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Welcome

Megaprojects involving contractors undertaking design responsibility are becoming increasingly more predominant in Hong Kong. We are therefore pleased to have Phillip Georgiou, Partner and Sonny Payne, Special Counsel of Baker Botts as our guest writers who consider the additional risks faced by contractors on such contracts, suggested ways to minimize these risks and some important legal concepts arising out of design issues.

Many disputes arise out of changes and a particular type of damage frequently alleged on changed projects is loss of labour productivity. One way to evaluate and quantify loss of labour productivity damages is through use of the measured mile technique. However, problems can exist with the measured mile approach because there are no generally accepted guidelines for developing and applying the technique. We are therefore pleased to have Professor William Ibbs and Josh Chittick of the University of California as our guest writers to provide practical considerations in the identification and application of measured miles with reference to a number of cases from the United States.

Finally, we are pleased to include in the *ADR Analysis* the results of a recent survey of industry leaders by Pinsent Masons, which reviews some of the challenges now facing the Hong Kong construction industry.

James B Longbottom
Managing Director

Risky Business: Design-build Procurement on Megaprojects in Hong Kong

By **Phillip Georgiou** Partner
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Introduction

Megaprojects are large-scale, complex ventures that cost US$1 billion or more, take several years to implement and are designed to transform society in some way. It is estimated that megaprojects account for 8% of the total global GDP.[1] Megaprojects are, however, synonymous with significant delay and cost overrun, with cost overruns of up to 50% routine and overruns of over 50% not uncommon.[2]

Two ongoing megaprojects projects in Hong Kong are on track to continue this trend – the Hong Kong sections of the Guangzhou/Shenzhen/Hong Kong Express Rail Link (the "XRL Project") and the Hong Kong/Zhuhai/Macao Bridge, including its associated link roads and the border crossing facilities created on a 150 hectare artificial island formed adjacent to Chek Lap Kok Airport (the "Macao Bridge Project"). Interestingly, the former has been procured primarily through build-only contracts[3], whilst the latter has been procured primarily through design-build contracts.[4]

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margin or suffering a huge loss. Although a multitude of factors are typically responsible for delays and cost overruns on megaprojects, design issues frequently feature as a significant cause. This is hardly surprising given that megaprojects often push the boundaries of engineering knowledge and capability.

This article analyses the additional risks to contractors who undertake design responsibilities on contracts associated with megaprojects and suggests ways to mitigate these risks. This article also considers important legal concepts that should be kept in mind when advancing claims in respect of delays and cost overruns arising out of design issues.

Overview of Risks Arising Out of Design Responsibility

On a design-build contract (or on a build-only contract with a significant element of contractor designed works), the added design responsibility can cause the contractor to incur liabilities or additional costs in three fundamental ways:

i) negligent design;
ii) delays to completion dates caused by design activities; and
iii) scope creep.

Negligent Design

Contractors on public works projects in Hong Kong are required to take unlimited liability for breach of contract and, on a design-build contract, this includes unlimited liability for negligent design. Although the contractor will typically engage a consulting engineering company to design the works (the "Designer"), as a result of constraints imposed by their insurers, Designers are rarely willing to accept unlimited design liability and invariably insist on a cap on liability, with the cap relating to the value of the engineering design services rather than the value of the works. Consequently, the contractor is required to bear any liability for design inadequacies or defects that exceed the Designer's liability cap. Such surplus liability can potentially be substantial in the context of a megaproject.

On a more positive note for contractors in Hong Kong, the implied obligation that the design be 'fit for purpose' is expressly excluded on design-build contracts in Hong Kong[5] thereby aligning the contractor's standard of care in respect of design with that of Designer, namely the obligation to exercise reasonable skill, care and diligence.

Delays to Completion Dates Caused by Design Activities

In design-build contracts, design activities inevitably fall on the critical path at some stage, particularly in the early stages. If delayed, design activities can delay contractual completion dates and expose the contractor to significant damages and additional cost. Further, general damages (rather than liquidated damages) are often imposed for delays to completion dates which cause knock-on effects to adjacent or follow-on interfacing project contractors.[6] Design activities related to foundations and underground works are particularly vulnerable to delays due to the need to verify design parameters by further ground investigation after the contract has been awarded.

