it is claimed, you have to refute the claim and that costs you money. Further, almost all warranties and general insurance provisions exclude consequential damages which, again, opens your assets to direct attack.

Indemnification

Indemnification is a means to transfer liability from one party (usually our client or a third party) to another party (usually us). This transfer is done by specific contract wording known as an “Indemnification Clause” or a “Hold-Harmless Clause.” In general, there are three forms of indemnification: broad form, intermediate form, and narrow form. Since the intermediate form is a semantic variation of the broad and narrow forms, only the broad and narrow forms are discussed herein.

For your risk management, you must strive to get a narrow form indemnification agreement. This puts the responsibility for your negligent acts squarely on you. More importantly, it limits your responsibility to only your negligent acts, not the acts, negligent or otherwise, of others. Again, this is an important consideration when subcontractors are employed.

A significant key here is the term “negligent.” As construction professionals, you must be willing to accept responsibility for your negligent acts, but you do not have to accept responsibility for all acts. Negligence is a legal term requiring interpretation and proof. “Acts” are just events or actions, including a necessary response to someone else’s actions, for which you or your firm might not be responsible.

Here are some examples of broad, intermediate, and narrow form indemnification clauses and what makes them good or bad.

Broad Form. This form of indemnity requires us to indemnify our client for all damages arising out of the project whether caused by us, a third party, or even our client. This is an attempt to shift all liability of the client and others to us. The following is an example of such a clause:

Contractor shall indemnify, defend and save harmless the Client, and its officers, directors, employees and agents, from and against all liability, loss, cost or expense (including attorney’s fees) by reason of liability imposed upon the Client, arising out of or related to Contractor’s services, whether caused by or contributed to by the Client or any other party indemnified herein, unless caused by the sole negligence of the Client.

This clause makes you responsible for anything that anyone on the project does, including those for whom you bear no responsibility. Do not sign a contract with a clause such as this!

Here’s another broad form indemnification that is a sleeper. It appears innocuous at first glance, but upon closer review, you notice something about the sequence of the words.

Contractor shall indemnify the Client for all claims, damages and expenses arising out of acts, omissions, errors or negligence of the Contractor.

If the term “negligence” appears alone, it will likely stand on its own as a separate part of the clause. In this case, it should be used as a modifier of “acts, omissions, errors” in the form:

Contractor shall indemnify the Client for all claims, damages and expenses arising out of the negligent acts, omissions, or errors of the Contractor.

Simple changes can take the provision from a broad form indemnity to a narrow form indemnity. To further help your cause, add the term “reasonable” in front of “claims, damages, and expenses.”

Narrow Form. A narrow form indemnity requires us to indemnify our client only for those damages caused by our negligence. This is obviously the most reasonable form of indemnity and one that you should try to get in each of your contracts. An example of such a clause is as follows:

Contractor shall indemnify the client for damages arising out of the performance of its services to the extent caused by the negligence of the Contractor.

It should be noted that state law might limit indemnification, particularly on public projects. Many states have specific indemnity limits that could make some contractual indemnification clauses illegal and perhaps unenforceable. Be sure to check your state for such laws and determine their effect on your practice.

Your need for care in reviewing an indemnification clause often comes when you are being asked to sign a contract generated by others. Many terms and conditions contain several indemnity references in different locations depending upon the subject at hand in the clause. While this is acceptable, it would likely be better to state your position on indemnity in a specific clause that covers the other conditions.

One other means of risk transfer is the use of “Additional Insureds” in the contract. Often clients ask to be named as additional insureds or the architect, engineer, or other project parties required through “flow-down” provisions to be named as additional insureds. This is a flag that should be resolved with your insurance carrier, keeping in mind that you might be insuring a third party for their own negligence. Further, in the event of a claim, *you* are the one who will experience the insurance claim loss and the resulting claims experience rating and premium increase. Avoid “additional insureds” provisions when possible.

