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### **Drones, Green Zones and Home-Mobiles: Navigating New Design Era**

As technology continues to develop and the global weather patterns significantly change, design professionals are facing new and unique standard of care challenges and risks. As weather patterns change, home ownership trends towards tiny and drones provide a bird's eye view of a project, the design professional needs to relook at past design practices and adapt to new ones. One lesson we have learned from the past decade is the business of design and construction is no longer as usual. Are design professionals ready to be resilient and adaptable to the ever changing environment of design and role of technology in building? How do changing climate patterns affect design and construction? Are drones now the project observer? This article will discuss the new normal facing our client professional clients and how counsel and claims professionals can provide risk management strategies to steer our clients in the right direction.

#### **I. Drones**

Look up these days on any construction project and you will likely see unmanned aerial vehicles flying in, around and above the project site. Unmanned aerial vehicles, commonly known as drones, are being deployed on construction projects to accomplish an increasing number of tasks which previously took significant manpower, heavy equipment and time, allowing construction to proceed more efficiently and with more reliability. Originally used primarily for site mapping and to inspect hard to reach elements of the structure, drone are being utilized on construction project today to collect data which enables the construction team to automate and optimize decision making, improve efficiency and control costs on the project. Drones can provide a variety of data, including data for surveying of the site, contour mapping, progress tracking, framing, façade, roofing and other building elements inspection, volume measuring, thermal levels, security, and safety. Drones are touted as eliminating much of the human error involved in construction by providing superior endurance and intelligence on job sites. Drones can hover over locations that are too dangerous to get into and provide information on areas that humans may not be able to safely access. It

is safe to say that the presence of drone in construction is changing the way the construction industry operates. In fact, the drone's eye view may one day replace the human eye in the observation and inspection of construction projects. After all, drones can provide real time images of construction as it happens just like the human eye can.

This new technology all sounds very exciting, but with every new technology comes a new set of unintended consequences and risks to manage. And while design professionals should endorse the use of drones on construction sites, that endorsement must come only after the design professional has performed a thoughtful analysis of how best to manage new consequences and risks it may face from drone use. Some of the risks to the design professionals can be managed by contract language and some risks can be managed by insurance coverage. But before jumping on the drone bandwagon, it is important to assess and understand the potential risks.

Drones do not adhere to traffic laws. What if a design professional dispatches a drone to the site and the drone collides with something or someone? The design professional will want to make sure it has insurance coverage for bodily injury or property damage. What if the drone damages the work itself? The design professional should make sure that there is insurance coverage which will respond to this type of claim. These risks are more obvious and easier to assess. But what if the drone inadvertently takes private images of someone near or adjacent to the construction site and that person asserts an invasion of privacy claim? This risk is likely not one is readily evident, but it has happened. The design professional should address this type of risk with its insurance professionals to make sure that it has or can bet appropriate insurance coverage.

There are other risks that may not come to mind immediately. What if the drone collects information about some aspect of the job for which it has no responsibility? For example, the design professional review video obtained by a drone tasked with performing inspections of job progress and compliance with construction documents. The video captures an imminent danger presenting a risk of serious harm to construction workers. The design professional quickly reviews its contract and confirms that the design professional has no responsibility for means and methods of construction or for safety. If the design professional says or does nothing, and a serious accident occurs, the drone video will be damning evidence against the design professional. This risk could be addressed by contract; perhaps with language that review of drone data by design professional is for the limited purpose of determining compliance of the work in place with the Contract Documents and for no other purpose. Further, drone data could be shared with the Contractor who shall be required in the Contract Documents to review such data for compliance with the Contractor's obligations.

While the benefits from the use of drone technology on construction projects far outweigh the risks, the risks cannot and should not be overlooked or ignored. There

are ways to reduce or eliminate the risks, and legal counsel and insurance professionals should work together to assist design professional in implementing the best strategy to manage these new risks. Once the risks are addressed, the design professional can look up on the job site and be assured that drone technology was the best choice for the project.

## **II. Green Zones**

Our world is evolving, and design and claims professionals must look up, down, and all around when considering risk and exposure to liability.

Rooftops have become green spaces. Whether for beautification or energy efficiency, the design of green roofs is as varied as the plants in every rooftop garden.

New York and Chicago have policies in place to encourage and incentivize green rooftops as part of storm water management. A green roof lowers the heat level in urban areas while preserving marketable square footage.