A sometimes overlooked feature of contracts on megaprojects in Hong Kong is that, even in the situation where the project owner (the "Employer") instructs a change as a variation to the contract (thereby entitling the contractor to an extension of time and additional costs resulting therefrom), the contractor will nonetheless be under an obligation to "use all reasonable endeavours" to make good the delay for which the Employer is culpable.[7] On a design-build contract, this obligation will apply equally to any design activities that fall on the critical path and it is therefore important for the Designer to appreciate the legal implications of the obligation to use all reasonable endeavours.[8]

Scope Creep

Scope creep is a term coined by project managers and refers to the uncontrolled change or growth to the scope of a project. Scope creep is a major cause of claims and disputes on all types of contract. There are, however, additional risks of scope creep associated with design-build contracts, in particular, risks arising out of insufficient design development prior to entering into the contract and at interfaces with other project contractors, which are discussed below.

Insufficient Design Development Prior to Entering into the Contract

On a build-only contract, the design of the works is (in theory) well developed at the time of tender and the scope of the works to be constructed is readily ascertainable from the drawings and the specifications. If the design transpires to be incomplete or is subsequently revised, the contractor will be duly issued with a variation and the Employer is culpable for any delay and/or additional cost resulting from the variation. Insufficient design development prior to contract award is widely thought to have played a significant factor in the scope creep on the West Kowloon Terminus, the centrepiece of the XRL Project.

On a design-build contract, the risk of insufficient design development prior to entering into the contract falls squarely on the contractor. It is, therefore, critical that the contractor develops the design of the works in sufficient detail at the tender stage in order to properly ascertain the scope of the works, and price its tender accordingly. To this end, given the time constraints during the tender stage, contractors typically have no choice but to rely heavily on materials provided by the Employer for information, such as the reference design, geotechnical reports / interpretations and drawings of existing utilities and facilities (the "Information Only Materials"). Such reliance is, however, at the contractor's peril as the conditions of tender and the contract will typically state that the Information Only Materials do not form part of the contract, with the Employer disclaiming all liability and responsibility for any reliance on the same.

Upon being awarded the contract and proceeding with the design, the contractor often finds that the Information Only Materials are incomplete or contain errors, resulting in an increase in scope to what the contractor has priced. In this regard, foundations and underground works are commonly

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prone to scope creep due to the need to conduct further ground investigation works after the contract has been awarded. Diversions or modifications of existing facilities and infrastructure which are peripheral, or incidental to, the main project works are also prone to scope creep due to the need to obtain approval from and comply with requirements of third parties.

Interfaces With Other Project Contractors

Due to their sheer scale, megaprojects are usually divided into multiple contracts and this division results in complex interfaces between the various project contractors. These interfaces are breeding grounds for claims and disputes and the situation is exacerbated on a design-build contract due to the introduction of a design interface in addition to the construction interface.

Employers typically deal with these interfaces between the various project contractors by imposing contractual obligations on them to cooperate and liaise with each other in respect of the design and construction of the works at the interface. To this end, detailed interfacing specifications are typically incorporated into the contracts defining the contractors' respective obligations in relation to matters such as design responsibility at the interface, information exchange and the construction timing / sequence. Despite such meticulous planning at the outset, things still nonetheless frequently go wrong at the interfaces due to events such as delays, design changes and sub-standard design / construction by one or more of the interfacing contractors.

Managing the Design Risk

Management of design risk starts at the tender stage where it is important to carefully select a Designer with due regard to its experience both in designing the type of works required under the contract and in working with contractors on design-build contracts. It is also at this early stage that caps on the Designer's liability should be negotiated before the contractor goes too far with the Designer and loses some of its negotiating power.

Second, the Designer needs to be properly managed throughout the design process. Managing a Designer requires a different approach from that of managing other subcontractors as, due to the different nature of their respective businesses, the interests of the Designer do not always naturally align with those of the contractor. For example, additional time and resources invested by the Designer in the design to reduce the construction cost do not translate into direct benefits for the Designer. Incentives can be considered to encourage the Designer to share in any cost savings realized through innovative design and value engineering.

