THE USE OF NEW TECHNOLOGIES TO DEMONSTRATE EXTENSION OF TIME (EOT). ALL PART OF THE "NEW NORMAL" UNDER COVID-19?

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INTRODUCTION

The coronavirus outbreak (and subsequent lockdown measures) has resulted in all businesses and industries having to rethink the way they work. Many workforces around the world are now working from home, or remote working, and are relying on new technology to do so.

While the construction industry is often perceived as a manual industry, with the majority of staff working on site in the job location, the pandemic has forced contractors and clients alike to adjust to new ways of working, with the industry forced to strive for more innovative ways of working. DGA believe this presents the construction industry with an opportunity to rethink how we implement and use technology.

Many projects are still planned "on paper" and this creates a disconnect between the office and the site. In our experience, providing planning services and assisting with independent expert advice (in adjudication, litigation and arbitration), the industry still relies heavily on such "paperwork". We are often presented with several years of information, and of course, this contains many errors, with many potentially valuable sources of data missing altogether. There seems to be a reluctance to use new technology in the industry.

In the context of a claim for EOT, it is vital to find all such sources of information, as the validity of a delay event claim will turn on the facts. It has to be assessed on its individual merits, including the factual evidence, the complexity and circumstances surrounding the event and of course, in accordance with the contract and applicable law. All too frequently problems arise, as parties may even be unable to agree exactly when a delay occurred, let alone the extent and impact of that delay.

Over the last decade, technologies such as "blockchain" (used for Bitcoin and cryptocurrencies) have been developed which have huge potential to transform businesses and the manner in which we work. We believe such technology has the potential to assist in roles such as my own (the demonstration of delay / delay analysis) by providing an effective way for the parties to agree records, identify the true extent of delays, and assess the impact of those delays.

TECHNOLOGY USE IN PLANNING PROJECTS

Construction projects tend to be complex, requiring the careful coordination of people, materials, and plant, as well as paper exercises such as document records and approvals. Projects often commence despite there being uncertainty and unknowns (such as incomplete design information, uncertain ground conditions, and so on). As a consequence, it is common for delay to occur.

Because of the volume of paperwork required, delay claims are often submitted, assessed and agreed months after the event. In many cases, the delay in making the claim comes because of the difficulty in collating said paperwork.

This article considers some key questions in this area:

Can technology solve this problem?

What technology is available?

How can the industry benefit from using it?

Below I consider how new and emerging technology can improve this process, as I feel it can help to provide a level of project transparency which helps to solve disputes and demonstrate delays. This article discusses the technology available to the construction industry and the potential ways it can help.

BIM 4D

BIM or Building Information Modelling is one of the fastest growing and developing construction technologies. The term "4D" arises from the linkage of the project's programme (the "time" dimension" with the project's existing 3D model (usually based around a CAD model).

A BIM model should be far more complex and extensive than a simple 3D model. While the CAD system enables the graphical representation of construction drawings (that were traditionally paper-based), the integration of BIM within the model allows the linking of that representation to a variety of datasets from multiple sources. A model may, for instance, capture both the pricing information for components of a construction project and the order in time that those components are needed in the build (the programme information).

An example showing an As-Planned v As-Built 4D BIM model is provided below:

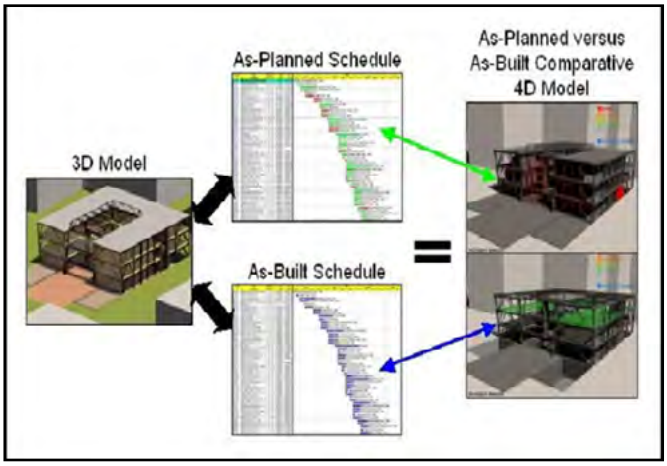

Figure 1 – showing that one could visualise the difference between as-planned v as-built progress at a given point in time.

