Liabilities for design defects in a collaborative, integrated, digital age

Juan Jonnathan Bravo, Pontificia Universidad Católica del Perú
Jaime Gray

Available at: https://works.bepress.com/jonnathan_bravo/12/
Liabilities for design defects in a collaborative, integrated digital age

The purpose of this article is to address the new challenges concerning liabilities arising from errors or defects in construction projects that employ new design methods and techniques such as BIM and new collaborative project delivery systems. Following an examination of some relevant legal issues, with particular emphasis on the Peruvian Civil Code, the authors propose that parties should clearly establish in their agreements the scope of work or services and the liability each of them should bear.

‘To everything there is a season and a time to every purpose under heaven’
Ecclesiastes 3:1

Historically, the construction industry has given owners, contractors and designers the opportunity to innovate by employing the most recent methodologies and techniques to achieve project objectives. From the very birth of the construction industry, large and
complex projects have challenged the minds of architects and engineers, inspiring them to respond to the challenges with innovative ideas which in the course of time have led to significant cultural and scientific advances. Projects such as the pyramids in Egypt, Saint Peter’s Basilica in Rome, the Great Wall of China and the Machupicchu archeological remains in Peru serve to illustrate this point.

New technologies, however, have not only brought about solutions; they have also created new situations and circumstances for parties and their lawyers to deal with. For example, while the use of steel iron allowed the construction of skyscrapers in New York, within a few years of their wide-scale construction, new agreements defining the liabilities of the construction parties employing this new methodology were necessary and design regulations (Zoning Resolution, 1916) were required to ensure that neighbouring properties had adequate access to fresh air and sunshine. Innovative solutions create new legal scenarios, which in cases of conflict are resolved through private agreement or enacted regulation.

BIM technology and the like should be seen not only as tools to be benefitted from by engineers and others, but also as new methodologies offering fresh perspectives on how to assign risks and consequently on how to deal with the liabilities and responsibilities in construction projects.

In reference to the quotation made at the beginning of this article, the time for BIM and collaborative project delivery systems has come, with a corresponding requirement to discuss the legal implications and implement the consequent legal solutions.

What is BIM and what are the collaborative, integrated models employed these days?

BIM stands for Building Information Modelling, defined by the National Building Information Model Standard Project Committee as follows:

‘Building Information Modelling (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle; defined as existing from earliest conception to demolition’.1

Proponents of BIM regard this technology as much more than just a 3D representation of the project, with the obvious opportunity to identify any errors or inconsistencies among the different elements involved. It also provides the means to clearly assess the time and resources necessary for a full understanding and satisfactory completion of a construction project. Some trade articles claim that BIM allows a 7D perspective of the project (the dimension number depending on the features involved, such as sustainability optimisation, costs, asset management, etc).

Innovative solutions create new legal scenarios, which in cases of conflict are resolved through private agreement or enacted regulation.

It is usual everywhere for the architect to initiate the design stage. Once the owner has approved his design, the other ‘disciplines’ (structures, electrics, water supply and sewage disposal, etc) are developed by other specialists. BIM technology gives the owner, the architect and the multiple designers the opportunity to determine if their different designs are fully and mutually compatible, to make any necessary corrections and foresee any required changes to the plans and specifications long before the construction stage has begun.

The collaborative, integrated model has essentially replaced the well-known design/bid/build (traditional), design/build and project management delivery systems, with a new one in which a sophisticated owner and a sophisticated contractor attempt to form a seamless, unified and collaborative team, sharing their objectives from the very outset of the conceptual phase of the project (the earlier the better) and together taking the most important decisions. Therefore, with BIM the contractor performs the engineering services based on mutually agreed concepts. Once the engineering deliverables are completed (or carried out up to predetermined points), they are jointly reviewed, improved and then approved by the parties. Contractors, of course, execute works in accordance with these previously approved plans and specifications.