Third, it is important that the consultancy agreement with the Designer includes obligations that mirror the contractor's own obligations. For example, an obligation to progress with the design in a diligent and expedient manner in accordance with the contractor's programme (which may change from time to time) and to use all reasonable endeavours to mitigate any delay whenever the contractor deems that the design is delaying (or has delayed) the progress of the works. The tendency to incorporate obligations into subcontracts using "back-to-back" language should be avoided as the term "back-to-back" is a vague expression that is neither a legal nor a technical term under Hong Kong law.[9]

Claims and Disputes Arising Out of Scope Creep

Scope creep in one guise or another frequently features as topics of claims and disputes on all types of contracts. When advancing claims for scope creep on a build-only contract, the main focus is usually on establishing a variation to the contract. However, given the more limited circumstances in which variations arise on a design-build contract[10], a somewhat different approach to advancing claims is required compared with build-only contracts. This often requires resorting to fundamental principles of contract interpretation.

For example, if the scope creep has arisen out of the contractor's reliance on the Information Only Materials at the tender stage, it will be necessary to find a way to override the various disclaimers in the contract relating to such Information Only Materials and justify a legal basis for permitting the Information Only Materials (which are 'extrinsic evidence') to be considered as part of the claim. In this regard, it needs to be borne in mind that the courts will permit the consideration of extrinsic evidence in interpreting contracts in circumstances where the words in the contract are ambiguous, or where they are devoid of commercial sense.[11]

Ambiguities are in abundance in construction contracts, particularly so in design-build contracts where there are numerous design codes and requirements incorporated by

reference into the contract which may contradict each other or contain nebulous requirements. Although many contracts foreshadow the occurrence of ambiguities by providing a hierarchy clause to deal with such ambiguities [12], these clauses are not necessarily barriers to resorting to fundamental principles of contract interpretation when it comes to establishing the objective intention of how the parties intended to allocate risks under the contract.[13]

Similarly, in advancing claims arising out of scope creep at interfaces with other project contractors, it is often useful to focus on the Employer's implied duty to cooperate and do all that is necessary on his part to bring about completion of the contract.[14] Whilst the extent of this duty is very fact sensitive, the duty to cooperate on long-term megaproject – with interfaces between contractors all of which are engaged directly by the Employer – is arguably very much enhanced and cannot so readily be shifted entirely to the project contractors.

Conclusion

Contractors take on significant additional risks by undertaking design responsibility on megaprojects. Such risks need to be carefully assessed at the time of tender and properly managed throughout the implementation of the contract. Scope creep due to inadequate design development at the tender stage and interfaces with other project contractors are particularly high risk areas which frequently result in claims and disputes over culpability for the consequential delays and cost overruns. Advancing such claims often requires fundamental legal principles to be invoked that strike at the heart of the objective intention of the parties at the time of entering into the contract, or point to breaches by the Employer of its implied common-law duties.

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Footnotes:

1. See article entitled *What You Should Know About Megaprojects and Why: An Overview* by Bent Flyvbjerg in *Project Management Journal*, Vol. 45, No. 2, pp.6-19, 2014.
2. Supra pp.9-10 and Table 2.
3. Namely, the MTR Corporation's *Conditions of Contract for Civil Engineering and Building Works Construction in relation to Entrustment Agreements*.
4. Namely, the Hong Kong Government General Conditions of Contract for Design and Build Contracts, 1999 Edition (the *Government Design-build Conditions*).
5. See, for example, Clause 23(1)(b) of the Government Design-build Conditions.
6. See for example clause S.C.C. A10 of the Hong Kong Government's Special Conditions of Contract for use in Mega Project Contracts.
7. See for example clause S.C.C. A4, supra.
8. See *Phillips Petroleum Company UK Ltd v Enron Europe Ltd* [1997] C.L.C. 329 CA, *Rhodia International Holdings Ltd v Huntsman International LLC*[2007] EWHC 292 and *Yewbelle Ltd v London Green Developments* [2007] EWCA Civ 475.
9. See judgment of Reyes J in *WH-SCG JV Limited v Hong Kong Construction (Holdings) Limited*, HCCT 48/2006, 9 August 2006 at para. 28, as applied by DHCJ Cheng SC in *Brington Engineering Ltd v Cheerise Asia Ltd* HCCT 2/2010, 18 August 2011.
10. See definition of 'Variation' in Clause 1(1) of the Government Design-build Conditions.
11. See Lord Hoffmann in *Jumbo King Ltd v. Faithful Properties Ltd and Others* (1999) 2 HKCFAR 279 at 296 and Mortimer NPJ in *Marble Holding Limited v Yatin Development Limited* (2008) 11 HKCFAR 222 at §20.
12. See for example Clause 6 of the Government Design-build Conditions.
13. See *RWE Npower Renewables Limited v J N Bentley* [2013] EWHC 978, upheld by the Court of Appeal in [2014] EWCA Civ 150.
14. *London Borough of Merton v Leach* (1985) 32 B.L.R. 51.