Site Operations

As the contractor, you are responsible for site operations. You need to clearly distinguish between “site operations,” the purview of others, and your “operations” on a site. They are different and you must not confuse them. Do not allow the responsibility to control the site to be given to others, including your subcontractors or the owner. If you have the responsibilities of the site control and management, then take it and do not allow others to control your destiny in this respect.

Site Safety

Similar to site operations, the contractor must maintain control over the site safety. This is a large responsibility and can easily result in a life or death situation. Take site safety and individual personnel safety very seriously and make sure they are not compromised by anyone or any entity.

Dispute Resolution

Disputes are inevitable. Whether they are minor disputes that occur in the normal course of day-to-day operations on a site or major disputes that may result in work stoppage or litigation, each must be handled professionally so as to minimize their impact to the overall operations of a contractor.

There are three common ways to handle a dispute once it has exceeded the individual party’s capacity to resolve. These are as follows:

- Litigation
 - Trial by jury
 - Bench trial (where the judge is both judge and jury)
- Arbitration
 - American Arbitration Association Rules
 - Other rules
- Mediation
 - Court ordered
 - Agreed mediation

Each of these means has advantages and disadvantages, and you should know these before you agree to them in contracts. The default mechanism for dispute resolution of a contract is litigation. Either harmed or damaged party may sue the other for a variety of reasons, whether a result of contract breach, negligence, or other legal action. Since litigation offers little in terms of a predictable result, is expensive, and time consuming, other methods of dispute resolution are often preferred. Sometimes those methods are no better than litigation as many different variables can come into play.

Litigation offers some advantages over the other methods. It is done under distinct rules of evidence discovery, so as to afford to both sides an opportunity to understand the nature of the claim and its basis. It gives insight as to “where the other party is going” with its premise. This process alone sometimes leads to settlement of the dispute.

Each party is then allowed to put on its respective “show” in an effort to convince a “jury of peers” as to the validity of its claim or the refutation of such a claim by the defendant. Unfortunately, this is where the process begins to break down in two respects. First, a “jury of peers” doesn’t really exist for a corporate entity. The jury pool is composed of local people, from a variety of backgrounds, who are expected to evaluate the minutia of technical details and decide on the “winner.” This is asking a lot of the jury pool. This concept is better suited to criminal cases and domestic disputes, but falls short in the professional realm. While the capabilities of jurors should not be underestimated, it is common to see them lose interest in technical cases and become quite bored. When this

happens, it is usually the charisma of one side or the other that helps to “carry the day” as compared to the issues, events, and facts. “Bench” trials, where the case is heard and decided by a judge without the “benefit” of a jury, are only slightly better in that the judge is more likely to be attentive and understand the nuances of the technical case better than a jury.

Looking at the two remaining options, the more popular of the two in the past has been arbitration. Over the past few years, mediation has risen in popularity and several forms of it have emerged to gain prominence in professional dispute resolution.

What is arbitration? In some respects, arbitration is a mini-trial, held in an attempt to avoid a court trial and conducted by a person or a panel of people who are not judges in the legal sense. Arbitration may be agreed to by the parties, may be required by a provision in a contract as a means for settling disputes, or may be provided for under statute if requested. One advantage of arbitration is that it can occur within a relatively short time period, usually at the discretion of the parties involved.

Arbitration of professional matters is usually done by a panel such as one provided by the American Arbitration Association (AAA). The AAA has a specific set of rules for the proceedings, and the panel must meet certain minimum standards. It is not necessary that the panel have legal experience, but should have experience in the professional field that is the subject or close to the subject of the arbitration. The panel selection is often done such that the plaintiff selects one member, the defendant selects one member, then the selected panel picks the third arbitrator. Occasionally, a retired judge, some other respected lawyer, or some organization that provides these services will hear arbitration singly. Contract-required arbitration may be converted into a legal judgment on petition to the court, unless some party has protested that there has been a form of collusion or fraud. Many states have adopted the “Uniform Arbitration Act”, a document promulgated by the Uniform Law Commission of the National Conference of Commissioners on Uniform State Laws. Some states have elected to modify the latest version of the Arbitration Act to accommodate and be consistent with its statutory provisions of arbitration. One such provision includes the conditions under which an arbitration award may be set aside or vacated. The statutory provision for setting aside an arbitration award for example, in Florida, is contained in its statute using the following:

Excerpt from Florida Statute Chapter 682, Arbitration Code, Section 682.13 Vacating an award.-:

- (1) Upon motion of a party to an arbitration proceeding, the court shall vacate an arbitration award if:
 - (a) The award was procured by corruption, fraud, or other undue means;
 - (b) There was:
 1. Evident partiality by an arbitrator appointed as a neutral arbitrator;
 2. Corruption by an arbitrator; or
 3. Misconduct by an arbitrator prejudicing the rights of a party to the arbitration proceeding;

- (c) An arbitrator refused to postpone the hearing upon showing of sufficient cause for postponement, refused to hear evidence material to the controversy, or otherwise conducted the hearing contrary to s. 682.06, so as to prejudice substantially the rights of a party to the arbitration proceeding;
- (d) An arbitrator exceeded the arbitrator’s powers;
- (e) There was no agreement to arbitrate, unless the person participated in the arbitration proceeding without raising the objection under s. 682.06(3) not later than the beginning of the arbitration hearing; or
- (f) The arbitration was conducted without proper notice of the initiation of an arbitration as required in s. 682.032 so as to prejudice substantially the rights of a party to the arbitration proceeding.

This is but one example of a “set aside” provision. Check the state in which an award is made for similar provisions.

This is binding arbitration and barring one of the noted conditions, it is usually hard to escape the decision. Many states provide for mandatory arbitration of cases on a nonbinding basis in the hope that these proceedings conducted by experienced attorneys will give the parties a clearer picture of the probable result and lead to acceptance of the arbitrator’s decision. It should be noted that an arbitration panel’s decision might vary significantly from a lay jury’s decision, given the same evidence.

Arbitration might or might not follow the rules of civil procedure used in court cases. This depends upon the rules under which the arbitration is done and agreement by the parties. When attorneys are involved on the arbitration panel, it is more likely that some semblance of the civil procedure rules will be followed, though concessions are likely on both sides of the table as far as evidentiary processes. When other professionals are involved, there is a lower likelihood of such rules being followed, as there is a greater likelihood that the panel members are not familiar with the rules. This can be dangerous to one party or the other as sometimes it is better that certain information not be allowed as evidence in an effort to prevent an undue advantage to one side or the other, and to preclude erroneous or “pseudo-factual” evidence such as hearsay.

What about mediation? This popular form of dispute resolution is gaining momentum as a viable means to effect a settlement between parties. The formal mediation is usually court-ordered. In this form, the mediator must be a licensed attorney and acts as a third party, actively participating with both parties as a group and with each of the parties individually in an effort to find points of agreement between the disputing parties. Mediation differs from arbitration, in which the third party (arbitrator) acts much like a judge in an out-of-court, less formal setting but does not actively participate in the discussion as is done in the mediation process. There are professional mediators or lawyers who do mediation for substantial fees, but the financial cost is less than fighting the matter out in court and may help to achieve early settlement.

Mediation does not always result in a settlement. In many cases; however, the discussions at mediation are privileged and cannot be used in subsequent legal action.

Which of the three is better? None. Whether we win or lose the “war,” we always lose in the battle. The better process is to communicate with clients and meet the standard of care, attempting at every turn in a project to mitigate the opportunity for a dispute to erupt.

Look Out for Purchase Orders!

A purchase order is a form of contract that often carries some standard terms and conditions that we, as licensed professionals, do not want to accept. Most often, a purchase order has terms and conditions prepared for the delivery of ordered goods and some nonprofessional services.