Once compiled, such a model should be continuously updated during the execution of works by the people and companies carrying out the work. A well kept model will serve as a vital source of project information both during and after the project: it can be useful for managing everything that changes in the programme, and eventually, be the repository for all as-built information about the project.

BIM can, therefore, serve as a 'single source of truth' for all project participants, from initial planning and design, to construction, management and operations, up to the date the building is decommisioned or demolished In relation to my planning work, BIM potentially has the ability to provide a "live As-Built" programme which could be relied upon for any subsequent delay analysis.

In order to be most useful, all information about a component is needed, from costs and lead-in times, to the duration of installation/construction,

BIM 4D
DGA GROUP CASE STUDY
HONG KONG

DGA Group was engaged by the Main Contractor on the M+ Project, Hong Kong's new museum of visual culture, located at the West Kowloon Cultural District. At the time of our engagement the project was 18 Months behind the original Contract completion date with the Employer lacking confidence in the programme to completion.

DGA coordinated and managed the implemention of a 4D BIM model to identify and enhance the project programme.

This enabled the Main Contractor to accurately re-plan the programme to completion, restoring confidence with the Employer. As an additional bonus, under our remit the model assisted the Contractor to identify a number of key heads of claims that had not previously been identified or demonstrated.

including the sequence of component installation, and dependencies on, and for, other areas of the build (in essence what would historically be considered predecessors and successors). A colour coding system can be incorporated into a BIM 4D model, adding the advantage of being able to visualize delayed activities and their impact on the project completion.

BLOCKCHAIN

The construction industry is regularly cited as being highly fragmented, with (in particular) large capital infrastructure programmes often being highly distributed and difficult to manage effectively. Crossrail, for example, employed a huge number of suppliers and workers at the peak of construction. Managing such supply chains (keeping track of work progress, schedules, payments) takes significant resources and effort, and individual projects (within the wider programme) experience varying delays and claims.

I believe blockchain technology, used in the underlying technology of Bitcoin, may be able to help such issues, to make the process more efficient, transparent, and accountable between all parties involved in the project.

In simple terms, Blockchain is a type of "distributed ledger" which is also highly reliable and secure. "Distributed" means that the database is scattered across multiple shared locations, similar to a cloud data system. Some of the advantages of blockchain technology include:

a) Decentralised data: records are stored on multiple nodes across an array of locations, which reduces the risk of data loss (e.g. from fire, theft, hacks, and corrupt file systems). It disperses the power and control over the data because no single administrator retains control of the information.

b) Transparency: the decentralised technology means that everyone holds a copy of universally agreed upon transaction records.

c) Time-stamping: this is built into the system, and will reduce the ability for parties to disagree on key time matters (approval dates, timing of late information, etc.)

The system does not need to wholly supplant the procedures already in place on a construction site, but using a blockchain layer will facilitate and record those processes within an automatic, unchangeable record. Every task order, approval and work completion can be registered and made traceable.

Construction contracts often involve complex challenges such as unforeseen issues, changes in programme, or health and safety problems, which can result in claims and disputes. Blockchain technology could optimise the project plan and enhance collaborative working (something that modern contracts such as NEC encourage).

If started from day one, Blockchain technology would allow all parties to receive project updates delivered in "real-time". If and when disputes arise, the transparent, time-stamped, record will make it much simpler to establish the "facts" in an efficient manner.

The potential applications for blockchain technology in the design and construction industry are endless. Project information could be made universally available to every level of the project team, leaving no excuses for a breakdown in communication. Clients, design consultants, general contractors, subcontractors and suppliers could all be given the ability to update the project database in real time.

Opening these lines of communication could improve many areas. Deliveries could be tracked, inspections shared, schedules updated, change orders processed and submittals reviewed, all in real time, while maintaining a complete historical record of the processes and contractual obligations and timelines surrounding them.