Practical Ways to Identify Measured Miles

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Introduction

Productivity is a measurement of output per unit of time and is important because it, along with the hourly rate and the work quantity, is one of the three components of labor cost along with the hourly rate and the work quantity. If productivity is impaired, project labor costs will increase. Because labor costs are usually a large proportion of total project costs, the overall total project costs will probably increase. Such an increase will jeopardize the project's business value to its investors and the contractor's profit.

One of the ways labor productivity may be impaired is through change, which is any addition, deletion, or revision to the general scope of a contract. Because change may result in idled resources (e.g. waiting for new instructions), reassigned resources (with extra, unplanned transit time or learning curve losses) or other problems, a contractor may suffer a loss of labor productivity (LOP).

To successfully claim LOP damages a contractor must demonstrate what caused the change, why the owner is liable for the change, and that any claimed damages are reasonable. There are different methods for estimating such LOP losses including actual cost, total and modified total cost, project comparison studies, specialty industry studies, general industry studies, and the measured mile approach.

This last method, the measured mile technique, compares a contractor's labor productivity during two sections of project time: a normal (also sometimes called the reference or non-impacted) period against an impacted period. It has been accepted by a number of professional organizations such as the AACE (2004)[1] and the Society of Construction Law (2002)[2], and a number of legal decisions.

Though seemingly simple in concept, there are actually a number of issues and nuances associated with measured mile analysis and it is frequently mis-applied because of those issues and nuances. One of the most common mistakes is using a reference period that is not similar to the alleged impacted period. "Similarity," though is neither well defined nor understood, and clear, practical guidelines are needed.

Key Similarity Characteristics

Measured mile analysis would be easy if projects had periods of time that were identical. However, that is not and does not have to be the case as the court in Clark Concrete[3] wrote:

> *"[The Government] is correct in asserting that the work performed during the periods compared by [the Contractor] was not identical in each period. We would be surprised to learn that work performed in periods being compared is ever identical on a construction project, however. And it need not be; the ascertainment of damages for labor inefficiency is not susceptible to absolute exactness. We will accept a comparison if it is between kinds of work which are reasonably alike, such that the approximations it involves will be meaningful."*

A key issue in measured mile analysis thus becomes a question of what constitutes similarity. One legal source defines it using terms such as *"analogous, approximate, close, congruent, kindred, like, synonymous"* (Free Dictionary). Another reference writes that similar circumstances will bear *"a partial resemblance only; but it is also often used to denote sameness in all essential particulars"* (Legal Dictionary). To understand and provide guidance on the subject of similarity, it is therefore necessary to investigate the *"essential particulars"* or factors of a project. The following subsections discuss such considerations.

The courts have repeatedly relied on conservative, expert judgment in analyzing such cases. Employing conservative and expert judgment increases the likelihood of a fair analysis and successful outcome.

Type of Work

One of the most obvious points of comparison between two time periods in a project is the type of work that is being done. According to Loulakis (1999)[4]:

> *"...the work performed during the mile should be substantially similar in type, nature, and complexity to the work that was affected."*

Work type and nature relate to the physical characteristics of the installed work (e.g. reinforcing steel in a column vs. reinforcing steel in a slab or PVC vs. EMT conduit). As mentioned above, identical periods of time and work will be impossible to find on a project; the courts, therefore, have allowed a certain amount of latitude by holding only a claimant to a standard of similarity.

