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Issue 16 | November 2018

DIGEST



Time for Tech



Welcome

to the Driver Trett Digest



Mark Wheeler
Global Chief Operating Officer

Welcome to the sixteenth edition of the Driver Trett Digest. Recently, I have been introduced to some apps, which are available freely to the billions of smartphone users worldwide. One of which uses the camera in the phone to read aloud from a document, instantly reading any one of over 100 languages and translating into whichever other language I choose. I am sure this app has much better uses than in giving me comfort that what I was ordering that night would not be a complete surprise, and also hopefully no longer alive. However, it did get me thinking about the technology deployed in construction these days and what our industry will be doing in five or ten years' time.

In this edition, Mahmoud Abougabal discusses 4D planning in the Middle East and speculates about the virtual reality (VR) next step. David Pritchard discusses the bespoke tools that our Singapore based data team are creating and using Artificial Intelligence (AI) in the future to make sense of the 'Big Data' we have created and must now manage. There are dangers with intelligence, particularly the artificial kind and Garth McComb discusses this issue in the context of a recent case. This also links into

John Brells' article on eDiscovery and its application to many of the larger cases we are currently working on. Technology is here to stay and getting better each day. If you would like more information about any of the cutting-edge techniques we are using, please contact us through the website.

This edition also offers some useful insights from Yamin Shihab as to Integrated Project Delivery and part two of Mark Castell's 'grey haired' expert article which looks at how things can sometimes get lost in translation. Other articles on mediation, expert witness and payment matters can also be found within this Digest. As much as new technology is important, our core skills have never been more in demand. Complex projects will always need people with a great deal of experience and world class skill sets to deliver them, turn them around if they go awry, or sort out the issues at the end in some form of dispute resolution. So, it seems that things are changing in terms of the tools we are using but staying the same in terms of the services we provide.

If you would like any information about our business, or perhaps would like to contribute an article to the next edition, please do not hesitate to drop us a line.

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4D planning - the case for proactive coordination in the Middle East's construction industry

Exploring the region's ongoing drive for innovation - including their approach to managing their futuristic construction projects.



Mahmoud Abougabal
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Over the course of the last few decades, the Middle East took significant steps to establish itself as the ultimate stage for modern architectural marvels. For it is here where the tallest man-made structure was conceived, the world's most iconic museum was re-inaugurated, gargantuan shopping malls were plotted, and sprawling, flora-inspired artificial islands were reclaimed back from the seas. Here, it is acknowledged with certainty, that not all projects are created equal.

It is on the back of such insatiable ambition that, come the year 2030, the region will have also hosted both a World Cup and an international Expo; been interlinked with space-grade hyperloop technology, and seen autonomous vehicles and flying taxis whizzing through its veins. Such a fiction-esque vision of the future is a testament to how construction and infrastructure projects have grown increasingly ambitious, requiring complex, cross-discipline coordination and engineering dexterity.

It is evident how these complexities give rise to fresh challenges at every stage of construction. Design clashes and incorrect sequencing of activities are only some of the most pertinent, yet avoidable, causes of delay in construction. And while designers and engineers have taken significant steps to reduce unnecessary errors by moving away slowly, but surely, from 2D computer assisted design (CAD) to 3D building information models

(BIM), contractors are still reluctant to follow suit. Then again, in a region where every other project is of pressing urgency, this could very well make all the difference.

Conceding to these dynamics, contractors often find themselves on the backfoot in full recovery mode. Haunted by missing information and numerous employer variations, contractors are seldom proactive, rendering the powerful planning tools at their disposal unreliable and overlooked. As for the cyclical construction lookahead reports, these too are heavily reliant on the skill and intuition of an overworked and understaffed planning department, unable to customise them to the needs of every stakeholder.

Therefore, a question beckons: Is it possible to build a planning model that is simple enough to be readily accessible by all stakeholders but that carries enough sophistication to be free from common planning errors? Can the same errors that instigate unrealistic expectations, such as 'the invention of flying hoverboards in the year 2015', even result in timeline paradoxes 'out-of-sequence activities'?

The short answer - Yes, using 4D.

So, what is 4D?

According to the most popular form of contract in the region, the Fédération Internationale des Ingénieurs-Conseils (FIDIC) 1999 Red Book, contractors are under an obligation to submit their proposed planned sequence of work in the early stages of construction. This is referred to as 'the programme'.

Whilst the programme's integrity in these stages is more or less intact, this certainly changes when subjected to employer's variations and the contractor's re-sequencing of its own activities - which are all healthy signs of

progress on site. The net result is a stupendous amount of data crunched into uninspiring, routine planning reports. The daunting task faced by planners is to streamline the tens of thousands of data-carrying activities into a comprehensible output, rendering the quality of project records a key factor to a reliable programme. Succumb to poor programme management, however, and this becomes a typical case of garbage-in garbage-out (GIGO), as coined by the computer science industry.

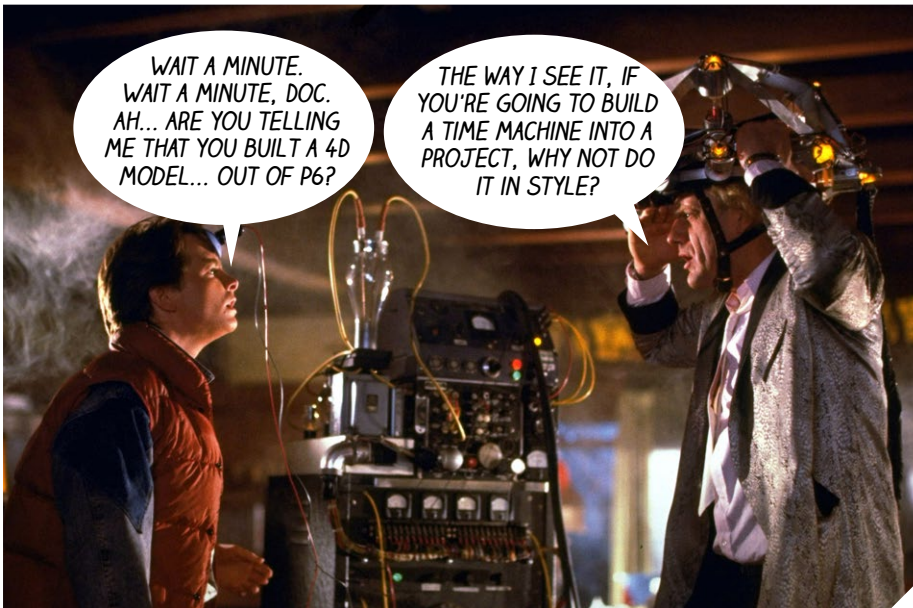
The fourth dimension, more commonly referred to simply as 'time', has always been a staple of construction progress reports. Time record-keeping earned its prevalence for a good reason too. Early completion of commercial projects is fundamental to maximising profit; therefore it is key, if contractual parties eventually lock horns over the issues of lost profit, prolongation costs, or liquidated damages.

'Time recording' is conducted on an independent planning platform where its workings are inaccessible to other disciplines. Even more direly so, although these platforms now allow for simultaneous multiple user access to the programme, only one user is typically allowed access at any given time to minimise the risk of errors.

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One might even dare to wonder whether Gantt charts could one day be replaced by highly accessible four-dimensional models

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To tackle this shortcoming, avant-garde contractors Bechtel and Hitachi worked together to merge aspects of design and construction planning in the world's first 4D model as early as 1987. In this model, designers, planners, and builders all collaborated to create a unified all-accessible view of their project. Today the same concept is further developed by the introduction of mainstream 4D planning software much like Synchro.

An independent and capable planning software in its own right, Synchro is also able to merge 3D BIM models, prepared by designers on Revit, with programmes built using planning platforms such as P6. This merger results in assigning every BIM element (beams, slabs, doors, etc.) to a time-bound programme activity and vice versa. The all-inclusive model carries enough information to produce 2D shop drawings, 3D renderings and 4D footage of planned construction activities and crew movements on site. Moreover, the end product possesses enough versatility to be useful to technical and presentable to non-technical stakeholders alike.

The power of the fourth dimension

Just as designers and engineers introduced three-dimensional BIM models to coordination workshops, contractors can also now have the means to be active participants in the design process. But make no mistake, this is beyond a mere cosmetic upgrade. The integration of 4D planning and BIM design brings powerful and automated clash detection tools to design and construction. Such tools will speed up and enhance the quality of design and planning reviews and minimise errors.

Software like Synchro, can detect three main types of clashes:

- Hard clashes - when two construction elements pass through one another or occupy the same space due to a design error.

- Soft clashes - when objects encroach into geometric and spatial tolerances.
- Workflow clashes - detects out-of-sequence anomalies related to procurement, construction, and work crews on site.

The project's critical path can also be represented dynamically using 4D. One might even dare to wonder whether Gantt charts could one day be replaced by highly accessible four-dimensional models. That, of course, is subject to employers and whether they are willing to spare the effort and bear the cost.

4D in the Middle East

The Middle East is a test site for novelties of all sorts. A recent survey conducted by Algohari (2017)¹ confirmed, perhaps unsurprisingly, that the United Arab Emirates is ahead of the pack when it comes to BIM adoption, followed by Qatar. According to the study, the general consensus among construction professionals favours 4D adoption, citing its many benefits from construction scheduling to logistics planning, and from clash detection to rendering and visualisation.

Yet, with all the cited benefits, 4D planning still has a few hurdles to overcome. The most obvious of which is perhaps the lack of trained professionals capable of capitalising on the premise of 4D. In the same study, Algohari¹, indicated that 60% of its survey correspondents identified the, "lack of skilled specialists" as the main challenge in preventing wide-scale implementation of 4D planning. This also resonates with one's personal experience. There is already a proven struggle to maintain reliable Gantt chart programmes, which are all but free of the sophistication required by BIM based software.

Client backing is undoubtedly another prime, if not the key, factor in 4D implementation. This is why many 4D and BIM advocates hailed the Dubai Municipality's move to become the first public authority in the Middle East to mandate

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the use of BIM in 2013. Shortly thereafter, in 2015, Dubai's Roads and Transportation Authority (RTA) released a BIM manual for its construction projects, further cementing the Emirate's progressive vision. However, this optimistic sentiment is not necessarily shared by the many employers of the region; who understandably, after the 2008 recession, always aim to keep their immediate costs down. Nevertheless, it can always be argued that by not investing in preventive 4D technology, construction projects would be more prone to design conflicts, leading to project delays and possible contractor claims. Therefore, in the long run, employers can actually find themselves losing more money than they were trying to save in the first place.

The future of 4D

4D implementation may not eradicate 'bad design', nor completely render clients impermeable to troublesome contractor claims. Yet, the case for 4D planning is that it can create a much-needed collaborative environment in which even the least-technical of stakeholders can achieve non-zero-sum gains. Even when delays cannot be avoided, it can serve to shed light on the manner and extent of delays by means of simple and accessible visualisations. More importantly, in a region where arbitration is yet to gain significant traction, 4D planning can be just the right medium to approach local courts in cases of litigation.

On the experimental side, 4D is also being integrated with other exciting technologies, such as virtual reality (VR), giving a more immersive and personal outlook into both prospective planning and retrospective records of progress on site. One might wonder, "isn't this moving too little too fast?", but you must have heard: 5D and 6D solutions are already making headlines! ■

¹Algohari, S. (2017) *4D Modeling and the Middle East*

Risky business – performance indicators from a contractor's perspective

Examining the practice of key performance indicators within the public works authority framework construction contract, for use on local roads and drainage projects in Qatar, and the financial risk allocated to contractors as a result.



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Risk taking has become a notable area of concern for contractors in Qatar in recent years, due to demanding economic times and the intense competition within the construction industry. As with all projects, the construction contract

is the focal point for the allocation of risks between the employer and the contractor. For that reason, it is always advisable that risks and responsibilities are clearly allocated within the contract. Although an employer and its consultants may decide the risk allocation policy for the project, both parties to the construction contract need to provide adequate risk management.

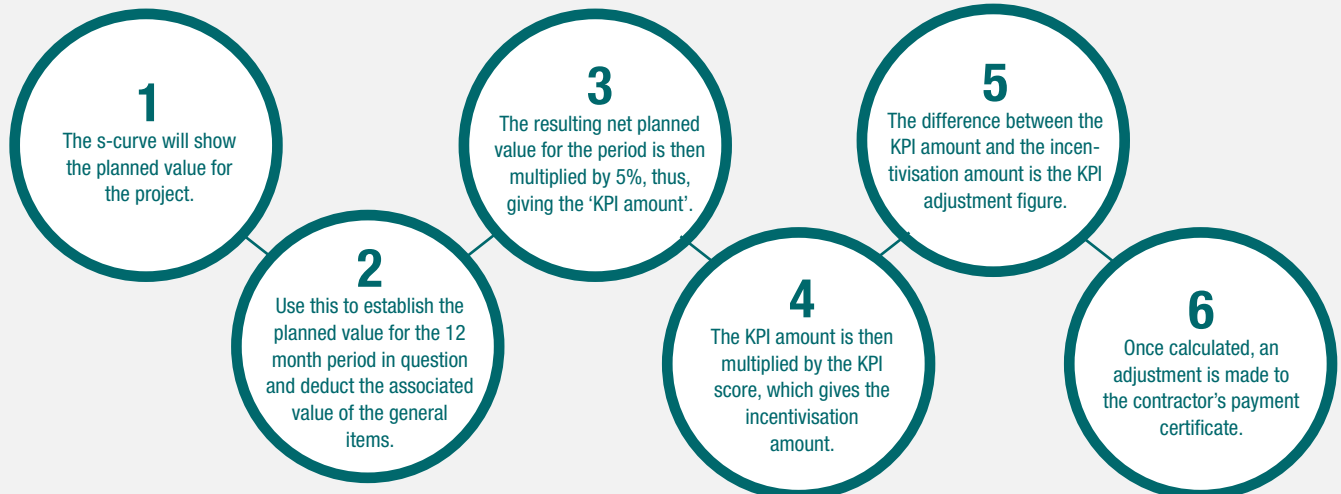
The concept of risk and the allocation of that risk within construction contracts, or indeed any contract, is not a new one. Being aware of the risks imposed by a specific contract

and assessing those risks is vitally important. It will serve as a benefit to the project in terms of execution and delivery. The extent or level of success or failure in being aware of, and managing risks, is likely to have a huge financial impact on the parties involved; particularly the contractor. Therefore, it is in the contractor's own self-interest to ensure that they are aware of the contractual risks that are being placed upon them.

Sir Michael Latham, author of the 'Latham Report', an influential joint government and construction industry report in the United Kingdom (also known as 'Constructing the

Box 1 - Calculating the KPI Amount

How to calculate the KPI adjustment?



Sub-clause 2.1.5 within schedule 5 of the framework contract states that the KPI amount is a 'fixed sum'. It is 5% of the work order price, excluding general items. It is important to highlight that if the contractor fails to achieve the maximum scoring, then this will result in a penalty to the contractor. Therefore, the KPI adjustment is not a bonus to the contractor, as it will give rise to a negative financial adjustment.

Another caveat that is worth highlighting:

Sub-clause 2.1.7 within schedule 5 of the framework contract states that: "the value or calculation of the KPI amount may be re-benchmarked if the engineer determines that circumstances have changed such that the originally calculated value is no longer valid". However, it is not clear as to what criteria the engineer would use to determine a change in circumstances? It appears that it is somewhat at the discretion of the engineer.

Team') highlights that:

'Risk is of course endemic in all forms of construction work. It can be managed, minimised, shared, transferred or accepted. It must not be ignored'¹.

Contractor performance

In recent times, the Public Works Authority (PWA) in Qatar have chosen to use key performance indicators (KPIs) to define the level of performance expected from contractors when undertaking their work on site.

Whilst the application of KPIs is not widely used in Qatar (outside of public work contracts), it is important to highlight that other employers, such as private sector employers, may look to incorporate similar contract mechanisms on upcoming projects. It is often the case that, when a new contractual approach has been implemented by a certain sector or certain type of employer, other employers tend to follow suit. So, we may see more contracts in Qatar include KPI provisions over the coming months or years.