The use of "Smart Contracts"

While many of the above uses are still "in the pipeline", Blockchain technology is particularly applicable to the development of 'Smart Contracts'.

A Smart Contract is essentially:

a) A set of undertakings, specified in a digital form including a protocol within which the parties perform these promises.

b) A recording of the legal agreement between the parties that is written in a language that is both human-intelligible and machine readable.

c) An algorithm which automates some or all of the performance of the agreement.

Being essentially software, such contracts need somewhere to operate, and this is where blockchain technology is ideal. Combining blockchain technology and smart contracts allows a single 'source of truth' for all contract data, providing an audit trail of design approvals, data verification and project management decisions.

Using blockchain technology, smart contracts and a BIM construction model ought to minimise the possibility for disputes. For example, the signing for receipt of materials could trigger a smart contract clause that automatically triggers payment under agreed timescales.

With development, smart clauses could be constructed to drive contractual notices, such that the fact of delay is managed more automatically.

The implementation of Smart Contracts (and Blockchain) is still a long way off as the industry is still getting used to BIM 3D, and often struggles even to move into BIM 4D. However, it gives the industry something to think about, and I am excited to see how the technology will be used.

ELECTRONIC SITE RECORDS

Site records are one of the sources of information used in demonstrating delays, and are vital for the demonstration of as-built progress.

Traditionally, this is done by keeping a paper based daily diary, which is then often typed in some electronic form, but this method relies on memory and handwritten notes made on site at the end of a day, and is time consuming (and, perhaps, not always reliable). Detailed, high quality records are difficult to achieve using a "paper" based process.

Providing a way to record information electronically, and integrating this with photographic, location and weather information (and any other such evidence), would achieve a higher level of quality and detail.

Producing such records electronically, contemporaneously and on site, can greatly improve their regularity and reliability, and good records significantly benefit the parties, and provide good information for subsequent analysis. The information can be uploaded as it is made, and can then be secured and backed up (in the cloud or using blockchain).

Such records allow for quicker access in the case of a dispute, and (for my work) allows more accurate and reliable delay analysis (with base information that is clearer and more accurate).

DRONES AND 360 DEGREE CAMERA PACKS

As they have improved in stability, reliability and price, the use of drones on construction projects has grown dramatically. However, even simple video recording using a 360 degree "walkaround" pack will provide a valuable "static" record at the point it is made.

Their use has enabled many clients and contractors to collect detailed real-time data about what is happening on site, which provides huge benefits when carrying out a delay analysis. The primary tasks drones are currently used for include:

(i) Monitoring progress on large sites, with the ability to validate and control completed work over a large area in a short timescale. The faster you are able to check and validate a task, the faster you can move on to the next task, saving time in the overall construction, and ensuring that deadlines are met.

(ii) Capturing progress photos / footage and reports. It is often valuable to have a "set route" for a drone to follow, with key photographs extracted from specific locations, and a video running to ensure that the same positions on site are recorded at the same time. An ability to watch multiple video streams alongside each other enables a visual identification of what has happened between visits, and a check / correlation against planned progress will allow the identification of parts of the project that are becoming delayed (and the ability to take proactive steps that may reduce those delays).

Extended services are also becoming available, as the use of drones and video recording alongside digital mapping and imaging tools is allowing the full digitisation of surveying and setting out services against existing structures and/or landscapes.

In my view, the regular use of video surveying systems can significantly improve the reliability of post contract delay analysis, with the clear reality of change and delay being captured in "real time" to demonstrate the issues on site to all parties involved.

CONCLUSION AND SUMMING UP

The use of new technologies holds great potential. Used proactively and regularly, such technology can be a positive force in the industry by:-

- The improvements in smart contracts will enable easier supply-chain management, and more defined and smoother contract administration (such as automated payment control systems).
- Using BIM and blockchain technologies more often should be used more regularly to improve and ensure the consistency and reliability of project records, and reduce the scope of disputes.
- Applying video recording and progress tracking systems integrated with other electronic

site progress recording methods, so as to improve the depth of these records.