The court in *P J Dick*[5] provides insight into this issue of similarity when it considered work type factors in a project with electrical circuit work that was disrupted by over two thousand changes. Dick, the contractor, argued that all the branch circuits had been disrupted by the government and thus did not have any branch circuit work available as a measured mile. Instead, it used feeder circuits as its reference mile. The court, after considerable in-depth review, accepted the contractor's analysis even though:

1) the feeder and branch wire and conduit sizes were different;
2) the feeders were installed in longer continuous runs and in interstitial spaces; and
3) the feeders did not involve device installations.

Evidence showed that the work was performed in the same general part of the building. A reading of the court's decision suggests that the large number of owner-caused changes led the court to exercise some leniency in accepting this measured mile comparison.

A counterexample in which a contractor's measured mile was not acceptable to the court is *P W Construction*[6]. In this case the court found that the differences in the materials and the means and methods were too great to accept as a measured mile comparison:

> *"The record shows that welding in the impaired period was butt-welding on **polyethylene pipes**, which takes only 15 seconds to 2 minutes per weld, whereas the welding done in the pre-disruption period was **steel welding**, which may take up to 2.69 hours per weld ... this evidence suggests that a comparison of the pre- and post-disruption periods must take into account the difference in welding ... Because the impaired rate accurately reflects productivity during the impaired period, but does not accurately reflect productivity during the ideal period, the court vacates the damage award on lost productivity. The rates must account for the differences in welding and trenching costs for the **different pipes [emphasis added]**."*

E C Ernst[7] is another example of a failed attempt to use measured mile. In this situation, the contractor's expert computed LOP by assigning craft labor-hours to drawing revision production. The approach was unsuccessful because the analysis;

1) included nonelectrical drawings; and
2) assigned an equal number of labor-hours of lost productivity to each revision even though some drawings had minor revisions.

Also, impacts were claimed at times when drawings were produced but no craft work was performed. On remand, Ernst used a different method that was accepted. A final example of a failed analysis is *J A Jones*[8]. In this dispute the impacted work was deemed by the court to be too dissimilar and too far away from the reference area to warrant use as a measured mile.

Means and Methods

A second factor to consider in evaluating possible measured miles is contractor means and methods. Contractors are usually responsible for and have control over construction means, methods, techniques, sequences, and procedures unless the contract documents give other specific instructions concerning these matters. Means and methods, in this context, is the installation and erection procedures used to construct a project. Examples include the choice of a tunneling method, the size of a backhoe, or precasting vs. casting-in-place concrete work.

This category includes the tools and equipment that are used. As AACE (2004)[1] notes;

> *"It is probable that productivity will decline because the right tools, materials and equipment may not be in the right place at the right time."*

The *P W Construction*[6] court, as cited above, emphasized that the means and methods between the impacted and unimpacted periods must be reasonably similar.

Labor Force and Worker Characteristics
Labor force and worker characteristics is another factor that should be reviewed as part of preparing a measured mile analysis. This applies to not only the workforce of the self-performing general contractor, but also to specialty subcontractors. Considerations at the project level include union vs. non union workforces, labor trade, crew sizes, foreman-to-journeyman ratios, training, morale, fatigue, overmanning, and absenteeism and turnover ratios.

These criteria must also be considered in light of the prevailing economic conditions. In economic slowdowns, the unemployment rate may be high and highly productive workers may be readily available. During economically robust periods, the converse may be true.

Crew mix is also an important part of this general category as realized in the *Bay Construction*[11] case, where the board denied a claim because the contractor failed to analyze the labor trades separately. The *P J Dick*[5] court also highlighted the importance of comparing similar crews when it put emphasis on the fact that the electricians used throughout the project consistently came from the union hall.

Supervision and Management
Another critical factor that must always be considered is supervision and management. Without proper leadership, a project will fail to optimize productivity. Hiring and using the correct people in a proper manner and ensuring that the correct equipment, materials, subcontractors, and other resources are available to the craftworker are keys to project success. The importance of supervision and management was highlighted by the Mechanical Contractors Association of America (MCAA) when it was made one of the sixteen factors in the MCAA model that can be used to assess LOP.[10]

Another important element of project management is the proper collection of productivity data. A portion of a project may serve as a useful and valid measured mile but the analysis will be flawed unless the labor-hour and quantity data are collected correctly.