From consulting with contractors engaged on the public work contracts, there is evidence to suggest that:

- A high degree of uncertainty pertaining to the KPI risk exists;
- This included uncertainty about the nature of the risk and the magnitude of the risk involved;

- Active risk management, on the part of the contractor, only became a focus during the construction stage; and
- As a result, contractors were not fully aware of the potential negative financial implications associated with the KPI risk.

What is a Key Performance Indicator?

The Cambridge Dictionary online (2016) provides a general definition of a key performance indicator as, "a way of measuring a company's progress towards the goals it is trying to achieve". In other words, KPIs are a set of quantifiable measures that compare performance against key objectives.

KPIs, form part of the Public Works Authority's Framework Construction Contracts for use on the Local Roads and Drainage Programme in Qatar. The framework contract states:

'Key Performance Indicators' or 'KPIs' are the mechanism against which the Authority measures the contractor's performance of the Works as described in Item 7 [Key Performance Indicators] of this Schedule B: Payment Schedules'.²

So at a glance, the word or phrase KPI does not set off alarm bells. Nor, in terms of risk, does the definition of a KPI appear onerous at the outset. But of course, as they say, the devil is in the detail.

Taking a closer look, the primary objectives of the application of KPIs is contained within the opening paragraphs of schedule 5 of the contract. It states the inclusion of a KPI is to:

- Incentivise contractors to implement a culture of health, safety, quality, stakeholder management, environmental culture and sustainability culture.
- Measure the actual performance by the contractor under the Contract.
- Promote a culture of continuous improvement by the contractor against a set measure of performance.

The framework contract also uses terms such as 'Payment Linked KPI' and 'KPI payment mechanism', thereby implying that the KPI results will have a direct financial impact on the contractor. Therefore, it is important to note that KPIs will not only be used to measure performance against a prescribed benchmark, but they will also influence the amount paid to the contractor.

The KPI results will, except in exceptional circumstances, have negative financial implications upon contractors (see boxes 1 and 3).

Risk management

The importance of managing financial risks associated with, and arising from, construction projects cannot be under estimated. Risk

management has been described as: “the art and science of identifying, analysing and responding to risk factors throughout the life of a project and in the best interests of its objectives”³. Ashley et al⁴ also suggests that there are three broad categories to risk management. These are:

- Risk identification.
- Risk analysis.
- Risk response.

In this instance, we first identify the risk; the inclusion of KPIs within the framework contract. In terms of risk analysis, one needs to consider both the probability of occurrence and the likely financial consequence. Once the risk analysis is complete, a risk response can be prepared.

Box 2 - Elements to the KPI Process

There are five key components to the ‘Payment Linked KPI’ process against which the contractor’s performance is measured. These are:

1. Health and safety.
2. Quality.
3. Programme completion.
4. Stakeholder management.
5. Sustainability and environment.

Each of these five elements also contain sub headings or, what are also known as, ‘KPI sub-sets’:

a) **Health and safety has three sub-sets:**

1. Assesses the number of significant injuries that occurred on the project.
2. Measures the number of road traffic accidents in relation to the works.
3. Under health and safety, assesses the number of near misses reported during the 12-month period.

b) **Quality has also three KPI sub-sets:**

1. Measures the number of non-conformance reports (NCRs) closed out during the period in question.
2. Assesses the failure rates of inspection and test results.
3. Assesses the number of defects identified at the time of handover.

c) **Programme completion has only one sub-set:**

1. Measures the level of compliance with the completion milestones as stated in the work order.

d) **Stakeholder management has only one KPI sub-set:**

1. Measures the extent of effective stakeholder management, and efficient coordination and interfacing with key project stakeholders, such as the local residents.

e) **Sustainability and environment has only one KPI sub-set:**

1. Relates to compliance with all statutory requirements set out by the Ministry of the Environment, and complying with the construction environmental management plan (CEMP) as required by Qatar construction specification (QCS).

This may include, for example, the contractor electing to focus their efforts on achieving the best possible KPI scores by ensuring they have designated resources assigned to the task identified in Box 2.

The example in Box 3 is based on a relatively positive KPI score of 80% and a contract value of QAR 500,000,000. There are, of course, projects with higher contract values, and these projects may not secure a KPI score as high as 80%. This could potentially expose a contractor to deductions in the region of QAR 7,000,000 or higher.

All of these possibilities mean that a contractor’s approach to risk management needs to be proactive, focused, and engaging. Ultimately, a contractor needs to consider to what extent they may include the cost of such risk within its tender bid, while at the same time, ensuring their tender bid is competitive enough to win the project.

During the construction stage, the contractor also needs to obtain the best possible KPI scores, and to achieve this, the contractor will need to ensure

that they have assigned sufficient resources to achieve these goals.

In conclusion, the potential financial consequences associated with KPIs illustrates the importance of contractors ensuring effective risk management procedures, together with associated resources, are in place from tender stage through to construction completion of PWA projects. ■

¹ Latham, M. (1995). Keynote Address by Sir Michael Latham. In M. Odams and J. Uff, *Risk, Management and Procurement*, London: Construction Law Press, pp. 1-1.

² Public Works Authority. (2017). *Framework Construction Contract for Local Roads and Drainage Programme*. Doha: Public Works Authority.

³ Wideman, RM., *Risk Management, Project Management Journal*, September 1986, pp 20-26.

⁴ Ashley, D.B., Dunlop J.R. & Parker, M.M., ‘Impact of Risk Allocation in Construction Contracts’, *Risk, Management and Procurement in Construction: Centre of Construction Law and Management*, King’s College London, 1995, pp. 113.

Box 3 - Example: examine the potential impact of the KPI risk on a project using a contract value of QAR 500,000,000 and a KPI score of 80%.

Table 1

Project A	'a'	'b'	'c' = ('a' - 'b')
Financial Particulars	Planned Cash Flow of Works	Cash Flow for General Items	Planned Cash Flow Amount (Excluding General Items)
Planned Value - Year 1	260,000,000	39,000,000	221,000,000
Planned Value - Year 2	240,000,000	36,000,000	204,000,000
Work Order Price	500,000,000	75,000,000	425,000,000

Table 2

KPI CALCULATION FOR YEAR 1 FOR PROJECT A		QAR
(a)	Planned Value of Work - Year 1	260,000,000
(b)	Deduct: Class A; General Items	39,000,000
(c)	Net Planned Value of Work = the Planned Value less the General Items; 'c' = 'a' - 'b'	221,000,000
(d)	Deduct the KPI Amount. Establish the KPI Amount by multiplying the Net Planned Value of Work by 5%; 'd' = 'c' x -5.0%	-11,050,000
(e)	Add the Incentivisation Amount. The Incentivisation Amount is established by multiplying the KPI Score '80%' x KPI Amount 'd'	8,840,000
(f)	KPI Adjustment for Year 1 is the KPI Amount plus the Incentivisation Amount; 'f' = 'd' + 'e'	-2,210,000

Table 3

KPI Calculation for Project A		QAR
(a)	KPI deduction amount: Year 1	-2,210,000
(b)	KPI deduction amount: Year 2 (Also using 80% KPI scoring)	-2,040,000
(c)	Total KPI deduction for Year 1 and 2; (c) = (a) + (b)	-4,250,000

Conclusion

- The KPI adjustment for year 1 gives a negative adjustment of QAR 2,210,000.
- If, for year 2, the same KPI scoring were to be applied, a total deduction to the Contract Price of approximately QAR 4,250,000 is made.
- This equates to almost a 1% deduction from the Work Order Price of QAR 500,000,000.

AI technology, BIG data and schedule analytics

Should Driver Trett plunge into the 'BIG' data trend? Do we have the right talent and knowledge to move us into the future?



David Pritchard
Senior Consultant,
Driver Trett Singapore

Bill Gates once said: "Information technology and business are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without talking about the other". Whichever department you work in, or whatever interests you may have, it is inevitable in today's market that you will come across a story on how 'data' is changing the face of business. While it could be using data to increase revenue through efficiency, or adding additional revenue streams, or using business intelligence tools to accurately predict forecasting; data should not intimidate the user, but should be utilised to create

informative data visuals and accurately produce results, to gain leverage in today's competitive markets.

Data is integral to our work and how we manage this affects how we conduct our day-to-day business activities and subsequent work flow. The Singapore data team has found great success in efficiently processing large quantities of data to support and enhance delay analysis. Under the management and guidance of John Lancaster and myself, the data team have successfully solved a number of complex problems, using a wide range of applications.

Some of the challenges the team encountered range from extracting significant volumes of data to linking welding databases into 3D models. They have derived certain solutions to complex problems, including writing comprehensive programming to automate the link to 3D models; or using bespoke tools, such as an in-house

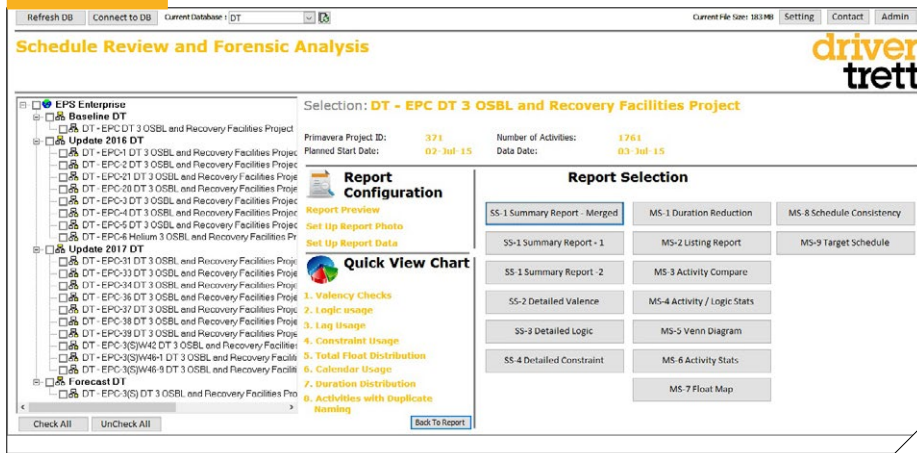
application which interrogates the structured query language (SQL) database of Primavera planning software. These solutions will allow the end user to generate schedule reports which can be used to supplement the delay analysis.

Large volume of documents from the clients

Currently, Driver Trett have approximately 45 servers worldwide, storing somewhere in the region of 45 terabytes¹ (TB) of data. Considering that 1TB is generally estimated to contain 75 million pages, it is becoming more apparent of late that the volume of project documentation received from our clients is growing from previous years.

For example, one of our recent projects required the interrogation of around 2TB of data. Digestion and interpretation of vast quantities of information within the client's timeframes (whether it be for a claim submission ►

Figure 1



or an expert report) is a challenge for most, if not all, consultancies and their respective teams. The data team have found the answers to automating a number of processes.

As an example, a typical process that the team manage is the extraction of data from daily progress reports, which is usually from a number of sources, not to mention differing formats. The use of daily progress reports is an important part of the assessment, as it often provides important information regarding what actually happened during the project lifespan.

Let's say a hypothetical project spans over three years, this equates to the extraction of approximately 720 documents for a productivity study, and possibly many more if there are multiple subcontractors. This would create literally tens of thousands of records to be captured. If analysis of the 720 documents in question were completed manually by a delay analyst, it would likely take several weeks (or possibly months) to perform and could be prone to human error. The data team has been able to streamline this process, requiring approximately 1-2 days to write the relevant code and then a further 2-3 days to capture data from many different formats of reports. When the data is extracted, it is populated into a database (allowing for ease of data management) where team members can access the data via the server to perform their respective analyses. In total, the automated process may take around 4-5 working days.

Schedule analytics

The data team have been developing a reporting system for the efficient analysis of Primavera schedules. They have now developed a fully-functioning application called the schedule analytics tool (SAT). This offers a suite of reports which allows the user to analyse multiple schedules simultaneously, as well as generating analyses at the click of a button.

The SAT has been designed to be user friendly, having a straightforward interface (see Figure 1). The tree-view structure shown in Figure 2 indicates that, when selecting reports, it mirrors the same structure as the Primavera enterprise project structure (EPS) created by the user.

Users can intuitively toggle between high-level schedule analysis, or dig down into the detailed activity levels and analyse the data via a powerful filter option. When it comes to sharing the results, users are able to export the chosen data into a PDF format file. Additionally, as further analysis might be required using the same data, the SAT has an enabled property function to export the raw data into a MS Excel workbook, putting it into a format which allows the user to create their bespoke graphs and reports.

4D modelling

The data team have been looking at ways to utilise 3D Navisworks² (NWD) models other than using it for taking two-dimensional (2D) snapshots. The data team have developed

effective ways to identify equipment, pipelines and various other properties within the 3D model, using programming code such as hypertext mark-up language (HTML) and visual basic application (VBA). This then allows the user to feed data into the backend of Navisworks and, as a result of this process, a 4D model can be re-created using site records showing exactly the sequence of works, as recorded in the data.

Traditional building design was largely reliant upon 2D technical drawings whereas, in recent years, building information modelling (BIM) is now becoming the norm. With the implementation of BIM, the data model can be augmented beyond the three primary spatial dimensions by including time as the fourth dimension, known as 4D modelling, and cost as the fifth dimension known as 5D modelling. This has gained traction in the construction industry and, in 2016, was valued at approximately USD 3,976.6 million and was forecast to grow at a compound annual growth rate (CAGR) of 19.3%³ from 2017 to 2025. BIM is also proving to be a beneficial tool in alternative dispute resolution (ADR). For instance, delay experts have been presenting 4D models to tribunals to visually demonstrate how delay events have impacted the sequence of construction works.

As is commonly understood, outsourcing tasks like this can be expensive. The team have investigated and innovated what they consider to be the best ways to link schedules and project data into the 3D models. This removes the tedious manual selection process, where the user has to manually select and group items in the model, to the activities in the schedule. By automating this process, they have substantially reduced the time to perform these tasks. Furthermore, a tool has been developed to import data directly and efficiently into Navisworks, allowing the creation of a 4D simulation; whereby information provided by the client, along with schedule data, can be linked to the model by means of automation.

The future Genetic Algorithm

Due to the complex nature of the projects that Driver Trett work on, there are often a number of possible sequences in the schedules linking execution of the works. Each of these sequences represents a different methodology for execution, or may be a subtler reconfiguration. Typically, when a set of activities are re-sequenced, the schedule should likely yield a different project completion date or a different profile of resource usage. With artificial intelligence (AI) now making its way into all industries, the academic community have been applying evolutionary algorithms to resource constrained project scheduling problems. As a result, the most optimal solutions are being generated, as these algorithms have proven to give better solutions than conventional planning software. The data team are currently testing these algorithms on Primavera data and generating optimised resource schedules.

