3D PRINTERS AND INNOVATION:
The Effect of Additive Manufacturing on the Law and the Insurance Industry

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I. INTRODUCTION

While 3D printing, or additive manufacturing, traces its roots to the early 1980s, it has been in this decade that the technology has finally matured and transformed into a viable manufacturing process. 3D printers have been used to produce an almost infinite array of products, including clothing, guns, camera lenses, acoustic guitars and medical implants. Never before has the potential of design and production appeared to be so limitless.

Despite all of the potential for innovation, 3D printing is not without its potential hazards. The risk of copyright infringement is at its highest point since the introduction of digital music downloading in the late 1990s. Product liability law is faced with new liability issues. Moreover, because 3D printing is becoming increasingly more accessible to individuals, issues concerning potential personal liability in connection with the use of products created by 3D printers are most certainly going to arise.

With the innovation of 3D printing and all of the associated risks, insurers and insureds alike face new challenges. Insurers must adapt their policies to this rapidly changing landscape. Insureds must make sure they are adequately protected against the risks associated with additive manufacturing. This paper examines the significant impact 3D printing has generally, including its impact on insurers.

II. WHAT IS 3D PRINTING?

In order to understand the liability and insurance implications of 3D printing, it is important to understand what 3D printing is. Like the name implies, 3D printing is the process of “printing” three-dimensional objects. Unlike traditional printing, 3D printing utilizes a process known as additive manufacturing to create three-dimensional objects of almost any size, shape or geometry. Rather than simply copying a two-dimensional image onto a sheet of paper, the additive process actually creates an object by laying down thinly sliced, horizontal cross-sections of material until the entire object is created.

As you might expect, the 3D printing process is slightly more complicated than finding a document or image on a computer and pressing “print.” Typically, the 3D printing process begins in one of two ways: (1) the user can create a
virtual design using a 3D modeling program, or (2) the user can use a 3D scanner to make a three-dimensional copy of an existing object which is transferred to the 3D modeling program. Thereafter, the 3D modeling program slices the model into thousands of horizontal layers which are uploaded to the 3D printer. The 3D printer then creates the object in successive layers of liquid, powder, paper or sheet metal. Any number of type of materials, including plastic, sand or various metals can be used in the 3D print nozzle to create the final object.

Additive manufacturing systems are currently being used in a number of industries, including aerospace, architecture, automotive, and the dental and medical fields. In addition, 3D printers are becoming increasingly popular for at-home use due to a rapid decrease in price. Where 3D printers cost in excess of $20,000 back in 2010, a personal 3D printer can now be purchased for less than $1,000. As the cost of 3D printers becomes more affordable, the use of additive manufacturing is increasing at a rapid rate. This technology truly has the potential to radically change the way products are manufactured.

3D printing has numerous advantages which appeal to individual and commercial users. First and foremost, there are very few constraints with 3D printing. Anything that can be designed in a 3D modeling program can be created with a 3D printer. Second, the downtime between designing an object and receiving a prototype has essentially been eliminated through additive manufacturing. Without any wait time, designers can duplicate and quickly begin testing a prototype to see whether any changes need to be made and, if changes do need to be made, instantly make them in the 3D modeling program and re-print the prototype.

Nonetheless, 3D printing is not without its disadvantages. While the downtime between design and printing has been eliminated, additive manufacturing is, at the present time, fairly slow as most 3D printers average a speed of 1-5 cubic inches per hour. As such, larger objects can take hours to print. Moreover, because the 3D printed object is created in successive layers rather than as a solid unit, it may lack the same quality of mechanical properties as a product created through traditional manufacturing processes. Additionally, to the extent the process lacks appropriate quality control procedures, the printed products could be of lesser quality.
III. LEGAL RAMIFICATIONS

As 3D printers become more commonplace, the prevalence of 3D printed objects in the marketplace is bound to have certain legal ramifications. From product liability to copyright to insurance issues, 3D printers are at the forefront as the next big challenge in the legal landscape. While there have been no reported cases concerning the issues created by 3D printed objects, they most assuredly will be forthcoming.