Project Location, Layout and Logistics
Project location, layout and logistics can influence measured mile analyses and thus are essential factors to consider in the design and use of a measured mile. Location can be viewed on a micro scale as indoor or outdoor work, or on a more macro scale comparing different geographical locations. Four of the sixteen factors in the MCAA model relate to location, layout, and logistics issues: beneficial occupancy, joint occupancy, site access, and logistics.

Location and logistics may also bring into question the accessibility of the work site to workers. *Holloway* (2007)[11] provides an example in which a welder is working at one point in a prefabrication shop one week and the following week must work outside in subfreezing temperatures. *"The contractor might argue that the entire cost overrun was caused solely by the decision to move the work to an outdoor [environment]."*

AACE (2004)[1] notes that;

> *"…poor site layout can contribute to loss of productivity… if crews have to walk a long way to lunch rooms, tool cribs, laydown areas, washrooms, entrances and exits, etc., then productivity may suffer as a result."*

One recent construction project this senior writer visited required more than eight hundred craftworkers to check-in at a gate that, at one point, was located two thousand feet from the actual work site. The gate was eventually moved closer to the actual work space. Because the workers were paid to walk the extra distance at the start and conclusion of each workday (sometimes in snowy conditions), their labor productivity increased after the gate was relocated.

Schedule
A sixth important factor to consider in defining a suitable measured mile period is project schedule, in terms of details such as activity sequence, work flow, activity density, and overall duration. *P J Dick*[5] is an example in this regard. Government driven acceleration of work resulted in the contractor directing a subcontractor to work on multiple floors concurrently in an attempt to make up for government caused delays. As a result the subcontractor was forced to assign multiple crews on each floor that were required to perform all aspects of branch circuit installation. This caused labor inefficiencies because it made the subcontractor's crew training efforts more difficult and prevented it from realizing the learning curve benefits of sequential circuit installation by task-dedicated crews. Having its crews working on all floors concurrently affected the subcontractor's ability to properly supervise the work, a factor that also contributed to labor inefficiency.

Work flow, which influences the pace of a schedule, was instrumental to the court in *P W Construction*[6] when it studied the concurrency of the feeder and branch work and the movement of crews between building floors.

Schedule should also be reviewed in terms of work times when conducting measured mile reviews. Night work is less productive (and less safe) than daytime work, just as work during months with favorable weather has higher productivity levels. Oglesby (1989)[12] has cited research where the time of week and day is influential on the productivity levels. Monday mornings and Friday afternoons are lower productive times than, for instance, Tuesday afternoons.

In long-term projects, project duration may become a factor as well. Frequently referred to as a "build-up" or "tail-out" period, both ends of projects tend to reflect inefficient man-hours due, in part, to the longevity and duration of the project. Zink (1986)[13] proposed eliminating the first and last 10% of a project's schedule from measured mile analyses because of inherent start-up, punch list, and fatigue inefficiencies. The *Bay West*[14] court also stressed this point when it adjusted a contractor's claim for learning curve effects.

Weather / Seasonality / Time of Year
Weather can factor greatly into the productivity of workers and has been researched extensively. Specific weather factors that have been studied include temperature and humidity, precipitation, and wind speeds. MCAA (2011)[10] also lists season and weather change as one of its factors. *P J Dick*[5] and *P W Construction*[6] are cases that involved weather conditions.

Seasonality and time of year can be influential to the productivity levels that are achieved by workers and both should be considered in measured mile analysis. Aside from the obvious changes in weather that arise over the course of a year, seasonality also impacts the amount of daylight available during working hours. Less daylight means dimmer working conditions and increased need for temporary lighting facilities (adding to site congestion), both of which can impair labor productivity. Also, holidays and vacations are somewhat seasonal, which can increase labor force absenteeism and turnover, and impair productivity. Multi-year projects may span multiple seasons and measured miles must be chosen carefully in such situations.