Figure 2

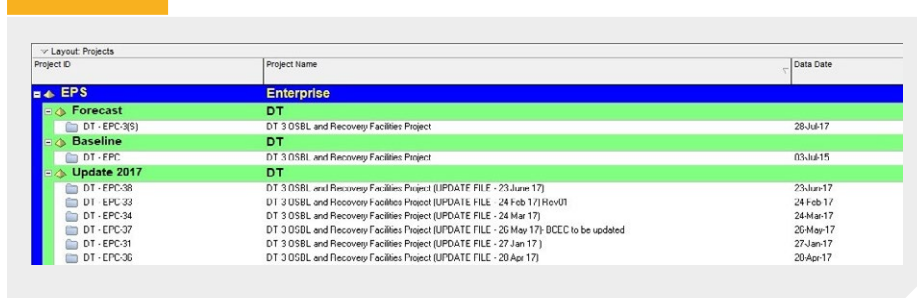
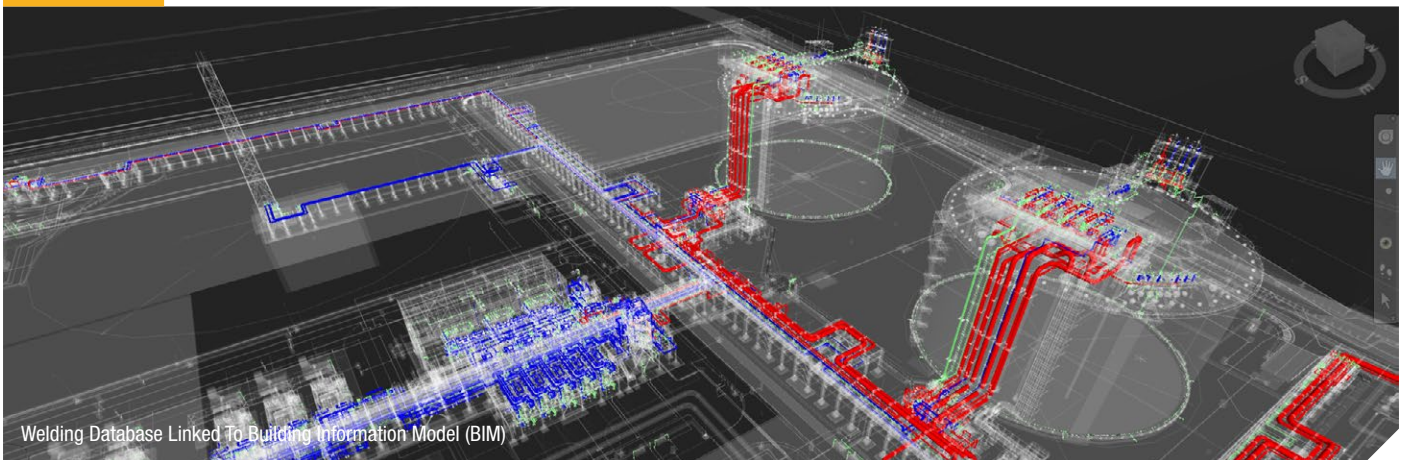


Figure 3



Welding Database Linked To Building Information Model (BIM)

Artificial Neural Network

Successful data extraction is achieved from files in native excel formats. However, this does present a challenge; as certain files in PDF formats cannot be successfully converted using conventional optical character recognition (OCR) software. To solve this, the team has started developing its own OCR model using Python and C++ code. The model has so far achieved a 60% accuracy. However, this will improve with the implementation of AI techniques such as neural networks and deploying various algorithms such as Camshift algorithms, which will differentiate and separate tabular data from normal text. The model will then undergo

supervised learning, allowing it to make decisions based on previous results. Once the model performs as expected, the team will start additional model training; where the model will soon read hand-written reports such as site daily diaries, etc. This will allow the analysts to search documents in a structured dataset, which may be used for further analysis.

Moving Forward

Given the current results, and the large quantities of data that the team are working with, there is a potential and an opportunity to take Driver Trett and its clients into the future and ensure they remain at the forefront of the industry. ■

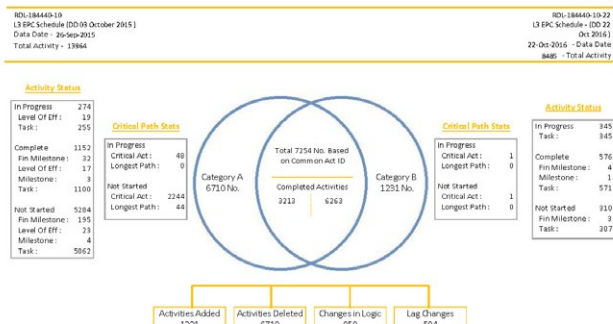
¹ A terabyte is more precisely defined as 1,024 gigabytes (GB)

² Used primarily in construction industries to complement 3D design packages (such as Autodesk Revit, AutoCAD, and MicroStation) Navisworks allows users to open and combine 3D models, navigate around them in real-time and review the model using a set of tools including comments, redlining, viewpoint, and measurements. A selection of plug-ins enhances the package adding interference detection, 4D time simulation, photorealistic rendering and PDF-like publishing

³ <https://www.businesswire.com/news/home/20180323005419/en/Global-Building-Information-Modeling-BIM-Market-2017-2025>

Figure 4

Schedule Review and Analysis Venn Diagram



Schedule Review and Analysis Activity Comparison with Delay Identification

HCD0001 ISSUANCE OF CIVIL DRAWINGS/DOCUMENTATION /CIVIL CONTRACTOR SCHEDULE - IFC									
Sch	DATA DATE	START DATE	FINISH DATE	2015	2016	2017	2018	2019	% Complete & Type
01	08-Sep-2016	29-Sep-16	30-Nov-16						Phys 1
02	15-Sep-2017	29-Sep-16	16-Sep-17						Phys 0
03	17-Oct-2017	29-Sep-16	29-Oct-17						Phys 90
04	10-Nov-2017	29-Sep-16	11-Nov-17						Phys 94
05	15-Dec-2017	29-Sep-16	16-Dec-17						Phys 94
06	22-Dec-2017	29-Sep-16	23-Dec-17						Phys 97
07	19-Dec-2017	29-Sep-16	20-Dec-17						Phys 94
08	05-Jun-2018	29-Sep-16	06-Jun-18						Phys 95
09	12-Jan-2018	29-Sep-16	13-Jan-18						Phys 97
10	02-Feb-2018	29-Sep-16	03-Feb-18						Phys 97
11	09-Feb-2018	29-Sep-16	10-Feb-18						Phys 95
12	16-Feb-2018	29-Sep-16	17-Feb-18						Phys 95

Schedule Review and Analysis Activity Logic Report with Pre / Succ Changes

Prog Name: DT01-9810-14 DT - Rev 1.3 dated August 26th - LNG Detailed Schedule of Works Data Date: 27-Aug-11					Prog Name: DT01-9810-16 DT - Rev 1.6 dated Nov 25th - LNG Recovery Schedule Data Date: 26-Nov-11																																																																																																																																																																																								
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Grove v S&T - the end of the 'smash and grab' adjudication?

A summary of the guidance surrounding 'smash and grab' adjudications and a precedent that could lead to their demise.



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Technical Director,
Driver Trett UK

Introduction

In recent times, there has been a deluge of cases focussed on the so-called 'smash and grab' adjudication – an unintended side effect of the changes brought about by the Local Democracy, Economic Development and Construction Act 2009 (LDEDCA), and the interpretation and application of those changes by the courts (more on this in Digest issue 12, page 8).

These cases all resulted from an alleged failure, by the paying party, to issue a valid payment notice or pay less notice. This entitles the contractor or subcontractor to payment of the full amount set out in its application (the 'notified sum'), whether or not that sum was an accurate reflection of the value of work performed.

Amongst the arguments over paying (or not) the 'notified sum' in the first place, was a further tussle over when (or indeed, whether at all) the payer was entitled to launch its own adjudication for recovery of the alleged overpayment.

The recent case of *Grove Developments Ltd v S&T (UK) Ltd [2018] EWHC 123 (TCC)* has provided some guidance on this matter - much to the relief of the paying party.

This case involved the construction of a new hotel at Heathrow's Terminal 4. S&T submitted an application (no. 22) to Grove in the sum of £14m. Grove acknowledged that it had not submitted a payment notice on time. However, Grove argued that it had submitted a valid and timely pay less notice in the sum of circa £1.4m, subject to liquidated and ascertained damages (LADs) in the sum of circa £2.5m.

S&T argued that Grove's pay less notice was invalid, as it did not specify the basis of Grove's calculation, referring as it did to Grove's previous payment certificate. The adjudicator



agreed with S&T, and ordered Grove to make payment of S&T's application for £14m.

At the same time, Grove had launched its own proceedings in court on two points: the first being that its pay less notice was valid, and the second that Grove was entitled to run a second adjudication to establish the true value of the sum due to S&T.

Grove's pay less notice

In relation to the validity of Grove's pay less notice, the court found in favour of Grove, saying it (the court) would be, "*unimpressed by nice points of textual analysis, or arguments which seek to condemn the notice on an artificial or contrived basis*". Rather, the court would look to see whether the notice "*provides an adequate agenda for a dispute about valuation and/or any cross-claims available to the employer*".

The entitlement to bring an adjudication to decide the true value of an interim application

Again, the court found in Grove's favour, saying that the payer is entitled to bring its own adjudication to decide the true value of an interim application, even if it (the payer) had failed to issue a valid payment notice or pay less notice (whether deficient or absent entirely).

In reaching this decision, the court listed six reasons as to why this was the case:

1. In line with *Henry Boot Construction Ltd v Alstom Combined Cycles Ltd [2005] 1 WLR 3850*, the court (and thereby an adjudicator) has the power to decide the 'true' value of an interim application.
2. The statutory power of the adjudicator is sufficiently broad to enable them to decide the subsequent 'true' value of an interim application.

3. The dispute decided in a first adjudication (as to the validity or otherwise of a payment notice or pay less notice) is a different dispute to that concerning the 'true' value of the corresponding interim application: *"if Grove challenge S&T's evaluation, as they do, then that dispute must be capable of being referred to adjudication. Any other result would be an unwarranted restriction on Grove's ability to adjudicate any dispute 'at any time', in accordance with s.108(2)(a) of the 1996 Act"*.
4. The wording of the contract differentiated between *"the sum due"* at Clause 4.7.2 and *"the sum stated as due"* in Clause 4.9, with good reason.
5. For reasons of *"equity and fairness"*.
6. The wording of the 1996 Act applies to both interim and final applications, and a distinction should not be drawn between the two.

Mr Justice Coulson (as he then was) looked to previous Court of Appeal decisions which pointed in the same direction in support of the court's position. Turning to previous Technology and Construction Court (TCC) decisions, he was less convinced, particularly in relation to *ISG v Seevic and Galliford Try v Estura*, confirming that: *"They [the decisions in ISG v Seevic and Galliford Try v Estura] are a 'different line', as Jackson LJ described them, and in my view, they should not be followed."*

Mr Justice Coulson also addressed some further matters in his judgement:

The absence of express wording in the contract permitting the employer to recover an overpayment

Mr Justice Coulson rejected the position that, just because the contract did not (or might not) include wording which would permit the employer to recover an overpayment, or which dealt with an adjudicator's decision that entitled the employer to recover an overpayment, there was no contractual entitlement to such recovery: *"The adjudicator has decided that there has been an overpayment, and pursuant to the contractual obligation to comply with the adjudicator's decision, the contractor must therefore repay the excess"*.

Policy considerations concerning an employer's right to challenge the true value of an interim application

Mr Justice Coulson did not consider that the contractor would be prejudiced in any way in respect of cash-flow, or that the notice regime would be undermined if the employer was permitted to challenge the true value of an interim application in a subsequent adjudication. The notified sum still had to be paid, and it would still be more efficient for the employer to *"resolve the alleged over-valuation point in the next interim payment round"*. What the contractor would not be able to do would be to keep hold of money to which it was not entitled: *"Cash-flow must not be confused with the contractor retaining monies to which he has no right"*.

Box 1 – Issued adjudication guidance

The guidance issued indicates the following:

- To be valid, applications for payment must meet a 'high' threshold². They must:
 - Be submitted on time (not early or late, or out of step with an accepted course of conduct)³.
 - Have *"proper clarity"* with the paying party being given *"reasonable notice that the payment period has been triggered"*⁴.
 - Be *"in substance, form and intent an Interim Application"*, *"free from ambiguity"* and *"clear that it is what it purports to be so that the parties know what to do about it and when"*⁵.
- The threshold for pay less notices may not be as high as for payment notices, with clear wording not necessarily required, if the substance and intent of the pay less notice is sufficient⁶, although beware submitting a pay less notice late, as this is still likely to invalidate that notice⁷.
- Be sure that any payment schedule included within the contract documents is sufficient to cover the (potentially extended) duration of the project. If a specific number of application or valuation dates are set out, ensure that there is a mechanism for extending those dates beyond the scheduled timescale, as failure to do so may result in an application being invalid⁸.
- Check that any payment schedule which is included in the contract does not contain *"obvious errors"*, as reliance on a detail which is clearly wrong when read in the context of the agreement will not safeguard the validity of a payment notice or pay less notice⁹.
- A lack of supporting documentation to accompany an application for payment does not necessarily render that application invalid, even though it may result in rejection of all or part of the application for want of substantiation¹⁰.
- There must be some explanation as to the basis on which the sum due has been calculated, setting out any grounds for *"withholding"* sums and indicating how those sums have been reached¹¹. However, that explanation (of the calculated sum) may be included by reference to other documentation which has already been provided to the other party¹².
- **If you lose a 'smash and grab' adjudication you must still pay the sums decided by the Adjudicator when they fall due – even if you have a strong argument for overpayment.**

Whether an employer is required to pay the sum claimed before it could challenge the interim application

Whilst this matter was not specifically addressed, the wording of Mr Justice Coulson's judgment indicates that the position remains that the employer is required to pay the sum claimed, and to then launch its own proceedings to recover that payment (or part thereof): *"The second adjudication cannot act as some sort of Trojan Horse to avoid paying the sum stated as due. I have made that crystal clear"*.

However, a word of warning. There is some discussion amongst commentators as to the point at which an employer is entitled to bring a second adjudication to recover an overpayment. Is it only at (or after) the point at which the overpayment is made, or does the employer have a right to begin proceedings to recover an overpayment before it is made - 'balancing the books' in some way before the money is paid over?¹. And will this really see the end of the smash and grab adjudication, or will contractors and subcontractors still take a chance and seek payment of the sums that they have claimed, challenging the repayment of any such sums when the time comes? Only time will tell - and don't forget that there is still the appeal, which is due later this month. Watch this space!

Summary

Whilst we wait to see how the decision in Grove (and its forthcoming appeal) impacts the world of smash and grab adjudications, it would be wise for all parties involved in construction contracts to heed the nuggets of advice handed down

from the benches of the TCC and the Court of Appeal in preparing and submitting payment notices and pay less notices (see Box 1). After all, this is the best way to ensure that, as an employer, you do not find yourself paying a sum to which you do not consider the contractor is entitled, and for which you must pay to recover, or that as a contractor, you ensure greater certainty of payment without the battle scars of multiple adjudications. ■

¹ The question being whether the cause of action arises on the overvaluation of the work or overpayment for work done.

² *Surrey and Sussex Healthcare NHS Trust v Logan Construction (South East) Ltd* [2017] EWHC 17 (TCC)

³ *Leeds City Council v Waco* [2015] EWHC 1400 (TCC)

⁴ *Caledonian Modular v Mar City Developments* [2015] EWHC 1855 (TCC)

⁵ *Henia Investments Inc v Beck Interiors Ltd* [2015] EWHC 2433 (TCC) and *Jawaby Property Investment Ltd v The Interiors Group Ltd and another* [2016] EWHC 557 (TCC)

⁶ *Surrey and Sussex Healthcare NHS Trust v Logan Construction (South East) Ltd* [2017] EWHC 17 (TCC)

⁷ *Kersfield v Bray & Slaughter* [2017] EWHC 15 TCC

⁸ *Grove Developments Ltd v Balfour Beatty Regional Construction Ltd* [2016] EWCA Civ 990

⁹ *Bouygues (UK) Ltd v Febrey Structures Ltd* [2016] EWHC 1333 (TCC)

¹⁰ *Kersfield v Bray & Slaughter* [2017] EWHC 15 TCC

¹¹ *Muir Construction Ltd v Kapital Residential Ltd* [2017] CSOH 132

¹² *Grove Developments Ltd v S&T (UK) Ltd* [2018] EWHC 123 (TCC)



The expert witness and the benefits and dangers of artificial intelligence

Delving into the pleasures and perils of artificial intelligence in supporting expert witnesses.



Garth McComb
Director,
Driver Trett Malaysia

By definition, an expert is likely to be a fairly intelligent person (even if the opposing expert is always less so...), so why would an expert require artificial intelligence (AI)?

When I first started out as a placement year, trainee quantity surveyor with a large QS firm in Birmingham many years ago, one of the first people I was introduced to was the newly appointed company computing and information technology manager. His appointment had coincided with the delivery of a new dedicated computerised measurement system and he had been less busy than everyone else on the day it arrived. I still remember a sign that he had on

the wall beside his workstation which read “To err is human, to really screw things up you need a computer”.