A few things to remember about purchase orders:

- The terms and conditions of purchase orders are usually from the Uniform Commercial Code (UCC) and do not apply well to professional services. Avoid purchase orders if you can. Note that if you do not respond to an issued purchase order under UCC provisions within 10 days of receipt, you are stuck with those terms and conditions as a contract. This is noted in the UCC, Article 2-Sales, Part 2-“FORM, FORMATION AND READJUSTMENT OF CONTRACT,” clause (2).
- If you must work on a purchase order basis, make sure it references your proposal and its terms and conditions.
- Try to negotiate with the client, a master services agreement and use the purchase order as a task order, referencing the master agreement, and negating the purchase order terms and conditions.
- If stuck with a purchase order and no other recourse, mark it up, paying close attention to indemnification, guarantees, insurance, safety, scheduling, standby, and other conflict-riddled points that often appear.

Releases of Liens

In the construction industry, liens or the threat of such are commonplace. This is the protection afforded by statute for the payment of wages to workers on the project, followed by the payment for goods used in the project, and then to services provided for the project. As contractors providing goods and services on a project, you generally have certain lien rights. In some states these are called “Mechanic’s Liens.” In other states, construction liens have been separated from the other forms of “mechanic’s liens,” thus having their own statutory features.

Once you have lien rights on a property, you are willing to exchange those rights for payment of your work effort. This is where a “release of lien” enters the fray. The problem comes in when a subcontractor, material supplier or even the owner wants to also throw in a few extra terms releasing them from all claims for everything. This is not appropriate and you must carefully review these for such craftiness.

One such example of a lien release that incorporates additional indemnification language is as follows:

Now, therefore, the undersigned, in consideration of partial payment in the sum of \$_____ receipt of which is hereby

acknowledged, and other valuable considerations and benefits to the undersigned accruing, do hereby waive, release and quit claim all liens, lien rights, claims or demands of every kind whatsoever which the undersigned now has, or may hereafter have on this project known as _____.

This is a broad form indemnification of any and all claims, slipped in as a partial waiver of lien. Note that since this is a partial waiver of lien, the client will take at least one more opportunity to get indemnification in a final waiver of lien. While the client might not have the intent of creating additional indemnification, that is the effect of the language and could be pursued as necessary against you.

You can mitigate your exposure in these releases of lien by providing your own form which states the limitations of the partial or final waiver of lien and makes the indemnification for *payment related* claims only, or you can mark up the client’s form making it clear that you are indemnifying only for payment-related claims.

The review of contracts is a complex and often confusing endeavor and must be undertaken with great care. It is usually advisable to engage an attorney for contract review; however, as a contractor, you should be aware of the provisions and understand the general language of the contract in order to better serve your company’s interests.

PLANS AND SPECIFICATIONS FOR CONSTRUCTION

It is the design professional’s responsibility to provide graphic plans and written specifications for the construction. The prime design professional for most commercial construction projects is usually a licensed architect. Under his or her contract with the owner, the architect produces a graphic representation of the construction. This usually includes plan (top view) and elevation (side view) drawings of the building and its parts, as well as details to assist the contractor in the proper construction of the building’s features. The plans also show the location and dimensions of the building and its components, providing for a coordinated “fit” of the parts of the building. Coordinating and accomplishing this dimensional control is one of the most difficult tasks of producing plans, as the coordination must include the dimensions of all structural components, mechanical features, plumbing locations, electrical locations, and equally important, the horizontal and vertical locations of each feature and part, as well as the physical location of the building on the site.

There have been numerous arguments and even legal battles over which takes precedence; whether it is the plans or the specifications. It must be understood that they both are necessary and serve two distinctly different purposes. A structure can be constructed with only drawings, or it could be constructed with only written descriptions. This process is optimized if there are appropriate proportions of both. The graphic details should be supplemented by detailed specifications that outline the materials, the codes and standards applicable to the use of the material and its graphic configuration, and the sequencing of construction of the parts. That is one

reason that most specifications are written in a three-section format, with the first section being general requirements and applicability, the second section being the materials or products to use, and the third section being the application or incorporation of the materials into the construction.