Overtime and Shiftwork
Another factor that influences labor productivity is overtime and shift work. Numerous studies have shown that overtime and shiftwork impact labor productivity. Such measures are often used to accelerate a project.

The *Natkin*[15] case exemplifies the consequences of substantial amounts of overtime and shiftwork. Natkin, a mechanical contractor installing industrial process machinery, had maintained detailed records documenting the quantities of work installed and labor-hours expended as well as correspondence protesting a constructive acceleration condition. As a consequence, its LOP claim was successful. Conversely, even though it noted *"...working of overtime hours does adversely affect labor efficiency,"* the *Havens Steel*[16] court rejected the contractor's claim because:

> *"[t]here was no testimony, expert or otherwise, as to the causal relationship, if any, between the deviations mentioned above and the ultimate failure of the cladding and insulation system which followed the storms of September 20 ... I believe one can find, even without expert testimony, that those inverted laps do represent a "defect" in "workmanship." That finding, however, is of no real significance here since I have no way of determining – even if I knew how many inverted laps there were – that they had any possible causal relationship to the cladding failure."*

This reinforces the point that expert testimony is often important to establish cause-and-effect, especially in highly-technical disputes.

Crowding / Congestion / Trade Stacking
Crowding / Congestion / Trade Stacking is a factor that is important to be considered when applying a measured mile comparison. Whether it is too many workers of the same trade or too many workers of different trades in a physical space, labor productivity can be impaired. This crowding effect can extend to not just the physical space used by the bodies of human workers ("hard" impediments); it can also pertain to the tools, equipment, and means and methods they use. For instance, welding generally should not be performed in a confined space if painting is also occurring at the same time in that space (a "soft" impediment).

Conclusions and Recommendations

The measured mile technique is a popular and widely-accepted method for measuring loss of productivity damages. Fundamentally, the method compares the productivity achieved during an impacted portion of a project against an unimpacted (or minimally-impacted) portion of that project that is of a similar nature. In certain instances, productivity from other similar projects may be accepted as a reference. The credibility of the measured mile comparison hinges on the similarity of the two compared periods.

One other important issue that must be considered in selecting the measured mile reference period is its length. Often, a plaintiff will want to select a "measured foot" (that is an unusually small period) because that yields a more favorable result. The proper length for a true measured mile of course depends on the factors enumerated above, but a rule of thumb would be 10% of the project's unimpacted duration.

Finally, the preceding discussions about labor impairing factors were presented in a separate, standalone manner. That is not the way that construction occurs and is not the way that measured mile design and application should be practiced. A period impacted by an owner's insistence on extensive overtime combined with a contractor's poor project management cannot be directly compared to an ideal period where all the work is straight time and the contractor's management is satisfactory. Thus, the combination of multiple factors can complicate the analysis and make the use of expert services even more important.

Although these factors may be difficult to isolate and identify individually within a project, there is often overlap of multiple factors that must be taken into consideration when determining the measured mile comparison time. The courts have repeatedly relied on conservative, expert judgment in analyzing such cases. Employing conservative and expert judgment increases the likelihood of a fair analysis and successful outcome.

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Footnotes:

1. American Association of Cost Engineers (2004). *Estimating Lost Labor Productivity in Construction Claims*. AACE RP25R-3.
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4. Loulakis, M.C. and S.J. Santiago (1999). *Getting the Most Out of your 'Measured Mile' Approach*, *Civil Engineering*. November, 69(11), 69.
5. Appeal of P J Dick Inc., VABCA Nos. 5597, 5836-5837, 5839-5850, 5951- 5965 and 6017-6024, 01-2 BCA ¶ 31,647 (Sep. 27, 2001), aff'd in part, rev'd in part, vacated in part, and remanded, all on other grounds sub nom. *P J Dick Inc. v Principi*, 324 F.3d 1364 (Fed. Cir. Apr. 7, 2003).
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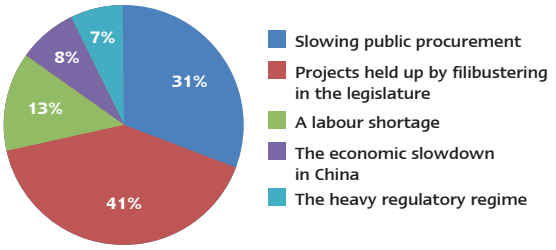
Challenges Facing the Hong Kong Construction Industry

The pace of public procurement and the risk of filibustering in the legislature represent the two greatest threats to Hong Kong's infrastructure sector, according to new research from international law firm Pinsent Masons.