While technology has changed since then, in ways that most of us couldn't have imagined, there are still things that go wrong and I am all too frequently reminded of that sign at the IT guy's desk.

Back to the present, and computer software can do so much more than set out a bill of quantities in a structured, logical manner (could it ever?).

On a dispute that I was recently involved in, the client told us at one of the initial meetings that they had virtually no evidence to support their contention that the subcontractor had caused most of the delays. They were sure that he had; but they had no evidence to prove it.

We requested a copy of our client's project server containing emails, incoming and outgoing correspondence, drawing registers, site

memos, etc., etc., etc. The information on the server was fed in to our AI system and certain keywords related to one of 62 systems within the project were added. At the first pass, the AI software identified around 60,000 potential hits (data files) related to delays in this system. After less than two days, by adding further filter keywords related to the type of information we were looking for, this had been reduced to 1,200 documents which were then searchable manually. This turned up numerous records of the delays in the form of letters, emails, meeting minutes, and even photographs that our client had previously been unaware they possessed.

I suppose it is the nature of the industry that, by the time most construction related disputes get down to the real fighting, most of the people that were actually on site performing the work have long since gone, and the real story of what actually transpired on site can often be obscured, or even lost entirely.

It is at this point that experts are often appointed and have to make up their own mind, based on the evidence available, what should have and what did actually happen. Generally, there will be factual witnesses who can describe what actually transpired on site, but in most cases, this may mean asking someone to remember often mundane details of their work from years earlier.

This is where it can start to get tricky. By this stage, whichever side the expert is appointed by will have made up their minds that their position is the right one and that they have every right to payment, or not to pay, depending on which side they are on.

They will tend to have a plethora of evidence supporting their position and surprisingly little, if any, indicating that the other side may actually have a valid argument.

In fulfilling their role, an independent expert is required to examine all information provided to them and to provide the tribunal that is hearing the case an unbiased and unblinkered view of the facts.

Clients often look incredulous when it is explained to them that an expert witness has to consider all information available to them whether or not it supports the client's case.

Experts will normally ask for as much information as the client possesses and then make up their own mind what is relevant or not. However, a recent case report from the supreme court of Western Australia caught my eye and serves as a timely reminder of something that parties, or legal counsel, should bear in mind when instructing experts and providing them with evidence to analyse.

In the case of *Westgem versus the Commonwealth Bank of Australia*, an expert was instructed by the defendant's solicitors to prepare a report for use at the trial; and to express his opinion on the time and costs involved to complete a building development in Perth, Western Australia.

For the purposes of preparing his report the defendant's solicitors provided the expert

“

AI software identified around 60,000 potential hits. After less than two days ... this had been reduced to 1,200 documents which were then searchable manually.

”

with a large volume of documents which were provided to him in electronic form. His report, quite rightly, contained a list of documents that had been provided to him for the purposes of preparing his report.

Certain documents, over which legal professional privilege was claimed, had been provided to the expert in unredacted form. The same documents had only been provided to the plaintiff in redacted form. The plaintiff sought production of the original documents in full.

The expert wrote to the defendant's solicitors advising that:

- The documents he had relied on in forming his opinion were those expressly referenced in the report, or one of the appendices to it.
- He had not relied on any of the privileged documents in the formation of his opinion.
- The privileged documents had not influenced the content of his report.

The judge ruled that legal professional privilege in the documents had been waived when the expert's report had been submitted.

The judge highlighted a degree of inconsistency in the defendant's approach to disclosure, in that they must be taken to have been willing to waive privilege in the documents had the expert relied upon them, but unwilling to waive privilege if the expert did not rely on them.

Another part of the judge's reasoning was that the defendant's solicitors must have considered the documents to be potentially relevant, or they would not have given them to the expert in the first place.

Furthermore, relying on a statement from the expert as to whether the documents had influenced his opinion, would deny the cross-examiners the opportunity to test the expert's opinion by exploring whether he was wrong to disregard the material that he said he didn't rely on.

In the judge's view, legal professional privilege in the documents was lost when the expert's report was served, notwithstanding the expert's statements to the effect that the contents of those documents were not relied upon by him, or that they did not influence the formation of his opinions.

So, it is worth remembering that an independent expert's duty is to analyse and consider all the information made available to them, irrespective of whether it supports or may be harmful to their client's case. They should also clearly identify all of the documents that were made available to them.

Artificial intelligence software may be the way of the future, but the phrase 'warts and all' springs to mind. It is worth remembering that most expert reports will contain a phrase along the following lines: "I have endeavoured to include in my report those matters, of which I have knowledge or of which I have been made aware, that might adversely affect the validity of my opinion. I have clearly stated any qualifications to my opinion."

With use of AI in discovery on the rise, will that statement hold true? ■

Gin tasting to celebrate 40 years of Driver Trett

On Thursday 21st June 2018, Driver Trett's London office were joined by a small group of clients at the City of London Gin Distillery to learn a little more about the gin making process, and to have a go at distilling their very own "unique" brand of gin...

Having settled in to the evening with a refreshing G&T, courtesy of the Gin Distillery, the time came for the wizardry of the gin making itself. Split into teams of three, our host for the evening, Jake, explained the gin making process, the key ingredients for gin (nothing more than alcohol and juniper berries!) and

the different flavours that can be derived from the extra botanicals on offer. Each team then had the opportunity to create their own gin, and watch the distillation process in action using a number of mini-stills in the Gin Lab.

Whilst the gins were distilling, our guests had the opportunity to enjoy some fine food, lively conversation and some more gin(!), before returning to the stills to try their own gins and to wax dip and label their own bottles to take home. The knowledgeable bar staff were also offered the opportunity to blind taste the gins we had created,



and the outright favourite was "Jona Gin" created by Andrew Agathangelou of Driver Trett and John O'Grady of Volker Fitzpatrick.

A great evening was had by all – who knows, you might see bottles of Jona Gin on supermarket shelves near you soon!



Concurrent delays and construction contracts

The realities of concurrent delays and the varied approaches and outcomes available through delay analysis.



Karen Wenham
Director,
Driver Trett Australia

“First, different causes of delay may overlap, and this will be intellectually troublesome if one is an event justifying an extension and one not; e.g. information or access may not be available, but due to culpable delay or an event not justifying an extension, the contractor would not be able to take advantage of them if they had been”.

Mr Duncan Wallace QC’s thoughts on concurrent delays appear as prescient in 2018 as they did in 1994. Almost 25 years later, concurrent delay – what it is and how it shall be treated – remains as “intellectually troublesome” as ever.

When dealing with concurrent delay, there are often two points of contention. The first point is the chasm between what we consider ‘true’ or ‘real’ concurrent delay to be, versus what concurrent delay is generally held to be.

The second point concerns how concurrent delay is to be treated. Not all construction contracts describe how concurrent delay is to be treated, and there are several different methods available to contract administrators and practitioners of delay analysis.

True concurrency is said to occur when two events, one an excusable event and the other not, occur at the same time – both starting and finishing on the same days – and the effects of each event are felt at the same time. Most people experienced in the delivery of construction projects will know that, in practice, true concurrency is exceedingly rare.

In the absence of what is true, it is generally

held that concurrent delay occurs when the effects of two events, one an excusable event and the other not, are felt at the same time or overlap to some degree.

In *Malmaison v Henry Boot*, the leading case in England and Wales for the past 20 years, Dyson J decided that where two events, one relevant and the other not, are concurrent or overlap, the contractor’s extension of time (EOT) should not be reduced but it should not be entitled to its prolongation costs for the overlapping period, as it would have incurred those costs in any case. This is often referred to as the *Malmaison* approach, and was reinforced by Aikenshead J in the case of *Walter Lilly v Mackay & DMW*.

The *Malmaison* approach is also advocated by the latest editions of Hudson’s, Keating, and the Society of Construction Law (SCL) Delay and Disruption Protocol.

Concurrent delay is often alleged by

both parties to avoid experiencing the full ramifications of culpable delay. Contractors may claim concurrent delay to receive an EOT, thus limiting its exposure to liquidated damages for its own delay. Alternately, an employer might claim concurrent delay to avoid paying the contractor its prolongation costs, incurred as a consequence of an excusable event. It is unsurprising that concurrent delay remains such a contentious subject.

Where concurrent delay has occurred, often one event will be more causative of critical delay than the others. To establish which event is the most causative of the delay (the 'effective' cause) a critical path analysis (CPA) will be required.

It seems that the actual point of contention may be whether concurrent delay can exist in a construction contract. If so, the answer can be found in the method of delay analysis described by the extension of time clause and by the capacity of that method to identify and quantify concurrent delay.

Extension of time clauses in many construction contracts, particularly standard form contracts, advocate a prospective approach to delay analysis. There are two types of prospective delay analysis:

- As-Planned Impacted
- Time Impact Analysis (TIA).

As-Planned Impacted uses the baseline programme to model the effects of a relevant event on completion. It does not consider the actual status of the work, or the critical path at the time the event occurred. As this method doesn't consider the progress of the works, it doesn't have the capacity to identify and quantify concurrent delay, bar the most exceptional circumstances.

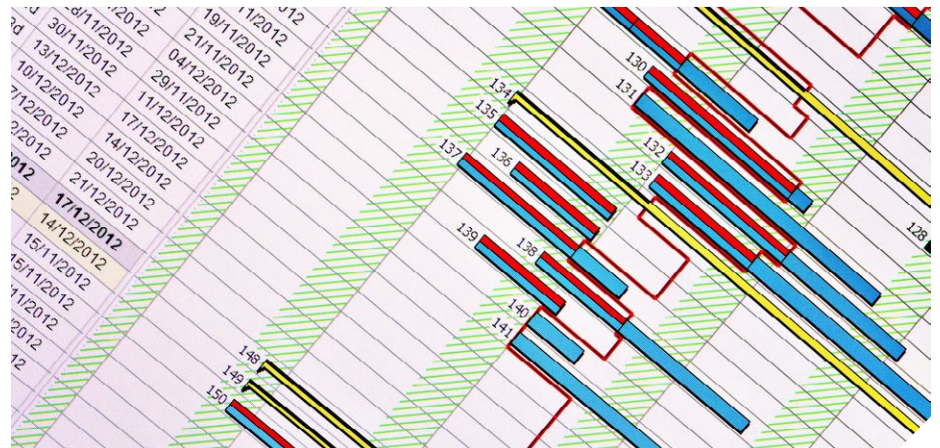
Some contracts advocating a prospective approach to delay analysis describe a method consistent with TIA. TIA uses the approved construction programme, updated to reflect the actual progress of the works at or around the time that a relevant event has occurred, to model the impact of that event on the project's critical path and completion date.

This approach is consistent with the approach advocated by Hudson's, Keating, and the SCL for delay analysis, which cautions against a 'wait and see' approach to granting extensions of time during the normal course of a project.

If concurrent delay occurs when the effects of two events, one a relevant event and the other not, occur at the same time, the capacity of TIA to identify and quantify concurrent delay would be dependent upon the timing of the two events.

If the excusable event was to occur before the non-excusable event, and the effect of that event was to be felt some time in the future, it is unlikely that TIA could identify any concurrency with the effects of a contractor's future culpable delay.

Retrospective methods of delay analysis are not strictly the domain of time-distant delay analysis for arbitration or litigation. Some contracts, particularly in the energy and



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Most people experienced in the delivery of construction projects will know that, in practice, true concurrency is exceedingly rare.
”

resources sector, require the contractor to demonstrate actual delay, thus a retrospective method of delay analysis would be required.

There are four retrospective methods of delay analysis:

- Time Slice Windows Analysis
- As-Planned versus As-built Windows Analysis
- Retrospective Longest Path Analysis (RLPA)
- Collapsed As-built Analysis

The two windows methods and RLPA are 'effect and cause' types of analysis. These methods are inherently forensic as they seek to identify critical delay and then attribute a cause (or causes) to that delay. Each of these three methods have the capacity to identify and quantify concurrent delay.

Collapsed As-built Analysis is a 'cause and effect' type of analysis. This method seeks to quantify the effect on completion of an identified relevant event. This method of delay analysis measures only incremental delay. The concurrent effects of any culpable delay will typically be taken into account without the need to explicitly identify and quantify effect.

The key distinguishing quality between the two windows methods and RLPA is how the critical path is determined. The two windows methods determine the critical path contemporaneously to the effects of the delay event, and thus would be suitable for use both

during the normal course of the project and after the project is complete.

RLPA determines the critical path retrospectively which requires the project to be complete.

Not all methods of delay analysis are created equal, and the way in which each method determines the critical path may result in different outcomes. A delay analysis which determines the critical path contemporaneously will consider what was actually happening on the project at that time and the contractor's responses to those circumstances. Thus, which event (relevant or not) was most causative of the delay. Such a method is more likely to return an outcome consistent with the parties' understanding of what works were controlling completion at that time.

A critical path, determined retrospectively, may differ from a critical path, determined contemporaneously, to the event allowing for variations, changes in sequencing, or other delays to the project. This has the potential to create concurrent delay, where the contractor may have reduced the productivity of an unrelated non-critical activity to take advantage of float created in the schedule by a relevant event.

These are issues to consider when drafting EOT clauses. Employers wishing to describe the treatment of concurrent delays should consider whether the method described has the capacity to identify and quantify concurrent delay.

A key criticism of the Malmaison approach is that contractors are insulated from the effects of their own delays. Employers who desire to hold their contractor to account for its own delays may also reconsider the default prospective approach to delay analysis.

Similarly, contractors should take careful note of how EOT clauses describe the assessment of delay, in particular how the critical path is to be determined and whether the clause also describes how concurrent delay shall be treated. As demonstrated most recently by Fraser J in *North Midland v Cyden Homes*, where there is an express provision made in the contract for treating concurrent delay, the parties are likely to be held to their bargain. ■

¹. *N. Duncan Wallace QC, Hudson's Building and*



Report writing and what not to say

Reading between the lines of expert reports and testimony, paying particular attention to what isn't there.



Andrew Agathangelou
Technical Director,
Driver Trett UK

The press has reported that Japan is struggling to make sure it has enough proficient English speakers for when it hosts the Tokyo Olympic and Paralympic Games in 2020. Apparently, this is at least partly due to the way in which other languages are taught in Japan, with more emphasis placed on the written, rather than the spoken, word.

Fumiko Inoue, a Japanese language lecturer at the Rotterdam Business School, recalled the experience of one of her Dutch students who taught English in a school in Tokyo.

The new Dutch teacher observed that the

Japanese students were reluctant to speak English in class. After much encouragement, she managed to get the students to talk and converse with each other in English. However, a senior teacher who was observing the lesson criticised the students for making too many grammatical mistakes.

"If you don't say anything, you don't make any mistakes either, of course," said Prof Inoue.

Similarly, I have been involved in a number of formal disputes where the expert on the other side has chosen not to say anything with regard to a particular matter in dispute, whether verbally or in writing. The reasons appear to be numerous:

- The matter in question would not support the case they were presenting.
- The issue was considered to be too complex to be dealt with in the time available.
- That they were simply afraid to make a mistake.

In a recent dispute, in which I acted as delay expert, my opposite number stated that there was no delay in the first four months of the works, and therefore there was no requirement to investigate the cause of delay. To demonstrate this, he produced a 'windows analysis' for each of the first four months of the works, with each window containing a baseline programme that established the progress of the works against

each construction activity with a staggered progress line.

On close examination of each of his windows, it transpired that the staggered progress line had not been straightened, i.e. the activities had not been rescheduled to their earliest commencement dates based upon the progress to date. Had the expert straightened the progress line (as he should have done) it would have shown that there was a significant delay in the first four months of the works, and that his client was culpable for the delay.

The delay expert, in this instance, simply chose not to say that he had not rescheduled the first four windows, because it was harmful to his (or his client's) case.

On another dispute, the expert on the other side presented an as-built programme containing an as-built critical path. The expert was silent about how the critical path had been established. A closer inspection revealed that the expert had hand drawn the as-built critical path in the precise location he wanted it, to support the case he was presenting. A lawyer's recent advice to me comes to mind, 'if you don't write about it you won't be cross-examined on it.'