The construction industry should be (and is) looking at how we can use different technological advancements to improve the way we work. Much of the technology is already here to help us build efficiently, safely, and on time, and to assess and record issues as they arise. It is only a matter of time before the more technological advanced processes and systems become more readily available. This will make my life easier, when seeking to assess and demonstrate delay!

If you need assistance in managing projects, tracking progress, or recording, making, or defending claims, DGA Group can provide the necessary level of support. We can provide consultant and/or seconded project-level team support, or can help in the assessment of specific issues, including preliminary reviews and recommendations for how to manage claims or disputes. Ultimately, we are able to provide detailed, fully independent dispute resolution and Expert Witness support as needed for both Quantum and Delay matters.

If you would like more information about the specific case study, or how BIM could be applied to your project needs, please contact our trained BIM consultant anel.idriz@dga-group.com.

MORE INFORMATION

If you would like to find out more details about any of the subjects covered in this Ebriefing please contact DGA Group through the contact details below or at DGAGroup@dga-group.com

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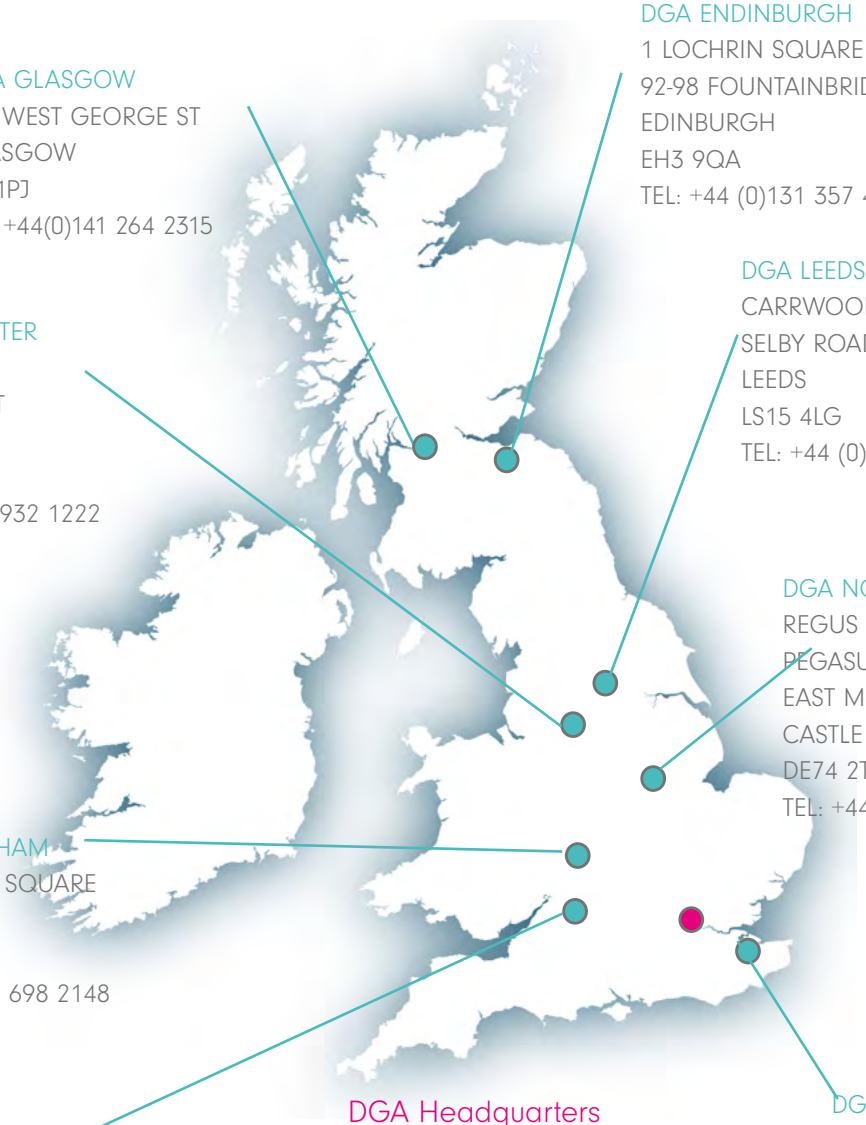

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