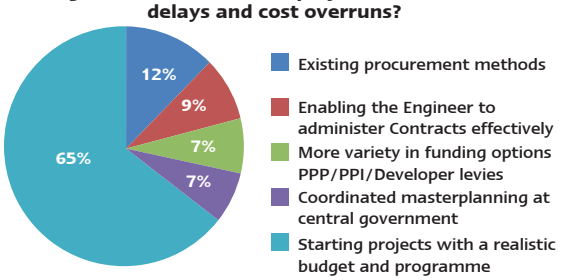
The survey of almost 150 senior contractors, designers and other industry executives found that 41% see projects held up by filibustering in the legislature as the greatest threat to the infrastructure sector in Hong Kong, while 31% cite slowing public procurement as a greater risk. By contrast, just 13% cite a labour shortage as the strongest threat.

What is the greatest threat to Hong Kong's Infrastructure Sector?



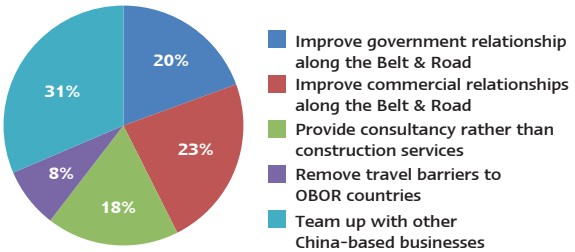
When asked what the greatest challenge is for the Government in avoiding continued delays and cost overruns on large scale infrastructure projects, an overwhelming majority (65%) cited, *'starting projects with a realistic budget and programme'*. 12% felt the biggest challenge is *'existing procurement methods'*, whilst 9% selected, *'enabling the engineer to administer contracts effectively'*.

What is the Government's greatest challenge in ensuring its large scale infrastructure projects avoid continued delays and cost overruns?



The survey also asked what Hong Kong contractors need to do to take advantage of the One Belt One Road initiative. 31% suggested they should team up with other China-based businesses, 23% cited the need to improve commercial relationships along the Belt and Road, while 20% saw the importance of improving government relationships. Interestingly, 18% saw the greatest opportunity in providing consultancy rather than construction services.

What do Hong Kong contractors need to do to take advantage of the One Belt One Road (OBOR) initiative?



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Forthcoming Events 2016

19 May	*The Society of Construction Law: Half Day Workshop on Construction Contract Administration and Claims by Sir Robert Akenhead - HKIAC*
19 May	*The Society of Construction Law: To Prove or Disprove by Sir Robert Akenhead - HKIAC*
25 May	*Atkin Chambers: Construction and Infrastructure Project Law Symposium – The Conrad Hotel*
26 May	*The Hong Kong Institute of Engineers: Unforeseen Ground Conditions - Myth and the Reality by Kaymond Lam of ADR Partnership Ltd – HKIE Headquarters*
26-27 May	*The Lighthouse Club: Two Day International Conference and Exhibition – Hong Kong Convention & Exhibition Centre*
27 May	*The Lighthouse Club International Design for Safety Awards and Cocktail Reception*
28 May	*The Lighthouse Club Anniversary Ball*
16 Jun	*ADR Cocktail Party – The China Club*
21 Jul	*The Society of Construction Law: Delay and Delay Cost Assessment under NEC3 by Mark Griffiths of Hinds Blunden*

Based in Hong Kong, ADR Partnership Limited is a dynamic practice of construction professionals providing specialist commercial and contractual services to the construction industry.

If you would like to discuss any of the articles published in this *Digest* or your project requirements, please contact James Longbottom, Patrick O'Neill or David Longbottom at ADR Partnership Limited on **(852) 2234 5228** or e-mail us at **info@adrpartnership.com**

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