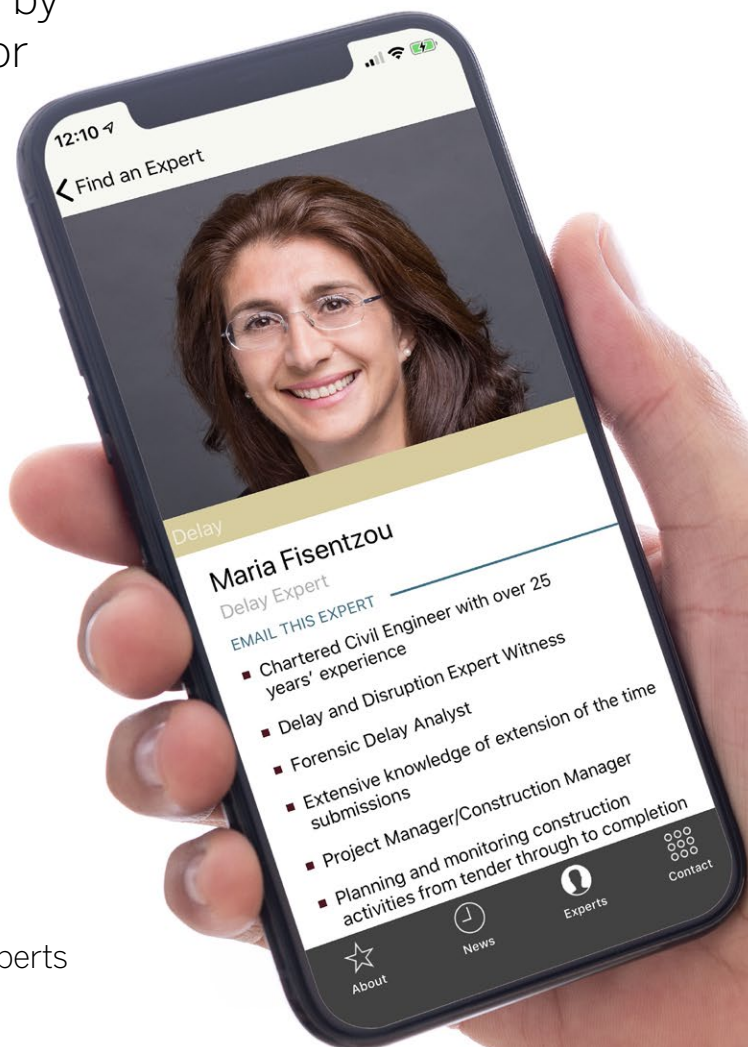
Therefore, the expert must always be mindful, not just of what is being said by the other side, but what is not being said. Silence isn't always golden. ■



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eAnalytics – making sense out of chaos

Insight into the cutting edge eDiscovery practices and tools being used to support clients across the Asia Pacific region.



John Brells
Managing Director,
Driver Trett Asia Pacific

The data challenge

Analysing ever increasing volumes of client data, within continuously tightening deadlines, is one of the biggest challenges facing our teams in the running of commissions. Key to the success of a commission is the ability to quickly see the big picture. We need to get to the main issues and understand the associated risks and solutions, which generally relate to quantum of time and cost.

The main data challenges facing teams in Asia Pacific (APAC) and globally include:

- Increasingly large data volumes, both:
 - Structured - as in spreadsheets, databases, and schedules.

- Unstructured - as in emails, contract documents, general correspondence, and reports.
- The need to quickly ascertain the completeness of a data set.
- Tightening deadlines for analysis and response.
- Comprehensive factual accuracy.
- Cost effectiveness for our clients.

These challenges have created the need to find an electronic method for which we can inventory all client files, search various forms of information, and extract very specific data that will assist in the commission. Without technologically advanced assistance, a task of this magnitude will not only take weeks to months of manual review, but is also susceptible to human error. The absence of such a tool can result in missed deadlines, factual inaccuracy, and keeping resources engaged on a single commission for an extended period; all of which are costly to our clients.

Finding a solution

Technology has moved on apace in the array of computerised methods of analysing and reviewing data. eAnalytics is electronic data analytics and, in broad terms, relates to how insightful decisions can be made from the analysis and understanding of data.

Until recently, the use of these electronic tools had been the domain of large legal and forensic practices; primarily due to the associated high cost of procurement and implementation. Data analytics for Driver Trett means that we can make decisions and draw conclusions quickly and more accurately, using the complete body of data being studied.

The exciting way in which we now meet this challenge and strive to increase our market-place competitiveness is with eDiscovery and its benefits. Our recent implementation of eDiscovery services has already had a positive impact on several commissions; assisting our internal processes and delivering speed and accuracy to our clients. Our immediate goal is to utilise this software for all commissions in the APAC region.

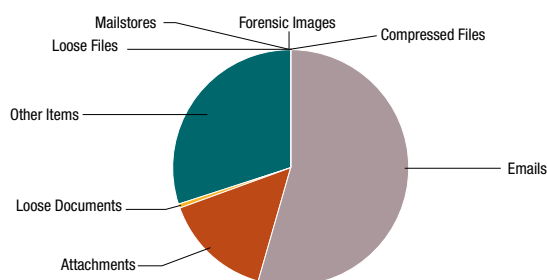
What it does

The mainstay of our data analytic tool is an eDiscovery package which employs powerful computer algorithms, enabling analyses of vast quantities of electronically stored data. This process is very fast and provides information down to the granular level, across the entire body of data. The package processes most file types in common use and is optimised for analysing unstructured and semi-structured data. It provides a set of powerful data research tools so that reviewers can:

- Trace email strings on topic or person.
- De-duplicate.
- Locate near duplicate documents.
- Search, filter, and sort.
- Tag and highlight.
- Cluster by subject or theme.
- Redact.
- Export.
- Report far more effectively than doing such things manually.

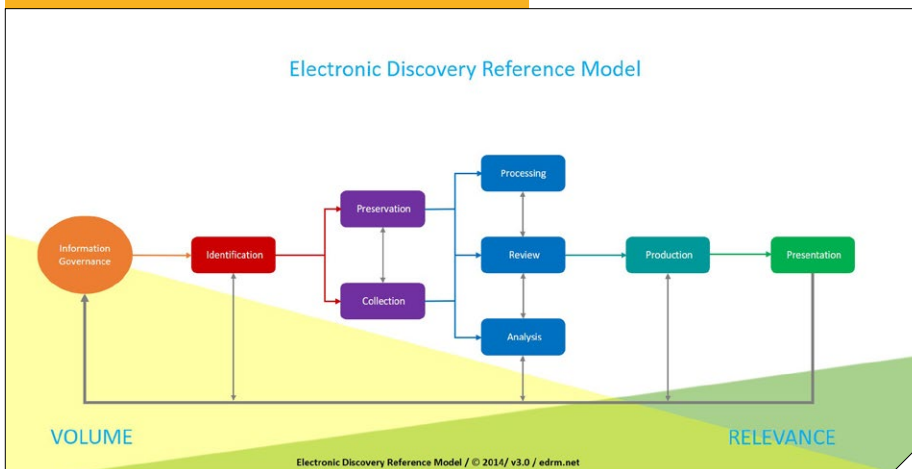
Twenty years ago, the traditional document review process followed linear review methods in which a reviewer would carry out word searches to find documents of interest.

Figure 1 System analysis of dataset



Name	Count	File Size	Audit Size
Mailstores	10	1,083,029,504	0
Forensic Images	12	543,653,665	0
Compressed Files	4	16,370,425	0
Loose Files	83	17,194,495	11,634,398
Emails	36,946	58,717,646	669,977,202
Attachments	10,036	1,144,839,502	1,061,452,178
Loose Documents	486	108,340,625	108,340,625
Other Items	20,209	4,444,580,759	840,793,534

Figure 2 EDRM model of analysis process



Additional reviewers were needed to speed up the process; but that also introduced increased costs, a potential risk for inaccuracy, and a lack of consistency among the reviewers.

eDiscovery is a game changer; providing an efficient method of reviewing documents. The electronic discovery reference model (EDRM), as shown in Figure 2, outlines the process and the various workflow sequences which rely heavily on our electronic data recovery (EDR) software for all data pre-processing on the front end.

Security of the system

Security of the system is flexible, it can provide secure and compartmentalised access to case data for multiple reviewers and investigators. The server installation security is controlled by an active directory which only permits access to those managing the data. Reviewers are provided login credentials, specific to their case, and login securely to the review process by means of a web browser interface called Web Review. This provides high-level security, as well as providing useful working flexibility. All case data viewed within Web Review is

protected, whereby users cannot alter or delete any information within a case, maintaining data integrity. Backups of all server data are secured remotely on a daily basis.

The benefits

Having used data analytics on several commissions in the first quarter of 2018, the APAC team highly recommend its use on all commissions where substantial analysis of data is required. Given the dramatic increase in volumes of data and information, it makes this tool vital to carry out the targeted analysis required. The main advantages are:

- Speed of data analysis.
- Greater accuracy in analysis.
- Cost savings to our clients.
- Time saving to our staff.
- Competitive edge over our rivals.
- Confidentiality and security of data.

To illustrate the benefits achieved through eDiscovery, consider a recent commission completed in the Western Australia office. Initially, the client provided over 40GB of data represented in well over 10,000 pieces

of evidence in various forms. The case was created, and all items were put through an ingestion and optical character recognition (OCR) process, allowing non-searchable items to become text searchable. The amount of case evidence expanded to over 67,000 items available for analysis and review. Additional case evidence presented by the client was quickly added to the existing case. The investigator utilised our Web Review and easily performed free form searches, filters, sorts, and tags; rapidly identifying key documents and time periods that were critical in his delay analysis.

Our review process took a several-month job and condensed investigative activities into 40 hours of work; with a level of speed and accuracy that would be difficult to achieve through a manual review of material.

Current software capacity

With our current capacity, we can run as many jobs as we wish (restricted only by server storage), with any one job handling up to 200GB of data. Looking at statistics from two of the largest commissions that we have undertaken, indicated that a 200GB capacity is currently sufficient:

- The largest amounted to 65GB client data (around 150,000 document files).
- Another, well above average, job comprised of 51GB client data (around 28,000 document files).

We can increase our capacity, should this not be sufficient, almost immediately.

Our eDiscovery system is installed and managed out of our Singapore office and provides an Investigator Workstation license, along with five licenses for Web Based Review, which can be used concurrently at any one time. If required, this capacity can also be increased quickly.

Current activities and future endeavours

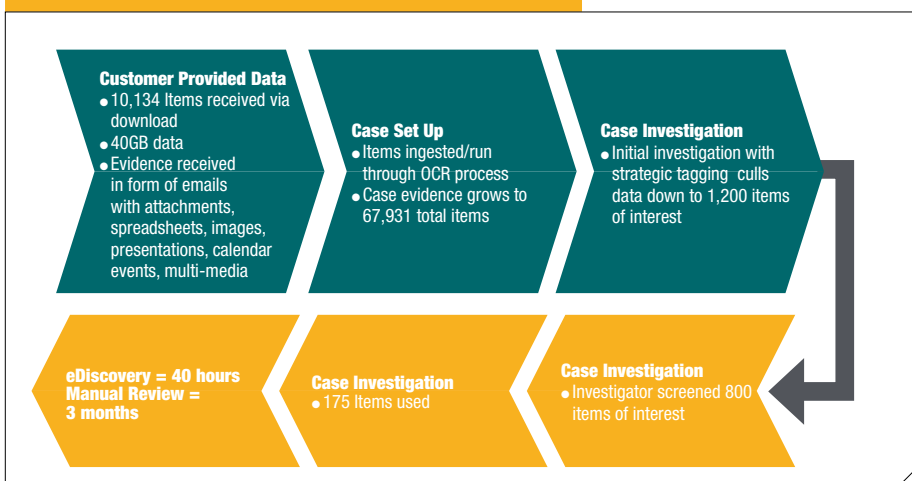
We are immersed in eDiscovery matters and have been for several months now. Our web review process is straightforward, and most of our professionals are comfortable using the software after a one-hour training session, with further advanced training to follow as needed.

Three training sessions have been conducted in-house thus far; which includes participation from staff in Australia, Hong Kong, Malaysia, and Singapore. Additional training will be scheduled in the coming weeks.

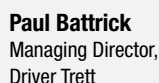
We will continue to develop our expertise and use this valuable tool on our commissions whenever possible; delivering results, where scale and complexity exist, with more clarity. Our future goal is to provide a separate service to small tier law firms and clients that don't have this capability.

In our industry, the use of eDiscovery is significant in terms of reduction in cost and time, increased quality of outputs, and ultimately an increased return on our investment. It is this differentiator that gives Driver Trett a competitive edge and will continue to drive excellence in delivery. ■

Figure 3 Typical case review process we used



A 'simple' explanation of the ins and outs of FIDIC claims.



Provide the notice within 28 days and the claim was in the Engineer's **in** tray; failure to do so and it was in the Engineer's **out** tray or more commonly known as either the waste bin or the delete button. It was quite clear and certainty existed (which is never a bad thing) however the Obrascon¹ case softened the harsh reality that

many Contractors found themselves facing.

No doubt the drafters of the 2017 versions of FIDIC had Obrascon in mind when they considered the **in** or **out** situation contained within the heavily amended Sub-Clause 20.2 (Claims For Payment and/or EOT).

Sub-Clause 20.2.1 (Notice of Claim) looks familiar, it states that the claiming Party (the conditions now apply to both the Contractor and the Employer) shall give a Notice, which is now a defined term and is a Notice of Claim within Clause 20, to the Engineer no later than 28 days after the claiming Party became aware, or should have become aware, of the event or circumstance.

It goes on to state that if the claiming Party fails to give a Notice of Claim within 28 days the claiming Party shall not be entitled to its claim.

Seemingly clear; the Engineer's **out** tray has a new addition. Sub-Clause 20.2.2 (Engineer's initial response) notes that to confirm this failure the Engineer must give a Notice within 14 days after receiving the Notice of Claim stating that the Notice was time barred.

However, if the Engineer fails to comply with this 14 day time period, the Notice of Claim is deemed to be a valid Notice and the claim goes back into the **in** tray; but does it stay there?

Sub-Clause 20.2.2 continues to note firstly, that if the other Party disagrees with the deemed valid Notice of Claim it shall give a Notice to the Engineer including the details of the disagreement; the Engineer has to take this into account within the review when determining the Claim under Sub-Clause 20.2.5 (Agreement or determination of the Claim). So, the Claim could again be in the **out** tray or in the **in** tray depending upon the outcome of the review. Secondly, if the claiming Party disagrees with the Engineer and considers that there were circumstances which justified the late

submission of the Notice of Claim, details of the disagreement must be included within a "fully detailed Claim" as defined within Sub-Clause 20.2.4 (fully detailed Claim). Note that the fully detailed Claim should still be submitted although the Engineer has stated that the Notice of Claim was time barred. So, the claim could later be back in the **in** tray or back in the **out** tray again depending upon the outcome of the review.

There are now time limits for the submission of a fully detailed Claim; unless the Claim is of "continuing effect" in which case a new set of procedures under Sub-Clause 20.2.6 (Claims of continuing effect) apply.

So, after the Engineer has given an initial response and no matter what this was the Claim could still be in either the **in** or **out** tray.

It is a requirement that the fully detailed Claim shall contain a "statement of the contractual and/or other legal basis of the Claim" and this together with all other requirements must be submitted within 84 days of the claiming Party becoming aware, or should have become aware of the event or circumstance giving rise to the Claim or another period if proposed and agreed by the Engineer.

Whichever period applies, on first glance, there is another fatal time bar. If the claiming Party does not provide the statement of the contractual and/or other legal basis of the Claim within time, the Notice of Claim shall be deemed to have lapsed and the Claim goes back into the **out** tray provided the Engineer gives a Notice to that effect.