There are design challenges when considering a landscaped roof. Soil is heavy, plants are heavy and the water they need to grow and thrive is heavy. The design professional will, of course, need to consider the added weight when designing the roof structure. In hot, humid climates, the risk of mold, fungus, and algae buildup may provide an unsightly addition to the skyline. Controlling moisture and water intrusion is challenging enough without the added layers of gravel, dirt, and plantings. Thus, the landscape system will need to account for run off and percolation to avoid root rot and mold or fungus buildup. Some of the other risks associated with green landscapes include abandonment or neglect. In addition to the potential for trees and shrubs to become unmoored, dry planting beds can also pose a fire hazard.

In the era of superstorms, keeping your rooftop landscaping in place is also a challenge. The American National Standards Institute has developed design standards for vegetation in rooftop gardens. (See ANSI/SPRI, Wind Design Standards for Vegetative Roofing Systems: RP-14 (2016)). These standards were designed to prevent the uplift of green roofs in high wind areas. These standards provide the information necessary to calculate how the plantings width and depth relates to typical ballast. Additionally, New York City's Department of Design and Construction has published a Cool & Green Roofing Design Manual that provides a comprehensive analysis of design, technical, and maintenance considerations. As more states recognize the benefits of providing a "greenscape" as part of the cityscape, consumers will insist that this type of design be added to their brick and mortar structures. Thus, design and claims professionals will need to understand the effects, pitfalls, and benefits of the added biomass.

## **III. Climate Change**

Design professionals face new challenges and risks in their profession, not only from technology, but from the ever changing environment. Although the cause of climate change is subject to much debate, there is no question that the U.S. climate has become more extreme each year, from intense heat waves and drought to category five hurricanes and massive flooding. This year, Hurricane Harvey alone accounts for in excess of \$65 billion dollars in property losses. Irma hit Florida shortly thereafter easily doubling the property losses this year. The concepts of “resilience” and “adaptation” have become buzz words as the rebuilding efforts continue. Resiliency, as it relates to architecture, relates to the elasticity of a building or structure and adaptation is about transforming how we design, produce and consume the built environment differently than we do now as we respond to the uncertainty associated with climate change.

Designing to current codes may simply not be sufficient in light of the lessons learned from the spate of major climatic events this year. Current design practices may be not be effective in meeting the challenges that climate change has brought us. Architects and engineers must now design in a way that the structure or building is resilient and adaptable, that it the building has capacity to accommodate changing environmental conditions predicted during the building’s useful life. Design professional and the insurance and legal professionals who serve them must be prepared to acknowledge that some standards, codes and techniques for building have changed and will continue to evolve with the advent of climate change. What this means to the design professional is that the standard of care in the design of structures is changing, and one of the major catalysts for this change is climate. Whether the severe weather changes are the result of global warming or something else is of no consequence. Weather events documents by the National Weather Service for the past ten years substantiate that climate change is real.

The recent hurricanes this year in the U.S. underscore the need for changes in design, both in the selection of land for development and in the design process itself. It is simply not enough to embark on rebuilding efforts to make owners whole until the next storm comes along. While lightweight construction use less materials and are more economical, these structures have the least resistant to storms and fires. Structures cannot simply be rebuilt; they must be rebuilt better, more resilient and less prone to damage. Innovations in design, including the use of weather-resistant and stronger materials, while more expensive, will become the norm for design in severe weather prone areas of the country. While lightweight construction may use fewer materials and is more economical, these structures are the least resistant to storms and fires. Design professional must use lessons learned from these past disasters to improve performance of the rebuilt structure and to convince their clients that additional costs associated with stronger more resilient structures are worth every penny.

While nothing can be to fully protect most structures from damage due the severe weather, the design professional may not escape the past weather relating catastrophes unscathed. It is expected that design professionals will see an increase in design related claims from owners who assert that the damages were much more severe due to defective design. Stated another way, the design, although code compliant, may be alleged to have exacerbated the damages sustained by the owner.

Natural disasters are going to continue to happen. But design professionals must consider those risks and plan for it. If they plan and design around the idea that something bad may happen someday, only then can losses be controlled and buildings restored much more quickly and economically.

We can expect that climate change will result in building codes changes in many areas of the country. But waiting for code strengthening changes to be implemented is too late for design professionals. Regardless of code requirements, design professionals must address the effects of climate change on the design of the structure now. Failure to do so will be tantamount to failing to meet the standard of professional care.