The aim is to take advantage of the common interest of the parties to agree on what is best for the project, paying the contractor for the actual cost incurred
during the design and management phase and under a not to exceed cost during the construction phase. This type of project delivery system is successful only if parties (contractor and owner, but often also their designers and suppliers) are committed to acting collaboratively and unselfishly, with a shared vision of what is most appropriate and efficient. In other words, this new project delivery system will only function effectively if the owner and the contractor forget their traditional, individual approaches and function as a single, integrated team.

We would like to add that a collaborative environment has no pre-determined scheme, work procedure or number of participants. These matters become clear when project needs are identified and the ideas jointly discussed are approved in order to generate efficiency.

The problem (not the solution) is clear now. In a truly seamless contractor/owner/designer/supplier relationship, who is responsible for the design and its errors or omissions? This question will be dealt with later on.

The use of BIM is of real help to the contractor who will review or validate the owner’s design

Different project delivery systems and BIM

Before making that analysis, it is important to consider if the use of BIM technology also has implications for the more commonly employed project delivery systems.

Traditional (design first, then bid and build afterwards)

At first glance, the use of BIM technology cannot help but minimise the risks of both the owner and his designer. As the risk of the design is not taken by contractors under this project delivery system, their position is not improved nor do they benefit from the use of BIM by the owner. In the worst scenario for contractors, they will not execute as many changes as in a project employing this system of delivery without employing BIM, as the use of BIM technology should minimise the need for changes resulting from design errors or defects. However, what happens if penny wise and pound foolish owners decide that their design should be reviewed or validated by the contractor employing BIM technology so as to transfer responsibility for the design to the contractor?

Of course those particular owners should pay for the review or the validation, but just because the project they ordered their designer to develop employed BIM, or was compatible with the electronic format employed in the BIM environment, can a contractor be found liable in case of errors or omissions in the owners’ design?

We believe that in these cases (in spite of the fact that the employment of the BIM technology as described above is substandard) the will of the parties has to be respected and if contractors have undertaken to review or validate and then be responsible for the design, they are entering into a valid contract. Of course the central issue here is to have a clear scope defining precisely what review or validate means and the precise liability the reviewer or validator has.

We believe that the use of BIM is of real help to the contractor who will review or validate the owner’s design.

Nonetheless, this type of agreement with the acceptance of revisions or validations of designs made by others should be entered into by skilled and experienced contractors duly trained in the use of BIM technology. They must surely add a risk premium to their quoted price and have sufficient time to conduct the requisite thorough review or validation of the project.

We note that this scheme is similar to the FIDIC Silver Book, and that different layers of responsibility could be created as in the case of the FIDIC Yellow Book (Articles 1.9, 5.1, etc).

Design build

The use of BIM technology when employing this delivery system is clearly advantageous to contractors, who can optimise the design and make the most efficient use of their resources and time to achieve better results during the execution of the project.

However, many design build projects specify that the owner has the right to review or approve and approve the design made by the contractor. Does the use of BIM technology alter, or could it alter, the relationship between the owner and the contractor?
We think the answer is no. The use of BIM technology by the owner and the contractor does not change the relationship established in the design build construction agreement, but simply benefits both parties.

In these cases, despite the fact that the use of BIM would increase the quality of the design, the designer would be responsible for errors in accordance with the respective agreements parties entered into. Again, we believe it is relevant to point out that the FIDIC standard forms (Silver and Yellow Books) cover this issue and have set the referential international standard.

**Project management**

To address this specific project delivery system, it will be necessary to split the analysis between ‘at risk’ project management and ‘agency’ project management.

In the case of ‘at risk’ project management, where the risk of the project including the design, construction and procurement is assumed by the contractor, we believe that what we have said above is perfectly applicable.

In the case of ‘agency’ project management, the project manager, in accordance with the specific scope of services agreed with the owner, reviews and/or approves the design made by the different contractors or suppliers hired by the owner, and therefore again the use of BIM technology simply helps agency project managers in the performance of their services, including controlling the resources employed and the time scheduling.

To avoid or minimise conflicts during the project, a clear concept of the effects and scope of the review and approval by the agency project manager is absolutely necessary.

**BIM and collaborative integrated project delivery**

Now that we have briefly considered the usual project delivery systems, it is time to say a few words about situations encountered when using the BIM technology in a collaborative integrated project delivery system.