If the Engineer does not give such a Notice, the Notice of Claim is deemed to be valid and the Claim stays in the **in** tray, even if there is still a pending decision from the disagreement(s) under Sub-Clause 20.2.2.

The other Party can disagree with the deemed valid Claim by issuing a Notice which

must include details of the disagreement i.e. noting the failure of the claiming Party to comply with the requirement to confirm the contractual/legal basis of the Claim and this shall be reviewed by the Engineer when making a determination under Sub-Clause 20.2.5.

Similarly, the claiming Party can disagree with the Engineer's Notice rejecting the Claim and the reasons will be detailed within the fully detailed Claim (which may have already been submitted...).

The Engineer's determination (or agreement by the Parties) will finally decide whether the Claim stayed in the **in** tray or was confined to the **out** tray; subject as before to referral to third party neutrals.

FIDIC have without doubt created a Sub-Clause that allows a claiming Party, which the vast majority of the time will be the Contractor, a few more bites of the cherry to ensure that a Claim remains in the **in** tray by what appears to be a complex web of the time limits and deeming provisions.

I started my explanation of cricket by saying "it's simple" and, believe it or not, the submission of Claims under FIDIC 2018 is also simple.

Those who play the game must fully understand the rules and most importantly not "flirt with a ball wide of the stumps"² and risk the possible rejection of a Claim for failing to comply with a stated time period. To do so Contractors (and Employers) will need adequate and competent resources to succeed with claims but it can be achieved.

Understanding the rule book is the first very important step; after all it's not rocket science! ■

¹ *Obrascon Huarte Lain SA v Her Majesty's Attorney General for Gibraltar* [2014] EWHC 1028 (TCC)

² A cricketing term - explanation provided if required from paul.battrick@driver-group.com

Celebrating 40 years of Driver Trett under Concorde

As part of the celebrations for 40 years, Driver Trett Bristol hosted a black-tie event under the wings of Concorde at Bristol Aerospace Museum.

Guests were greeted with a glass of champagne on arrival and given the opportunity to step aboard the last Concorde ever to fly, as well as the chance to land one in the Concorde simulator.

A great evening was had by all and continued into the night with dancing to live band 'Agent Funk', canapés, a casino challenge, and plenty of cake.





Knowing the unknown unknowns

Common practices and challenges of delay analysis on complex mega projects that are so prevalent in the Middle East.



Sean Hugo
Operations Director,
Driver Trett UAE

Case background

Donald Rumsfeld, the then United States Secretary of Defence, gave notoriety to the saying that there are 'known knowns', 'known unknowns', and 'unknown unknowns' referring to matters pertaining to the Iraq war. In complex mega projects, the 'unknown unknowns' appear to be the rule rather than the exception; the result of this is that developing a robust baseline programme, that will stand the test of all scrutiny, is virtually impossible.

This was recently reconfirmed when Driver Trett were commissioned to undertake a strategic review of a contractor's extension of time (EoT) claim on a prestigious project in the Middle East.

The project experienced significant overrun to the time for completion, besieged by iteration upon iteration of design changes to the original scope of works. The contractor was diligent (as far as reasonably practical) in submitting the contractually prescribed prospective time impact analyses (TIA), event by event. The contract administrator unequivocally rejected the TIA submissions.

The familiar failed path of planning

The original baseline programme quickly became obsolete. The impossible task of trying to effectively plan the 'known unknowns', and more particularly the 'unknown unknowns', was most likely the cause of the increasing speed with which the programme diverted from reality on site.

The original baseline programme, updated periodically with progress, became an unreliable forecasting tool as it did not reflect a reliable prospective critical path for the remaining works. The project followed the same sequence of events that befalls most of the complex projects

we encounter in the region, it is a specific sequence; almost pathological. The original baseline programme, once approved, transitions into obsolescence upon periodic updating. This triggers the development of an acceleration programme to mitigate 'contractor delays' (largely due to the contract administrator's rejection of the contractor's numerous applications for an EoT). Finally, the proverbial ship can take on no more water and sinks - i.e. even the most optimistic contract administrator must concede that the completion date will not be met. Then follows a project wide reset with the development of unapproved target completion programmes.

All the while, during the implosion of the planning process, the contractor is left with little option but to continue with the submission of prospective TIAs in accordance with the contract specifications.

It was at this point that Driver Trett was approached to provide a viable strategy to take the contractor's EoT claim forward and present this to the contract administrator in a fair, robust,

and easily understandable format so that a negotiated settlement could be reached.

The perils of a prospective TIA

A prospective TIA was prescribed by the project specifications for quickly approximating the impact that an excusable delay event may have on the completion date (or another contract milestone).

The contract administrator handled this process by linking time and cost together; this is incorrect, a prospective time impact analysis is a mechanism for the contractor to seek an interim extension to the time for completion, where it has been prevented by the employer from discharging its obligations under the contract. It is also fully understood why contract administrators and employers adopt a 'wait and see' approach; awarding an EoT is definitely a precursor to a serious discussion about the associated costs. However, obstinately refusing to entertain awarding interim extensions of time to 'protect' the employer from incurring costs may be disingenuous and ultimately may prove the more expensive course of action.

It is not always a case of the contract administrator not administering the contract fairly, when it comes to awarding an EoT, but rather the inherent risks associated with assessing the impact of future events using, what many consider for reasons set out below, a highly dubious forecasting tool. The forecasting accuracy of a critical path method (CPM) network - a complex algorithm consisting of discrete tasks linked together to forecast a completion date - is reliant on many factors. The forecasting accuracy is not isolated to the quality of the programme at the baseline programme development stage. The forecasting accuracy is also distorted by less tangible external influences, such as contemporaneous decisions to mitigate and accelerate the works and changes to the future sequences of work, by choice or necessity.

Strategy and a way forward

The appropriate administration of the contract had clearly failed at this point but, most importantly, the contractor and the employer had not engaged in a formal dispute. The opportunity to negotiate a settlement still existed and presented the best outcome for both parties. Driver Trett proposed that, in the genuine interests of a fair negotiated settlement, a consolidated TIA should be carried out on a retrospective basis. This would consolidate and confine the analysis to events that, on the balance of probability, caused critical delay. Driver Trett recommended that a consolidated retrospective TIA should be carried out in accordance with the best practices set out in the AACE International Recommended Practice No. 29R-03 for Forensic Schedule Analysis (FSARP), i.e. an implementation of Modelled/Additive/Multiple Base (MIP 3.7)¹. Whilst this recommended practice did not form part of the contract, it provided rules of engagement for each party to agree to accept.



...during the implosion of the planning process, the contractor is left with little option but to continue.



Before plunging straight into the mechanics of a MIP 3.7 implementation, it is imperative to highlight the complications faced when analysing delay on complex projects. As a result of the planning life cycle, the analyst is faced with several disconnected and conflicting sources of programme information. The specific programme to be used, and its current state, always become a matter of heated debate and, unless a degree of common sense prevails, hopes of a negotiated settlement will fade quickly.

Mechanics of a retrospective TIA

A retrospective TIA is essentially the same process as a prospective TIA, except that the analyst now has the benefit of hindsight (the project is completed or nearing completion). The prospective modelling of an event is now an actual fact and the event can be assessed in incremental periods of time otherwise known as "windows". It is defined in FSARP as follows:

*"MIP 3.7 is a modelled technique since it relies on a simulation of a scenario based on a CPM model. The simulation consists of the insertion or addition of activities representing delays or changes into a network analysis model representing a plan to determine the hypothetical impact of those inserted activities to the network."*²

It is important to note that MIP 3.7 is a multiple base method. The term 'base' is simply terminology given to describe the date up to which the programme has been updated with actual progress. The multiple base method (MIP 3.7) ensures that the quantification of delay is confined to the period of analysis (or window). The analysis methodology can use updates of the original baseline, contemporaneous, modified contemporaneous, or recreated updates. Driver Trett selected to modify the progress updates of the baseline programme as it was felt that, with the benefit of hindsight, structural changes could be made to improve the forecasting accuracy. The practice of modifying updates is admittedly a minefield, with many differing opinions among delay experts and even triers-of-fact. Hallock and Mehta point out that: *"in recent years, courts and arbiters have held that contract extensions should be based upon current schedules and not recreated schedules with the benefit*

*of hindsight"*³. This appears a blinkered view, if those changes align with the facts and retrospectively improve the forecasting accuracy.

There are several benefits to performing a retrospective TIA. Many of the assumptions made during the development of prospective mini-programmes (fragnets) to model the delay can now be converted to reflect the as-built status (fact). It can be ascertained in fact whether immediate successor activities, purportedly impacted during the prospective analysis, were in fact impacted.

What does a practical implementation look like?

Baseline validation

The first step in performing a retrospective TIA is to validate the baseline programme. This requires the settings of the software to be understood and documented, i.e. whether the network algorithm is calculated using retained logic, progress override, or actual dates. One of the most important steps is ensuring that the programme represents the full scope of work. In design-bid-build projects this is easier than design-build projects, where the scope of the project is initially poorly defined. Any aspects of the baseline programme that violate the contract provisions should be documented. There should be at least one continuous critical path from the inception of the project through to completion. Ideally this programme should not be updated with any progress.

Programme updates: validation, rectification and reconstruction

Due to the excessive manipulation of all the programmes during the planning life cycle, it was decided to start with a clean slate. The original baseline programme was used and updated periodically with progress only; no amendments were made to activity duration and interdependencies (logic) between activities. The baseline programme was updated in three-month intervals, for the duration of the project, to form revised progress updated programmes. Thereafter, each revised progress updated programme update was corrected to model fundamental changes to the work sequence, as could be determined retrospectively from the contemporaneous records.

Identification and quantification of delay events

There are two ways to analyse delay, it can either be quantified by 'cause-effect' or an 'effect-cause' approach. The 'effect-cause' approach relies on the observation of delay and then, once observed, it is up to the analyst to establish the cause of the delay through careful study of contemporaneous records. The observational methods follow this approach (as-planned versus as-built methodology). The cause-effect approach models specific events and tests the hypothetical effect by introducing the event, through the development of a fragnet into a progress updated programme at the time

of the event. As it is a retrospective analysis, the causes are modelled with fragnets which are updated with actual start and finish dates to simulate an event which is a matter of fact. Additionally, a fragnet was developed for events which were clearly the liability of the contractor. This is an important step if the analysis is to be balanced and robust, but it is a step that contractors do not always carry out, preferring the 'it's all the employer's fault' approach.

An additive model schedule, with only employer caused delay events, is unsuitable for determining concurrent delay⁴, and thus entitlement to compensability. The development of both employer and contractor delay events is important to determine approximate concurrency. Concurrent delay is a complex matter, the interpretation of which hinges on provisions of the contract. (This is well beyond the scope of this article but further details regarding concurrent delay can be found in Karen Wenham's article on page 10).

“there are a myriad of methodologies available to the analyst, which all have their own challenges to overcome

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Determination and quantification of excusable, non-excusable and compensable delay

The final step is to assess excusable, compensable, and non-excusable delay, resulting from both contractor and employer events. This is achieved by separately impacting the contractor and employer caused events on the 'unimpacted', or host programme and comparing the results. Obviously, the interpretation of compensability hinges on how concurrent delay is defined in the contract.

Figure 1 illustrates the comparison of the unimpacted programme, the programme impacted with employer caused delay events, and the programme impacted with contractor caused delay events. It is a rare occurrence where a contractor records its own delay events, and this has to be retrospectively developed. This may be an area where a contract administrator can become more involved during the currency of the project as opposed to writing all encompassing 'you're in delay' letters. The period of excusable delay exists where both the contractor and employer caused events to concurrently extend past the completion date (blue arrow labelled 1) and the period of compensable delay is the extent that the employer event pushes the completion date beyond the contractor caused event (orange arrow labelled 2). The employer

Figure 1 - Compensable & Excusable Delay

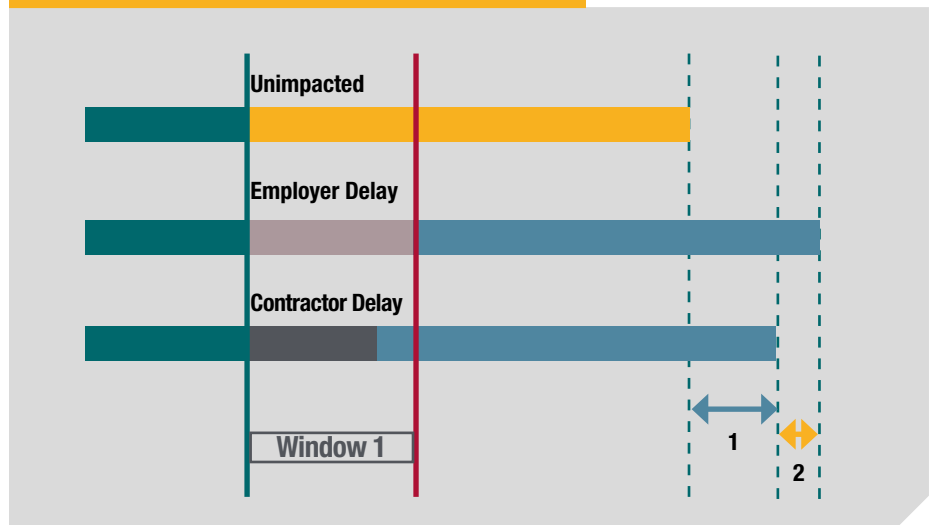
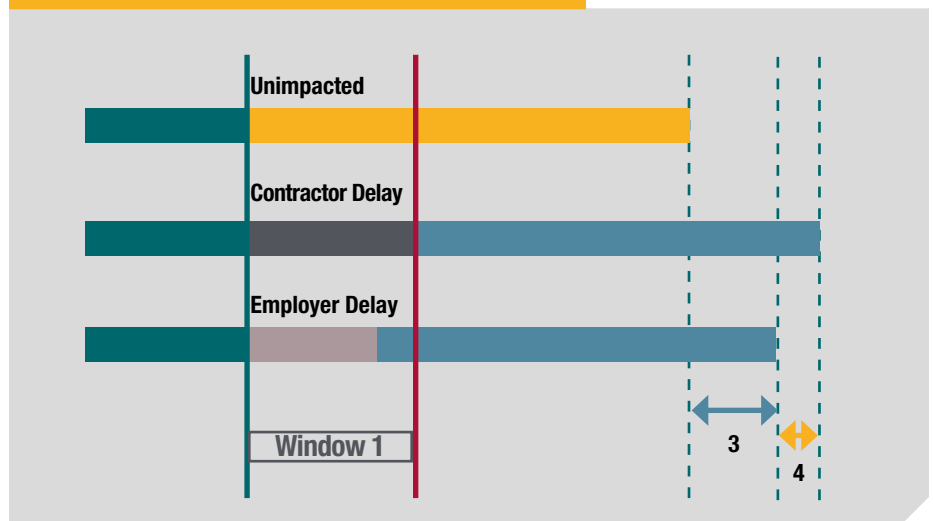


Figure 2 - Excusable and Non-Excusable Delay



caused event is driving the completion date.

Figure 2 illustrates the reverse condition where the contractor delay engulfs the employer delay and drives the completion date. This yields a result where a portion of the delay is excusable (blue arrow labelled 3) and a portion of the delay is non-excusable and non-compensable (orange arrow labelled 4). The contractor caused event is driving the completion date.

Lessons Learned

The most often cited criticism of a retrospective TIA is that the results do not reflect the facts. However, what it does provide is a mechanical, rules-based method with which both parties can agree to be bound by the method and results. If implemented correctly it will provide a fair approximation of project delay. There is no magic answer when it comes to delay analysis and there are a myriad of methodologies available to the analyst, which all have their

own challenges to overcome. Perhaps it is time for the parties to agree to start agreeing on an appropriate methodology, or otherwise pay the price in a formal dispute setting. Stakeholders are warned that a blind reluctance to resolve complex issues may prove crippling to both parties if they blossom into costly disputes⁵. ■

¹AACE Internal Recommended Practice No. 29R-03 pg. 75/134

²AACE International Recommended Practice No. 29R-03 pg. 75

³BE Hallock and PM Mehta, 'The Great Debate - TIA vs Windows; A Better Path for Retrospective Delay Analysis?' [2007] N/a(CDR04) AACE International Transactions 1

⁴AACE International Recommended Practice No. 29R-03 pg. 73/134

⁵BE Hallock and PM Mehta, 'The Great Debate - TIA vs Windows; A Better Path for Retrospective Delay Analysis?' [2007] N/a(CDR04) AACE International Transactions 1

Lost in translation

A 'grey haired' view on dispute avoidance and resolution in mainland Europe (part 2) - language scenarios to be avoided.