#### **IV. The Tiny Home... a story of scale.**

A man's home is his castle. There's no place like home. Home is where the heart is. There are thousands of proverbs, adages and maxims to describe the love affair Americans have with home ownership. A home may take many forms, but it starts with a building permit. Most jurisdictions have minimum square foot requirements and use zoning requirements to control growth and develop neighborhoods. Zoning requirements set standards for height, lot size, use and square footage. Some of the requirements are decades old.

Enter the tiny home. Just what is a Tiny Home? It is not just a small house. It is a movement. This is not the first time homeowners have sought the smaller option. Between 1908 and 1940 Sears sold ready to assemble mail order kit homes. According to Sear's archive website, they sold 70,000 homes. One of which has been restored on Anna Maria Island, Florida.

As the Millennials enter the work force and begin to start their families, the 30 year mortgage has been daunting and a trial. As college tuition increases and salary opportunities shrink, there have emerged a growing number of people who see mobility, reduced size and freedom as their driving force to home ownership. Enter the Tiny House.

While a Tiny Home is typically defined as 500 square feet by real estate professionals, they range in size, shape, mobility and detail. Simply tune in to your local

cable news Home and Garden channel and you will find two or three television series devoted to building and living in a Tiny Home.

There is an absence of legislation governing the construction or design of Tiny Homes or governing the craftsmen that build them. Before you build a Tiny Home in your neighborhood, be aware that most municipalities' square footage requirements exclude Tiny Homes from serving as a dwelling. Without a variance or rural location and to avoid building and zoning laws, most Tiny Homes are built on trailers. In that case, certain rules and regulations promulgated by the Department of Housing & Urban Development (HUD) and Department of Transportation could apply. For example, if the Tiny Home is being designed on a permanent chassis and is 8 body feet or more in width or 40 body feet or more in length and is at least 320 square feet, it is defined by HUD as a manufactured home and therefore must be built to the HUD building code. The current exception to the HUD code is self-propelled recreational vehicles. To the Tiny Home community – these structures are called THOW – Tiny House on Wheels. Today's claim professional will need to appreciate the difference to understand the potential risk.

In most jurisdictions your Tiny Home on Wheels will need to be registered with the DMV. There are also height, weight and width requirements. For example Oregon has a total length limit of 65 feet maximum including the tow vehicle while Rhode Island limits the total length of trailers (including tow vehicle) to 53 feet. Most states limit the height of the trailers (and thus the Tiny Home) to 13.6 feet. There are also rules regarding the duration and type of use – but that has not seemed to deter the Tiny Home market.

Designing a Tiny Home is also challenging since the designer will also need to consider that for at least a part of the Tiny Home's useful life it will be traveling at highway speed. Windows, tile backsplashes and light fixtures will need to be integrated so that they are not damaged while en route. Bumps, potholes and winding roads will need to be considered as materials are selected for countertops, wall coverings and structural supports. Larger homes may require a commercial license to be moved from location to location. Porches, chimneys and roof top patios will need to be securable for transportation and withstand racking and twisting. Insurance for the Tiny Home will also present challenges. Is it a dwelling? A recreational vehicle? Fishing Cabin? Understanding what the Tiny Home is, based on your jurisdiction or application of local, state and federal relations, will most likely determine what insurance product will cover Tiny Home losses.

Thy myriad of problems seems insurmountable. In Florida and Texas for example, how will the Tiny Home withstand hurricane force winds? A designer will want to use lightweight materials to comply with DOT's weight restrictions, but will need to include strapping, anchor points and wind rated windows. But if the local building department does not issue a permit, and the Tiny Home is on a trailer, what type of

insurance will apply? If the Tiny Home is on a neighbor's lot without water or sewer hookup – will that satisfy a policy definition of a dwelling?

Despite the absence of regulation and requirements governing construction the Tiny Home industry is booming. A generation of homeowners whose first home may not exceed 250 square feet will be demanding glass backsplashes, wood paneled ceilings and roof top patios. They will insist that their home withstand hurricane force winds and flooding from super storms. The design professional who is interested in stepping into this new world of home design and construction must be prepared to consider less traditional methods of home building and become familiar with HUD and DOT regulations. With the emergence of these novel dwellings will undoubtedly flow the litigation. Understanding the challenges a Tiny Home can present, is a good way to begin to understand the potential exposure that awaits.