Previously in this article, we said that parties jointly determine certain objectives, construction methods and even certain parameters to be met when the contractor or a designer designs the project. What happens if: (i) the objectives, construction methods and parameters are incorrect or contain omissions or, in the case of the methods, they are not accurate or efficient? or, (ii) if they are correct, but the interpretation made by the contractor or the designer hired by the parties was erroneous but was subsequently reviewed and approved by the owner or by the owner and the contractor?

In response to point (i) above, we would say that objectives and parameters would be incorrect not only if they included errors or inaccuracies, but also if achieving them involved any solution altering cost and/or time objectives. This also applies in cases where the construction method was incorrect or inefficient.

Therefore, the risks in a determination jointly made by the parties will be assumed by them, unless there is an explicit (not implicit) provision made by the parties transferring the risk to one of them exclusively.

Regarding point (ii), it seems clear to us that the risk was taken by the contractor and it will only be shared with the owner if there is an explicit (not implicit) provision made by the parties transferring the risk to or sharing the risk with the owner as a result of their revision of the design.

What happens if the design complies with the physical objectives determined by the parties but does not comply with the time and resource objectives with the result that the cost of the project is skyrocketing?

We think that the answer is the same as in case (i) described above.

What if one of the parties alleged that it reviewed and approved the design or the parameters or some other relevant document because its counterpart made a representation that the information provided was correct, and that that information was not correct?

In these cases the answer is, again, strictly linked to what the parties agreed. If they agreed that the risk was to be assumed by one of them or was to be shared, this agreement must be respected.

As we can appreciate, the contract defines the assignment of risk and when the risk is not assigned, it should be borne by the party who made the decision and by both if the decision was jointly taken.
However, this answer could be challenged under Peruvian law.

**The Peruvian Civil Code and liabilities in the case of engineering consultants**

**Use of collaborative project delivery systems and BIM in Peru**

As Peru is principally a mining country, the employment of collaborative project delivery systems was initiated in these types of projects. Owners convinced of the benefits of having a contractor who is not necessarily an opponent but rather a partner, cautiously used some features of this type of project delivery system in some projects in the Peruvian highlands in around 2004/5.

Later on, Brazilian owners of mining projects conducted some experiments, developing schemes more similar to an integrated project delivery system. However, a key feature of the specific scheme they developed was to clearly identify three different types of risk: (i) those shared by the owner and the contractor (for instance, target price and target completion date); (ii) those taken by the owner only (right to decide the final supplier and some technological issues, etc); and (iii) those taken exclusively by the contractor (the price quoted for certain parts of the project that parties decided should be paid on a lump sum basis, for example).

BIM design is used for mining industrial facilities but not all the features it provides are employed.

To the best of our knowledge, a 100 per cent integrated project delivery system where every risk is shared among the participants has not yet been employed in Peru.

To the best of our knowledge, a 100 per cent integrated project delivery system where every risk is shared among the participants has not yet been employed in Peru. Sophisticated Peruvian owners, designers and contractors have not yet sufficiently developed a relationship of mutual trust which could allow them to benefit from all the advantages an integrated, collaborative project delivery system might bring.

In other projects not using the collaborative project delivery system, BIM is commonly employed but with limited use of its features. Mining, oil and gas and architectural projects take advantage of this technological tool.

Insurance companies serving owners, designers, suppliers and contractors have not yet given much consideration to the use of collaborative or integrated project delivery systems.

Informally, insurance brokers have expressed the view that as key decisions are taken jointly by the parties and consequently their liability is also limited in the contract, the risk exposure of insurance companies falls. We feel sure that open acceptance of this fact by insurance brokers will lead to requests by contractors (at least) to receive discounts in the premiums they pay.

However, all participants share a common concern. Is it possible to have a truly collaborative project delivery system if the contract is not clear on the liabilities each party will assume and a possible contingency has to be resolved employing Peruvian Civil Code rules?