Mark Castell
Regional Managing Director and
Head of Diales in Europe

In issue 15 of the Digest, I reflected on the last 14 years of my professional life, which have been spent in consultancy based in the Netherlands. I looked at some aspects of dispute avoidance and resolution from a mainland European perspective.

In this article, I want to look at three particular instances where the use of different languages had an impact on my work as an appointed expert witness. The first concerns an example of where using 'foreign languages' in a contract contributed to the dispute, the remaining two are examples of challenges that are faced where information is available in different languages.

1. A contract written in two different languages that contributed to a dispute

This occurred on an infrastructure project in Southern Europe. The contractor was directly approached by the employer and asked if it would be interested in negotiating a contract to undertake civil engineering works to a major river crossing. The contractor agreed and the subsequent negotiations were undertaken in English; a 'foreign' language to both contractor and employer.

At the end of the negotiations, the employer informed the contractor that it wished the contract to be written in two different languages; English and the employer's own language. Furthermore, that the employer's own language should take priority in case of anomaly. This was duly agreed by the contractor and the completed contract documents were formatted so that the wording was in the two different languages side-by-side on each page.

During the execution phase of the project, problems started to occur because the employer's site representatives were requesting the contractor to do things that the contractor considered to be different to the contract requirements, but the employer then refused to accept that this was the case. Upon investigation, it became apparent that the cause of this 'misunderstanding' was that the contract wording, in the employer's own language, was not an accurate translation of the English version that had been the outcome of the negotiations



between the parties.

As stated previously, the employer's own language was agreed to have priority in case of anomaly and, perhaps as a result, the parties were unable to settle their differences amicably and resorted to international arbitration. I was appointed by the contractor as their quantum expert in the subsequent proceedings. Whilst my brief did not include the interpretation of

the contract, I learnt of the background to the dispute during my investigations.

2. Project documentation in one language but the submissions to the court written in a different one

A project between two Dutch businesses had English as the contract and project language, yet it was agreed that any disputes arising

under it would be referred to the Dutch courts for resolution. Unfortunately, problems arose on the project with late issue of design information and free-issue material by the employer; which caused the contractor to suffer delay and reduced productivity. In addition to the resulting delay, this led to the contractor incurring additional costs for which it submitted claims in the English language.

Attempts at an amicable settlement failed and the dispute was referred to the Dutch courts. At a certain point in the proceedings, the court identified a need for a court-appointed expert to give a view on the delay and quantum issues and asked the parties to agree the appointment of an individual.

As I was known by both parties, and after discussions over the brief that included me being assured that the majority of the documents would be in English, the parties agreed to my appointment. This was then ratified by the court.

After confirmation of my appointment, I received copies of the documents relied upon by the parties that were both voluminous in nature but also mainly in the Dutch language. Furthermore, it was confirmed that my report would now also be required in Dutch, rather than English as initially proposed.

Whilst I can communicate in Dutch to a certain level, my linguistic abilities are not sufficient to read and fully understand all of the documentation that I received, or to draft a report in that language. Thankfully a solution that avoided the costs and potential problems of translation, yet still enabled my input, was easily found. The solution was a native Dutch speaking colleague, Hugo-Frans Bol, with whom I worked on the investigations. We separated tasks between us wherever possible, to avoid duplication of effort, and were able to minimise the time we had to spend updating each other as a result of the many years that we had

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...language is a hurdle to be overcome in order to communicate and it is not a barrier to communication.

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previously worked together.

The final report and the opinions on the delay and disruption suffered by the contractor were accepted by the court and incorporated in its decision.

3. Substantiation for claims is in a different language to that used on the project

This is something that I have encountered on a number of instances, but this example concerns an appointment as quantum expert, for an International Chamber of Commerce (ICC) arbitration, on a project in Central Eastern Europe.

The contract and project language was English, as were all pleadings submitted as part of the arbitration. However, a significant extent of the back-up documentation for the quantum of the claims (i.e. invoices) were in the local language and I needed to understand their contents to fulfil my brief.

After discussion with the party that appointed me (the contractor) and their legal advisors, I proposed that I used the contractor's local accountant as my 'assistant'. As part of the claims were cost based, the accountant had

provided copies of relevant invoices and so was already known to me. He consequently had some knowledge of what was happening.

Following the agreement of the contractor and its legal advisors to this way forward, I directed the accountant to review the relevant invoices (there were several hundred), identify the month in which the invoiced services were actually undertaken (as distinct from the month that the invoice was issued), and then allocate the invoiced costs to the relevant month and to certain categories that I had defined. The output of this exercise was used to assist me in forming my opinions on the valuation of certain cost-based claims.

Whilst I was able to conduct certain checks of the output, I could not verify the work. This was clearly explained in my report, which was supplemented by a signed statement from the accountant. The employer, its legal advisors, and the quantum expert appointed by them raised no objections to this when my report was responded to.

Conclusion

Dealing with different languages is a common occurrence on international projects and one that I come across daily as our mainland European offices (in France, Germany and the Netherlands) all work in a number of languages other than English.

I first recognised this when I lived and worked in France nearly 20 years ago. My then colleague and I did not know certain words in French and the representatives from the French contractor we were meeting with did not know the words in English. The solution, we drew pictures.

From my experiences, I consider that language is a hurdle to be overcome in order to communicate and it is not a barrier to communication. How you overcome this hurdle depends on the circumstances. ■

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Origins of Confidentiality in Mediation

Looking at the practical effects of confidentiality in the mediation process.



Keith Strutt
Regional Managing Director,
Driver Trett UK

Mediation is a practical process of assisted negotiation which has confidentiality at its heart.

The promotion of mediation

Mediation sits against the backdrop of ever increasing time and cost for the formal adjudication of disputes, in either the courts or arbitration; along with the suggestion that the general populace – as opposed to those with significant wealth or access to state support for litigation – are effectively barred from access to formal assistance in settling their disputes¹. The ancient and widely used method of dispute resolution, mediation, has been co-opted into the public policy of many countries in an attempt to 'improve' access to justice. In the UK, the need to improve the quality and delivery

of access to dispute resolution was made in support of alternative dispute resolution (ADR) in general (and by implication mediation) by Lord Woolf and his report 'Access to Justice'².

The process of mediation has wide spread support across the world. From governments of all types, from command to capitalist economies, and from common law to civil law jurisdictions; and just about every point in between.

It seems clear that the attraction of a flexible, fast, and cost-effective process of dispute resolution is widely appreciated; not least by parties for whom the confidential nature of their private dispute leads them toward a process whose very nature, it seems, relies on confidence and confidentiality. The ubiquity of confidentiality and mediation appears widely accepted but perhaps a few authorities would be helpful as an illustration. The Commission for the European Communities: Green Paper on alternative dispute resolution in civil and commercial law³ at section 3.2.2.1 states:

'Confidentiality appears to be the key to success of ADRs because it helps guarantee the frankness of the parties and the sincerity of

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Mediation is, at its heart, consensual assisted negotiation.

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the communications exchanged in the course of the procedure'.

The court, in support of confidentiality in ADR, in *Halsey v Milton Keynes*⁴, stated:

'We make it clear at the outset that it was common ground before us (and we accept) that the parties are entitled in an ADR to adopt whatever position they wish, and if as a result the dispute is not settled, that is not a matter for the court. As submitted by the Law Society, if the integrity and confidentiality of the process is to be respected, the court should not know,

and therefore should not investigate, why the process did not result in agreement’.

The need for confidentiality

So, it appears that the majority are convinced about the need for confidentiality in mediation, but why should this be so? The most widely used of the formal dispute resolution processes, litigation in the courts⁵, is a public process and appears none the worse for it. The key to the answer appears to lie in an appreciation of what mediation actually is and what it sets out to achieve.

Mediation objectives

Mediation is not a public forum; neither does it set out to establish rights and obligations in law. It does not attempt to provide a correct answer to the problem at hand and it most certainly does not attempt to find and impose a ‘just’ solution.

Mediation is, at its heart, consensual assisted negotiation. It is the logical extension of the first port of call in dispute resolution, that being negotiation. When negotiation has failed (although in truth it is the parties that fail), mediation can be seen as a continuation of the process – or as is often the case, the first step when it is clear that the normal process of discussion will never lead to a settlement.

A neutral third-party joins the negotiations and assists the parties to maintain communication and, when appropriate, gently assist the participants to evaluate their own position, make offers, and consider counter offers. The whole process is akin to a complex dance through the issues; the skilful mediator helping parties form realistic views, make offers of settlement from which they can gradually learn each other’s position and expectations, and explore alternative solutions to the problem.

The objective is to enable the parties to settle, to arrive at not the right answer, but at an answer both can live with, even if they do not particularly like the final outcome.

Confidence and confidentiality

In a consensual process, where the participants have entered into the process freely⁶, choose to remain in the process, and continue to support it after the formal mediation through to implementation of the agreement; the confidence of the parties rests in large part in the confidences formed through the process. By this I mean that the complex interplay of negotiation is assisted and informed by the ability of the parties, through their neutral, to explore through offer and counter offer the path to settlement.

During the process, it is recognised that parties will often say and admit things that they do not actually believe or agree with; this is with the objective of finding a commercial settlement, one which recognises the advantages of early resolution to a dispute enabling the protagonists to return to their normal business.

Commercial settlement here can incorporate (as the process is privileged) some form of



hybrid justice – restorative and financial – as opposed to financial alone⁷. The confidentiality that comes from privilege (and I suggest, realistically, no other comparable ADR method⁸) provides the ability to offer things other than money alone. Perhaps a new contract, prompt payment on another, return of some equipment, a certificate, or even an apology. Whatever is seen as the just answer.⁹

How are the duties that arise enforced?

In the first instance, the duty of confidentiality should be enforced by the confidentiality agreement that all participants to the mediation have signed. This would be the main method of enforcing confidentiality against the other party to the mediation (as opposed to party representatives and the mediator).

Conclusions

There can be no reasonable doubt that mediation is, if not entirely dependent, immeasurably improved in effectiveness by the ability of the parties to exchange candid views and make admissions as commercial gestures with the purpose of settling, in ways that they would not normally do.

By recognising the nature of the information contained within the documents and exchanges, and most importantly recognising that the information is made up of different – separate – elements and attributes, it is possible for supervising jurisdictions to support mediation by choosing to use only those elements necessary to give effect to the settlement and support the process. For instance, there is no need to go behind a settlement and investigate what led to it to assess whether an agreement was reached.

Confidentiality is at the heart of the mediation process and, while the flexibility, speed, and low cost of mediation need to be maintained, it cannot be at the expense of confidentiality.

However, as with most things in life, there is a balance to be struck; the needs of justice and mediation need to be balanced on the double-edged sword that is confidentiality. ■

¹ See ‘Alternative Dispute Resolution Processes within the Framework of the World Wide Access-to-Justice Movement’; Mauro Cappelletti: *The Modern Law Review*, Vol 56, Nr3, May 1993; see also ‘Getting Disputes Resolved: Designing Systems to Cut the Costs of Conflicts’ William Uri, Jeanne M Bret and Stephen Goldberg, 1988.

² ACCESS TO JUSTICE Final Report - By The Right Honourable the Lord Woolf, Master of the Rolls - JULY 1996.

³ Commission of the European Communities: *Green Paper on Alternative Dispute Resolution in Civil and Commercial Law* [2002] COM(2002) 196 final.

⁴ *Halsey v Milton Keynes General NHS Trust* [2004] EWCA Civ 576.

⁵ In the UK the overwhelming choice of dispute resolution forum is for the use of a court or similar; of the claimants who choose to go to a form of dispute resolution 70% choose a Magistrates Court, County Court, The High Court or other court. Source: ‘Paths to Justice; the National Centre for Social Research’ Prof H Glenn University College London [1999] page 152.

⁶ At this point the reader may be tempted to cry foul, but even court annexed mediation and some of the more robust inducements to mediate – English cost sanctions for unreasonable refusal, US court ordered mediation, etc. still rely on the basic consent of the parties to remain in the mediation and to implement the agreement.

⁷ The justice here being an answer that is just solely in the eyes of the parties, without the wider public domain judgement of what is seen to be acceptable public policy or meeting socio-political mores.

⁸ The nature of Mediation being private, explorative and sufficiently flexible for the parties to consider all the settlement options and combinations available, safe in the knowledge that they are not bound until they agree to be.

⁹ Apology is an often overlooked and powerful ally in achieving settlements – see E. Cole, *Apology, Forgiveness and Moral Repair* (2008)22(4) *Ethics & International Affairs* and for how to do it properly Apt *Apologies* by Joel Marks is Professor of Philosophy at the University of New Haven in West Haven, Connecticut, U.S.A from *Philosophy Now Magazine*, issue 30 *Moral Moments*.



Project controls solutions

Going back to the basics on project control solutions for contractors.



Colin Capper
Associate Director,
Driver Trett UK

So, what are project controls, when are they required, and who is going to provide them?

Put simply, project controls encompasses the people, processes and tools used to plan, manage and mitigate cost and schedule issues and any risk events that may impact a project.

It encompasses all stages of a project life cycle including, where needed, the forensic analysis to understand the causes of failure and the potential of recovery through claims.

Over the years, it is evident that many contractors have lost control of time on construction projects. The effect of failure to control time results in vast amounts of time being wasted. Resources are deployed on managing the effect of delay and disruption.

Time is money, so from the outset, effective project controls can protect a project and ultimately influence the success of a business.

Fundamental to controlling time on a project, is the manner in which progress is recorded and reported by contractors.

Experience has proved that contractors can be vague when reporting issues relating to progress on construction projects.

By way of example, a contractor's monthly progress report states, "work has progressed well during the period despite the recent wet weather".

What does this say? It gives the impression that all is well, when in fact the opposite may be the true picture. It is not unusual for contractors to be unwilling to report actual progress achieved, or to fail to properly notify delay events. In fact, contractors sometimes misleadingly report the project as being on time, even though they are (or should be) aware that the project is actually in delay.

This reluctance to put off notifying inevitable delay (perhaps to avoid interrogation by a client) not only causes problems with reporting but

also, in some instances, prohibits the successful prosecution of retrospective claims.

The best approach is not to hide the reporting of time related issues, but to let the facts speak for themselves, by establishing the extent of works actually carried out and comparing them to the planned programme.

The planned programme

It is generally accepted that a planned programme, when prepared correctly, becomes an important control document. Not only does it help contractors plan the works, but it also becomes a useful management tool for assessing the effects of progress on a project and any mitigation that may be required.

The challenge for most contractors is back to time and money.

Consider this dilemma - what if a contractor plans a project properly at tender stage and fails to win the contract? Would this be considered a waste of time and money? What if a contractor fails to plan the project correctly and is awarded the contract. Clearly there is a risk of project overruns due to inadequate planning with the

associated cost implications.

At the award of a contract, the intensity of planning work often increases, which can cause problems for contractors with limited planning resource. Contractors are constantly balancing tender planning with live construction project planning. This often creates issues in the quality of planning documents produced and the frequency with which records are maintained.

When contractors report disastrous economic results, increased costs can often be attributed to project time overruns. In many instances, a contributing factor to time overruns is the lack of control of time. It is important to appreciate project control and the value of planning resources on projects.

In my experience one of the reasons often cited by contractors for failure on projects is, "we didn't provide sufficient planning resource". This becomes one of a number of recognisable causes of failure to manage and control time.

It is no coincidence that when planners work on projects, and the correct project controls are implemented, contractors stand a much better chance of completing projects on time and minimising the risk of increased cost.