A. Copyright

The most obvious legal concern with 3D printed objects concerns the replication of copyrighted products. Additive manufacturing drastically raises the risk of the production of counterfeit products. While commercial manufacturers are aware of copyright laws and presumably would not deliberately violate them, never before have individuals and companies had readily available access to the “formula” of any product. Individuals can instantly discover the “formula” by scanning the product with a 3D scanner and recreate the product by uploading the digital file to a 3D printer. All of this would, of course, be in violation of any copyrights held by the product manufacturer.

Like the advent of Napster for digital downloads of music, 3D printing has given individuals a potential license to violate copyrights. When individuals become manufacturers, they have the ability to do that which they ordinarily could not do. Any product, regardless of how complex, is conceivably at their fingertips and has the potential to be reproduced. Indeed, there are 3D printers that can reproduce extremely complex products, including automobiles.

As was the case when downloading digital music became prevalent in the late 1990s, copyright issues often surface prior to the development of any means to combat the infringement. Just as Metallica embarked on its crusade against Napster, expect product manufacturers to take similar measures against 3D printers to combat piracy. For example, 3D printers have already begun utilizing software which prevents the printer from producing unauthorized copies of protected files. It is anticipated that copyright laws will have to be updated to deal with technology.
B. Product Liability

As is well known, the three primary types of product liability claims are: (1) manufacturing defects (i.e. poor materials or workmanship); (2) design defects; and (3) a failure to warn of inherent non-obvious dangers. Undoubtedly, additive manufacturing raises concerns for each of these types of products claims.

As discussed above, 3D printed objects may lack the quality of traditional products due to the nature of their construction. 3D printed objects are constructed in layers rather than as solid pieces from a mold. While it is uncertain as to whether the potential quality deficiency of 3D printed objects equates to a higher likelihood of failure and risk to the user, it is conceivable that this could be the case. Moreover, 3D printers, like any other printer or manufacturing machine, may also make mistakes in transcribing the digital file. Corruption can also occur in the digital file itself and result in the production of a defective product.

The potential design defects of 3D printed objects presents an interesting conundrum. On the one hand, design defects should theoretically be minimized as additive manufacturing affords engineers greater opportunity to test and re-test prototypes prior to placing an object into the marketplace. On the other hand, there are no safeguards ensuring that all design defects have been eliminated with the digital design. After all, the 3D printing process begins with the creation of the digital design—a process which has proven to be fallible.

From a product liability standpoint, perhaps the most problematic issue is that due to the increasing accessibility of 3D printers, almost anyone can become a product designer and manufacturer. Creating products outside of the safeguards of the traditional manufacturing process drastically increases the risk of errors in design and in manufacturing. Moreover, the widespread availability of 3D printers raises supply-chain issues unlike those in traditional product liability cases, particularly when it comes to at-home printing.

For example, assume an individual acquires a 3D printer and begins producing and selling certain objects. Those objects were generated using a 3D scanner to copy an existing product manufactured by Company X which the individual purchased at Store Y. What happens when a customer purchases the 3D printed object from the individual and is injured due to a design defect in the product? Who is liable? The individual who created the 3D product?
manufacturer of the 3D printer? The retailer who sold the original product? Conceivably, all of the above could face liability under a traditional product liability theory. This obviously could greatly increase exposure for traditional products designers, manufacturers and suppliers.

Under the above hypothetical, it is arguable that the individual should bear the brunt of the liability. Strict liability product law traditionally only applies to designers, manufacturers and suppliers of allegedly defective products. It can thus be argued that these entities should not be liable for 3D copies of their products, particularly if the alleged defect arises from the copying process. On the other hand, if the original product contained a design or manufacturing defect, that could create liability for the original designers, manufacturers and suppliers.

In addition to potential liability for traditional products claims, an original designer and manufacturer may face liability for not insuring that proper safeguards exist to either prevent the duplication of their products or to insure that the products are duplicated in such a fashion so as to include any and all appropriate safety features. There may also be liability for failing to warn of the potential dangers arising out of the duplication and use of the products. This could be particularly true in cases involving individuals who obtain and copy dangerous materials.