**The Peruvian Civil Code and the use of BIM in a collaborative project delivery system**

Article 1762 of the Peruvian Civil Code states that:

‘If the rendering of services involves solving professional issues or technical problems of particular difficulty, the service provider is not liable for damages except in the case of wilful misconduct or gross negligence’.

The particular difficulty of technical problems when engineering consultants and contractors render their services is undeniable and, therefore, Article 1762 will always be applicable to engineering consultants, contractors and the engineers representing an owner. Arbitration awards have consistently backed up this assertion.

Also, we should add that other articles of the Peruvian Civil Code specify that the burden of proof for wilful misconduct or gross negligence lies with the receiver of the services and that judges and arbitrators must assume that any breach by the service provider is a result of simple negligence until any wilful misconduct or gross negligence has been duly proven.

This regulation, which clearly protects
designers and contractors from their liabilities in engineering and construction projects, is applicable across all the project delivery systems we have described, including, of course, collaborative ones.

How does this regulation affect the integrated project delivery system? We believe that these articles of the Peruvian Civil Code affect the integrated project delivery system employing BIM only if the liabilities of the parties to the construction agreement are not well defined in terms of scope, decision making, responsibilities arising from reviewing or for obtaining and analysing information, making calculations and so forth.

The reason for this is as follows: what if a party who approved or reviewed an erroneous statement made by its counterpart which leads to a failure in the project and/or increases its cost believes that its approval or revision does not absolve from liability the one who made the statement and furthermore believes that even though it did not in fact discover the problem, it is solely attributable to the wilful misconduct or gross negligence of the counterpart?

It will be very difficult for the claimant to demonstrate such wilful misconduct or gross negligence. This leads to the following question: do these rules encourage or discourage the use of collaborative project delivery systems?

We think that the rules contained in the Peruvian Civil Code simply oblige parties to be very careful and diligent in defining their obligations and risks and complying with the agreed standards.

This high degree of care and diligence applied from the very beginning of the project will allow parties to determine if their counterpart will be able to comply with their obligations under the contract. If a party perceives at an early stage of the project that a counterpart is being insufficiently diligent, it will allow them to take timely corrective measures (including termination of the contract).

Furthermore, this level of diligence will motivate parties to be extensive and thorough when conducting reviews, taking decisions and doing research.

Most importantly, this standard will provide the incentive for parties to define clearly the scope of work, their individual liabilities and what liabilities should be jointly assumed. In other words, to neatly and precisely express who is responsible for what.

So, having said all that, is new regulation needed?

Is there a need for new regulation?

We do not believe that any new regulation is required. We believe that adherence to a comprehensive, well-designed agreement is sufficient and that investment in adequate research and education in understanding what BIM is and what the collaborative project delivery systems are is important.

This educational task is not the responsibility of one party alone. The responsibility is equally shared among designers, consultant engineers, contractors, supervisors, owners, sponsors and construction lawyers.

A thorough knowledge of BIM and collaborative project delivery systems will permit project participants to understand the real risks they will be responsible for and, consequently, be of great assistance to their projects.

With that said, the risk in enacting regulation on these issues is that it may constrain, complicate or increase the cost of the agreements parties enter into, as no two projects are exactly the same.

Conclusions

BIM and collaborative project delivery systems open up new possibilities for all the agents involved in construction projects in terms of increased efficiency. However, the clear allocation of risks and liabilities (including their limitation) and the requirement for participants to be well informed on BIM and collaborative project delivery systems are the key issues.

New, innovative techniques will continue to be developed, with the consequent responsibility of the parties and their lawyers to adapt contracts to respond to new project needs and requirements. This process of evolution will never cease. We construction lawyers must also evolve with it, and learn to adapt to deal effectively with the new challenges faced. The time for BIM and the like has surely come.

Note

1 See: www.buildingsmartalliance.org/index.php/nbims/faq.

Jaime Gray is a partner and Jonnathan Bravo an associate at NPG Abogados in Lima, Peru. They are both specialists in construction law. They can be contacted at jgray@npg.pe and jbravo@npg.pe respectively. This article was previously presented by Jaime Gray to the ICP Subcommittee at the IBA Annual Conference in Boston in October 2013.