Preparing the planned programme

Over the years as a member of a contractor's project team, one of the common requests I have witnessed by clients, often towards the end of a meeting was, "has the contractor prepared a programme?". Also, "when it is available, might the project team receive a copy?".

This often generated a short sharp reply from the contractor's contracts manager in the following terms, "programme is currently being prepared and when complete will be issued to the project team". Note a clear non-committal by the contractor as to dates.

Usually, where there is a contractor's unwillingness to commit to providing a programme by a certain date, this is because of the uncertainty of the availability of a suitable resource to produce the planned programme. In fact, a contractor's commitment to dates is sometimes dictated by the amount of planning expertise available, often falling short during busy tendering periods and holidays.

Historically, financial and market pressures demand short time scales for tendering. Commencement of construction activity on site is often too soon and, inevitably, prior to the design having been sufficiently advanced to meet the procurement of labour, plant, and materials.

I have experienced time on a project being dictated by an employer's funding arrangements. The employer required construction works to start immediately upon the award of a contract, with activities required to be planned around the existing tenant's occupancy, archaeology, and utility service diversions.

Agreements between the parties resulted in activities becoming enabling works, planned before the main construction activity could

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...one of the reasons often cited by contractors for failure on projects is, "we didn't provide sufficient planning resource."

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practically commence on site.

Understanding the activities required on the project during the initial early stages of a contract is important. It requires careful planning and management of the plan to provide a satisfactory solution to the employer's requirements.

Documents supporting the programme

The planned programme is the obvious control document, from which other documents are developed by the contractor to help manage time effectively.

These documents include design release schedules, health and safety plans, method statements, information required schedules, lead-in and procurement documents, cash flow forecasts and countdown documents, all of which assist with the management and control of time on a project.

It is essential that the planned programme becomes the accepted or agreed construction programme. Without acceptance of the planned programme, all other control documents may be considered flawed.

Accepted programme

To some practitioners in the construction industry, an accepted or agreed programme means no more than providing a simple Gantt chart, identifying a few construction activities preceded by a milestone date to start on site and succeeded, at the end of the construction period, by a brush up and final clean activity, before a client accepts practical completion of a project. In other words, a programme which reflects little more than the information and dates often contained in the contract.

Clearly, this is too little information, which does not provide an effective control document for a contractor to manage time.

Equally, a programme or schedule containing too much activity information may become difficult to understand, time consuming to produce, and unhelpful when trying to show the effects of delaying events.

In my view, contractors find difficulty in managing the level of detail to be provided and when to provide such information.

In other words, they plan too far ahead and in greater detail than is necessary, say when a strategic plan is required at the beginning

of a project life cycle. Conversely, when detailed programme information is required (for example when input is obtained from specialist mechanical and electrical engineering subcontractors) it typically arrives later than required, creating limitations in the timing and development of a detailed planned programme.

In my experience, when preparing programmes for acceptance, contractors don't give enough attention to the planning and allocation of resources to activities, key milestones, and logic. Many projects proceed without these important elements being included in the programme. This lack of detail can adversely affect the contractor's ability to achieve the requirements of an accepted or agreed programme and therefore the contractor is unable to manage the plan correctly.

Since the early nineties, acceptance of the planned programme is considered one of a number of key matters and core principles, especially when planning and programming under an NEC type contract.

Ask yourself whether the project team is working to an accepted programme (as described in core clause 3 under NEC4) and can any contractor feel comfortable knowing a project is being planned, monitored, and reported on without there being an accepted programme?

At the conclusion of a project that has suffered delay, an as planned v as built programme may be needed. It becomes a primary document, used to identify where delay has occurred and can be used to support the analysis of time related matters.

Fundamental to supporting the as planned v as built programme is the reliability of contemporaneous correspondence and documents required to evidence the actual start and finish dates of activities. Our experience informs us that the information identified in an as built programme will often suffer from a lack of evidence to support the dates shown. Significant costs are often incurred by contractors employing additional resources to investigate the availability of record documents which accurately represent the progress of the works, as it occurred on site at the time.

In any event, planners often move to new projects creating a shortfall in availability of suitable resources to manage and control information to support disputes. My advice to contractors is to proceed with an as built programme exercise as the work progresses. This allows contractors to test and understand the impact of an event. It also acts as a tool for ensuring that the appropriate notices are issued timeously and provides a baseline from which to assess the commercial impact of an event.

Updating the programme

When a project progresses, plans change, and the programme can quickly become out of date. This creates problems for contractors reporting progress during the course of the contract works. Contractors often adopt or show progress as a jagged drop line. This does

not allow proper and accurate analysis of any potential delays.

This method of reporting is simple to prepare, easy to understand, and generally gives an indication of the status of the progress on a project as it is related to the original planned programme. Contractors often continue reporting progress on programmes without rescheduling or updating it for change.

Therefore, they do not show the effect of delay events or in fact the effect of progress. In these circumstances, a problem with forecasting is created. It does not predict a completion date.

Ask yourself, if predicting a storm, would you rely on an out-dated weather forecast?

To overcome this problem, contractors need to regularly update programmes by showing the effects of progress and events on the programme. In my view all events should be shown, whatever their perceived or alleged cause, including any actions in respect of mitigation.

Critical tasks and float

Industry practitioners familiar with planning terminology will recognise the term float. Float defines the amount of time available to carry out non-critical tasks before they become critical. Critical tasks require the contractor's attention to ensure they don't become delayed. Delays to critical tasks will affect the contractor's ability to complete a project on time.

A programme with the capability of scheduling, as well as the calculation, of float and identifying critical tasks, is a vital document for contractors. Good practice suggests that this is a particularly important document required throughout a project.

Unfortunately, the realisation of the importance of programmes identifying critical tasks and float often comes too late to create an effective management control document. A programme lacking logic links creates a false picture.

Conclusion

Fundamental to a contractor controlling time on a project is the manner in which control documents are prepared, monitored, and updated. The planned programme, prepared correctly, is the main control document from which other control documents are developed by contractors to help manage time and resources effectively.

A lack of detail in the control documents can adversely affect the contractor's ability to manage time and the impact of change correctly.

The management of time on a project is generally influenced by the availability of experienced planning resources to maintain the appropriate records and reviews of progress achieved.

The implementation of a fully coordinated project controls procedure may protect a contractor from paying delay damages and will also assist in the recovery of additional monies for delay and disruption. ■

Q&A Integrated Project Delivery

Yamin Shihab – Vice President, MHPM-Driver, UAE outlines the project management approach of integrated project delivery and its potential for Middle East projects.



The construction industry is notoriously adversarial and slow to adopt innovative practices. In a 2018 MEED report, which analysed productivity growth across 21 sectors since the 1940s, construction ranked the lowest with a meagre 6% growth, compared to 1,512% growth in agriculture and 780% in manufacturing. A 2017 report from Arcadis indicated that the Middle East's average dispute value sits at US\$56 million, significantly above the global average of US\$40 million, and took an average of 14 months to resolve. Could there be a fundamental flaw in the way in which projects are procured and project teams assembled?

What is Integrated Project Delivery?

Integrated project delivery (IPD) is a response to the increased acrimony, litigation, reduced productivity and delays that have become prevalent in the construction industry.

The American Institute of Architects (AIA) offers the following definition:

"Integrated project delivery is a collaborative alliance of people, systems, business structures and practices into a process that harnesses the talents and insights of all participants to optimise project results, increase value to the owner, reduce waste, and maximise efficiency through all phases of design, fabrication, and construction."

What is the IPD Process?

An owner develops the high-level project parameters, such as cost and completion schedule, to inform the IPD team members. This pre-project work is similar to the development of the 'employer's requirements (ER)' in a design-build contract. However, unlike a traditional design-build procurement, the owner's evaluation and selection of the contracting and consulting teams is not focused on further development of a design concept, or a fixed price, but rather on the team's personnel and

their ability to work in a truly collaborative setting.

Once the owner has selected the preferred IPD partners, all parties work together through a validation period, often called the 'conceptualisation phase'. By working collaboratively, the team can identify efficiencies and ways to improve the 'expected project cost', in order to reach a 'validated target', which usually represents a reduction against the initial schedule and time parameters of approximately 6-8%.

The ability to deliver actual costs that are lower than the target represents an incentive pool in which all parties share. Conversely, missing the target represents a risk to be shared by all parties, for example through reduced profit. Figure 1 illustrates this principle.

“

IPD is an emerging trend in the market...we must learn about the benefits and shortcomings and be prepared to adapt to it.

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Once the conceptualisation phase is completed, a multi-partied agreement is executed between the IPD partners (owner, consultants, contractors) and project development begins. The IPD multi-party agreement requires all parties to specifically agree, in contract, to avoid liens, claims, and litigation.

A fundamental element of IPD is co-location. 'The Big Room' is, in essence, a project-specific

site office where all project participants work collaboratively to reduce the design iterations which are often necessary to achieve both cost targets and constructability.

Another integral part of IPD is the use of 'lean' construction, a process in which every project element and task is scrutinised in order to eliminate waste, inefficiencies, and downtime. For example, 'lean' construction may use just-in-time (JIT) delivery of products to avoid stockpiling of materials on-site and the double handling that occurs.

IPD also encourages the use of building information modeling (BIM). BIM is a growing delivery methodology which uses a comprehensive, multi-dimensional model overlaying all building elements. With BIM, work done in the Big Room can be shared immediately, and conflicts and drawing coordination errors can be reduced, thus contributing to overall efficiency.

What are the advantages and disadvantages of IPD?

IPD's primary merit is the incentive-based environment where all stakeholders collaborate to deliver lower costs, more efficient processes and the elimination of claims and litigation. Some of the advantages and disadvantages are noted below.

Advantages

- Incentivises cost-reduction and optimises value.

- Reduces waste and maximises efficiency.
- Promotes creative solutions.
- Fosters team spirit and a more enjoyable work environment.
- Discourages escalation of disputes.

Disadvantages

- May deviate from the owner's initial vision without a compliance consultant.
- Owner surrenders some design input and measure of control.
- Longer front-end process to arrive at agreed 'expected' and 'target' parameters.
- Requires the project team to set realistic target budgets at the outset.
- Difficulty in finding the right mix of team members that can make this successful.

What is the role of the Project Management Consultant in IPD?

Owners are already asking, "What about IPD?" and as project management (PM) practitioners we should present the benefits and limitations of this approach. Two key areas which an owner's PM must understand before implementing IPD are:

Pre-Project Work

The age-old wisdom, "Projects don't fail at the end, they fail at the beginning," certainly still holds true. IPD requires the owner to have a reasonably detailed project framework at the outset because the effort and detail incorporated into the Pre-Project work can have

a significant influence on how the owner is able to control the project outcome.

Dedicated Team Leadership

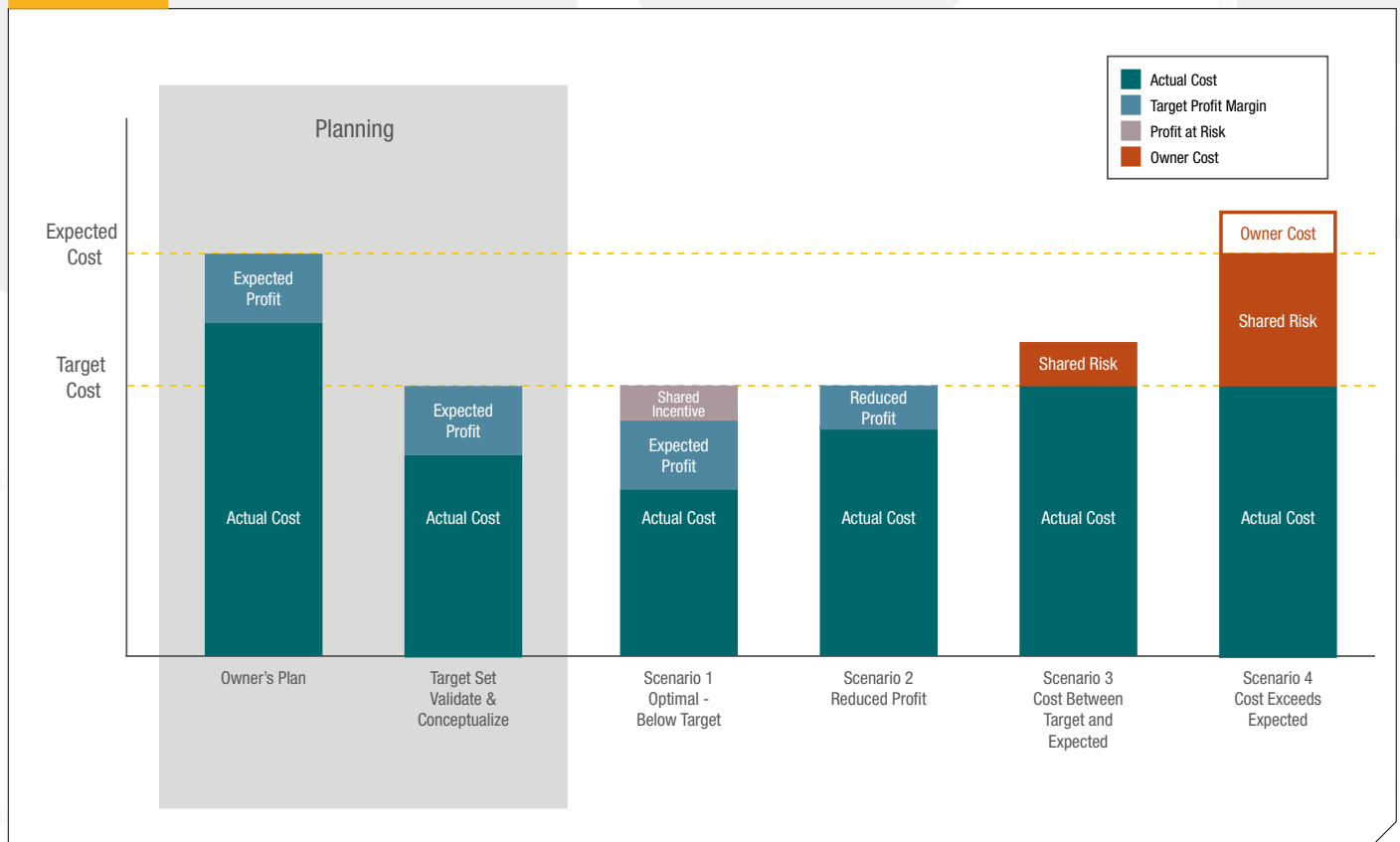
Based on client feedback from one of our IPD projects, an owner's representative estimated that a minimum of 80% of the team's time was required to ensure appropriate involvement and timely decision making. In reality most owners don't have this amount of time to lead a project, which reinforces the need for a dedicated project manager. Owners will need to ensure that they are hiring project management professionals with unique leadership skills, appropriate construction knowledge, and the ability to foster a collaborative environment.

What is the future for IPD?

Only by changing the low-price mindset to a value-added mindset will clients see the real value of a process such as IPD. The current practice of shifting risk to the supply chain is not sustainable, but if risk and adversarial conditions of contract can be removed, money can be diverted to innovation, thereby enabling prices to come down.

IPD is an emerging trend in the market and, as it gains traction, we must learn about the benefits and shortcomings and be prepared to adapt to it. IPD may not solve all the Middle East's construction industry problems, but we certainly see merit in applying some of its principles to drive higher productivity and lower both the time and money spent on construction disputes. ■

Figure 1



BYTE 1



WHAT CAN HOLLYWOOD TEACH CONSTRUCTION?

Alistair Cull - Operations Director, Driver Trett UK draws parallels between the complex twists and turns of a Hollywood blockbuster plot and the, slightly less glamorous, world of construction projects.
<https://www.driver-group.com/global/news/what-can-hollywood-teach-construction>

BYTE 2



TWO BRICKS

Mark Wheeler - Global Chief Operating Officer, Driver Trett rethinks the construction process for the 21st Century.
<https://www.driver-group.com/global/news/21st-century-construction-process>

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