If there is a conflict or disparity between the plans and specifications, neither prevails. It is simply a conflict and its resolution should be up to the design professional. The design professional is the ultimate interpreter of the plans and specifications as he or she is the author and the responsible party. In the event of a conflict in the plans and specifications, the contractor is obligated to ask for a clarification by the design professional. This is done through a formal documentation process known as a *request for information* or RFI. Using the RFI procedure, the contractor asks for a specific item of clarification, upon which the design professional must act by providing to the contractor an interpretation, clarification, or revision. This entire process is done in writing so as to protect all parties involved and to make sure there is no misinformation or misinterpretation given through an oral response.

A contractor must be proficient in reading plans and specifications. An understanding of the referenced codes and standards is necessary so that the contractor will understand what is required of the subcontractors and to assess whether the subcontractor has complied with its contract and performance requirements.

CODES AND STANDARDS

Commercial construction projects in the United States and Canada are generally required to comply with a prevailing building code. In most jurisdictions, this building code is based upon some accepted model code. Over the years, these codes have evolved, progressed, and merged to the present status of having a national model code, with local or state adoption and modification. In the United States, the accepted national model code is the International Building Code. This document, and its allied documents such as the International Plumbing Code or the International Mechanical Code, is produced by a private, for-profit corporation. A state or municipality then adopts the model code in its entirety, partially adopts the model code with modifications, or creates



a similar document under its authority using the model code as the basis for its building code. The code interpretation and its enforcement then fall to the “Authority Having Jurisdiction” or AHJ, typically the local Building Official.

In Canada, the National Building Code of Canada is its model code. This document is produced by the National Research Council-Institute for Research in Construction, a department of the Canadian government. Canada’s National Building Code model is then treated in much the same manner as the United States model, in that provincial adoption is required for legal interpretation and enforcement.

Building codes in the United States are currently on a 3-year revision cycle, while the Canadian codes are on a 5-year renewal cycle. This means that at the end of each revision cycle, a new version of the model code is produced. Often, states and provinces follow these cycles in their appropriation or adaptation of the model code.

A building code generally sets forth the **minimum requirements** for design and construction of buildings and other structures or features. For the design professional, the code gives a “starting point” from which to develop designs that are code compliant, progressive, and cost-effective for the owner. For the contractor, the code establishes a minimum performance requirement for the development of means and methods responsive to building the design.

What is the difference between codes, standards, specifications, and regulations? These terms can be so closely intertwined that it is sometimes difficult to tell the difference. First, remember that a code, upon adoption, becomes a statutory requirement at the state, province, county, or municipal level. That means it carries legal status that, if violated, can result in civil or criminal penalties. A **standard** is usually a consensus document that outlines certain criteria for materials, methods, or performance results that only becomes legally binding when referenced within the code. There are thousands of construction standards promulgated by various standards-producing organizations such as ASTM International, The American Concrete Institute (ACI), The Canadian Standards Association, the American National Standards Institute (ANSI), and others. Only a small percentage of these standards get directly referenced for inclusion in the building code. It is implicit that when a particular standard is referenced in the building code, its effect is as if it were directly included in the code, in its entirety. One anomaly of which all should be aware is that the most recent version of the standard is not necessarily the one that is referenced in the code. Recalling that building codes are produced on a multi-year cycle, it should be noted that referenced documents might be several versions behind, particularly near the end of a code cycle.

Regulations are similar to codes in their statutory effect; however, they are often contained directly in statutes (laws) or are contained in administrative codes of regulations that are prepared and enacted in a manner similar to developing a law. To give an example of the difference between a code requirement and a regulatory requirement, consider the site-specific condition of a setback line. In many coastal areas, building is prevented from encroaching too closely to the