IV. INSURANCE IMPLICATIONS

As 3D printing continues to expand, the associated risks evolve. As such, users of 3D printers need to appreciate those risks and ensure that they are properly insured. Because of the numerous increased risks associated with additive manufacturing, insureds should take adequate measures to increase their general liability, professional liability, and business risk insurance. Conversely, it is equally important for insurers to properly assess those risks; however, the novelty of 3D printing presents a number of new challenges for underwriting.

With the advent of additive manufacturing, there are potentially new risks associated with each stage of the manufacturing process from designer to consumer. Even if the designer designs the “perfect” product, he or she may have no control over how well the 3D printer creates the product. In cases where the digital designer sells the digital design to a manufacturer or direct to consumer, the opportunity for quality control is limited. Without the necessary oversight, the
The risk of product failure can increase and, thus, increase the risk of liability for the designer necessitating the need for increased general and professional liability insurance. In pricing that insurance, underwriting will have to take all of these increased risks into account.

Similarly, with additional stress placed on the manufacturing process, the 3D manufacturer arguably bears a heightened burden to ensure that the product is manufactured appropriately. The producer of the raw materials used in additive manufacturing also has a potential loss exposure. Like any product, the 3D printed object is only as good as the raw materials utilized in its production. Any faults or defects in those materials will translate into faults or defects in the 3D printed object. As such, 3D printer manufacturers must do their due diligence when purchasing materials from appropriate suppliers. Further, they should make sure that those materials are traceable to protect themselves in the case of any liability claims. All of this results in the need for a re-evaluation of their insurance program to make sure they are properly insured for these products.

The risks associated with 3D printing are not limited to traditional product liability exposures. For example, 3D printing e-designs over the internet may attract trade or expert control compliance obligations which insurers and designers need to appreciate. In addition, due to the potential for design or manufacturing defects, the potential for product recalls is high. Moreover, as discussed above, the potential for intellectual property infringement is a significant risk that should be accounted for in assessing risk exposure. Also, property risks may also increase as an unattended, slow-moving 3D printers create a fire hazard. An insurer’s quality control inspections and underwriting processes need to take all of these new and additional risks into account.

As discussed in the hypothetical above, the at-home manufacturer likely has risk exposure that he or she never anticipated. Because it is arguable that any liability for injuries caused by the at-home 3D-printed product may fall on the individual, he must first protect himself by doing his due diligence when choosing which products to replicate. Second, the individual should ensure that he has liability insurance in place to protect against product liability and potential copyright infringement claims.
In sum, when underwriting the risks of 3D manufacturing, insurers must carefully assess the increased risk the insured has in the manufacturing process, any supply chain issues, the complexities of product traceability and the potential impact on subrogation rights, the number of jurisdictions which the insured operates, and the risks at each stage of the process. Conversely, the insured should ensure that it has strategies for managing the new risks via traceability of designs and materials, has considered the risks of product recalls, and has the appropriate dialogue with its insurer to develop the proper risk management plan.

While there are a number of issues that undoubtedly will be raised, certain issues pertaining to insurance coverage that must be addressed immediately come to mind. Specifically, will common policy definitions for “Your Work” and “Your Product” need to be amended to account for additive manufacturing? Do additional insured endorsements need to be tailored to address contractual obligations in the 3D printing supply chain as well as to address those issues which will arise from persons or entities copying the insured’s products? Will they become additional insureds? What impact will additive manufacturing have on the application of the “Your Work” and “Your Product” exclusions? How will 3D printing affect personal and advertising injury coverage and its various exclusions concerning the knowing violation of the rights of another, quality of goods, or infringement of copyrights? Do new exclusions dealing with additive manufacturing need to be drafted? Certainly multiple coverage issues will be raised by this technology.

V. CONCLUSION

The full effect of 3D printing on our jurisprudence and the insurance industry alike is yet to be seen. The potential for innovation with 3D printing is limitless; however, with any new innovation, the potential for new risks also increases. Insurers and insureds alike must appreciate those risks and take adequate measures to protect themselves from those new hazards.
For additional information regarding these issues, please refer to the following sources which were reviewed in drafting this paper:


