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Newsletter

Editor:	Zoe Stollard
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Chairman's Message

In my last message I raised the topical issue of productivity in the construction industry. I will return to this topic later in the context of our annual conference. By chance, another related topic has recently hit the local headlines, with the adjustment of employment pass qualifications. With such a high proportion of construction work being undertaken by foreigners (whether talented or not) it is inevitable that these changes will add a further burden to contractors with ongoing contracts and to developers going out to tender.

I recall that 25 years ago, when I was first working in Singapore, one of my duties was to compile a monthly report for my (international contractor) employer explaining the steps taken to transfer technology from foreign staff to local staff. At that time, this was a mandatory requirement and was intended to ensure that future complex construction works could be undertaken by local firms with local expertise. There is no doubt that there was some transfer of technology but it is equally clear that the most challenging construction works are still largely undertaken by international contractors. I wonder if this has something to do with the degree of risk associated with these works, rather than the necessary technology to undertake them. Perhaps there should be a review of risk allocation in public works contracts, to encourage greater participation from local 'main contractors'?

Moving on...

**INAUGURAL SCL INDUSTRY
DEBATE**

By the time you read this, our somewhat experimental inaugural debate will have taken place and we will be considering whether we should aim to hold this as a regular annual event. Whilst the topic chosen this time was deliberately controversial, it was also, in the tradition of debates, a topic for which there can never really be a right or wrong answer.

I am already considering motions for next year perhaps, "*Arbitrators should be assisted by an expert delay analyst to determine which firm of lawyers caused critical delay to proceedings*" or "*Projects consultants cause more delay to completion than contractors*".

Any other suggestions?

SCL ANNUAL CONFERENCE

In 2010 our annual conference was held jointly with SIAC. It was a great success and attracted significant international participation. In previous years we have held our conference jointly with the Law Society. This year will be something of a 'coming of age' because we have decided to hold our own conference without sharing the risk, workload and reward with another organisation. This decision was not taken lightly and we are most grateful to our former partners in the joint conferences. However, The SCL Council feels that we have the skill and experience to 'go it alone' and the SCL Annual Conference will therefore become, I am sure, our flagship event annually.

Perhaps controversially, we have chosen the theme of 'Construction Productivity' for the conference this year. You may wonder what the connection is between

(continued on page 2)

productivity and construction law. Well, returning to the theme of my previous Chairman's Message, we consider that improved efficiency in the industry requires all parties to cooperate. Productivity is not a factor of Government control of Man Year Entitlement. Steps must be taken to ensure that clever solutions are rewarded commercially. We are bringing together speakers representing contractors, consultants and lawyers and we hope to be able to demonstrate that improved contract practices can make a significant contribution to improved productivity.

SOCIAL EVENTS

Since my last message, we have held two successful social events. Firstly, networking cocktails in Chijmes during May, attended by 38 members and guests, and secondly our

annual dinner in July. Both events reflected what has become the SCL 'Signature' – plenty of wine and a very informal atmosphere. It is difficult to recall precisely where this tradition started. Certainly, past Chairman Chow Kok Fong is a wine connoisseur, but I recall an early AGM during Philip Jeyaretnam's time when wine was served during proceedings, rather than later. In any event, I personally believe it is a healthy sign of the society maturing and developing its own unique character.

Christopher Nunns

Chairman

2010-2012

CALENDAR OF EVENTS - 2011

No.	Date	Event
1	26 January 2011	Latest Developments in Construction Law
2	22 February 2011	Challenges with Infrastructure Projects in India (with a perspective of the Singapore experience)
3	8, 10, 15, 18 March 2011	Engineering 101 (3rd Run)
4	21 April 2011	An Introduction to Construction / Engineering Insurance
5	25 May 2011	1st Networking Cocktails Event 2011
6	2 June 2011	The Expert Witnesses: Are Tribunals Expecting Too Much From Them?
7	20 July 2011	SCL Annual Dinner
8	24 August 2011	SCL Inaugural Debate: Construction Contracts In Singapore Are Inherently Biased Towards Employers
9	24 August 2011	Annual General Meeting 2011
10	7 September 2011	Investment Arbitration in Construction
11	21 September 2011	Annual Construction Law Conference
12	29 September, 4, 6 and 11 October	Construction Law 101 (2nd Run)
13	October 2011	Bridging the Gap between Construction and Construction Law - An Update
14	15 November 2011	The Application Of Force Majeure & Frustration In Construction Contracts

Engineering 101 for Non-Engineers (3rd Run) - 8, 10, 15 & 18 March 2011

Ian Johnston
Kennedys



Audrey Perez of Dragages (Head of QSE & Maintenance department) deserves to be applauded for the way she guided participants through a fascinating series of modules on engineering for non-engineers. Audrey has that ability to take people into areas they know little (or in some cases nothing) about and make them feel smarter for the experience. All participants ended feeling enriched and confident as the course was perfectly balanced between instruction and encouragement. The common feeling was that the end of the sessions signaled the beginning of a new understanding and appreciation for engineering achievement and involvement rather than simply a 'been there done that' feeling that some courses engender.

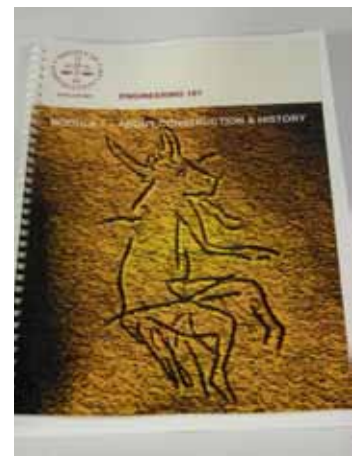
How was this achieved? The start point was Audrey's clearly meticulous preparation and attention to detail that made all learning materials informative, educational and, perhaps most importantly, appealing. The materials left the reader with no doubt that a lot of thought had gone into the preparation so that participants were motivated to think matters through for themselves (both during the sessions and afterwards). Participants were also regularly compelled to appreciate matters that might otherwise have been beyond our experience.

The course program was engineered around modules on:

- Construction and history.
- Engineering principles – how does it hold? how is it dimensioned?
- Description of a building.
- Project management – who does what?
- Construction sites and execution facts.
- Construction disputes vs. construction challenges.

We are all grateful to Audrey for having delivered such an entertaining, informative and rewarding series of modules. She clearly has great passion for the areas covered and we all feel enriched for having participated.

Thanks must also go to the SCL for organising such a compelling event. The facilities were excellent and the food delicious. Cheryl and Gabriel, from the SCL, were ever present to ensure everything went without a hitch.



An Introduction to Construction / Engineering Insurance - 21 April 2011

Joseph Liow

Straits Law Practice LLC



The SCL organized the “Introduction to Construction / Engineering Insurance” Seminar which was well received by members and guests of the Society. The seminar was delivered by Mr. Choy Wing Kwong, Regional Director of JLT Solutions Asia Pte Ltd, an associated company of the Jardine Matheson Group and a market leader in insurance broking and reinsurance in Asia.

The event was well attended by 37 members and guests who were introduced to wide ranging and unique issues relating to insurance in the construction and engineering industry. The talk explained the design obligations in building contracts, insurance covers available for faulty designs, professional indemnity insurances, the types of insurance covering construction risks and explained certain insurance terminology used by the insurance industry. Mr. Choy shared with the audience some of the

typical exceptions that one would find in some of the common policies as well as how insurance companies may price their policies as well as set deductibles for insurance policies. Despite the width of the information shared, Mr. Choy’s rapid fired delivery was concise and well-delivered, packing in comprehensive information in the allocated one hour.

Chairing the event was Mr. Clarence Ting, from Liberty International Underwriters, who managed the talk and customary Question and Answer Session ably. The evening ended with the Honorary Secretary of the Society thanking both the Chairman and Speaker and presenting tokens of appreciations.

1st SCL Networking Cocktails - 25 May 2011

Ben Bury

Nabarro LLP

The first SCL Networking Cocktail event for 2011 was held on Wednesday, 25 May at the Modern-European restaurant “Chef D’Table” located at Chijmes on Victoria Street. It was a very successful event attended by 40 members, guests and non-members.

Christopher Nunns, the Chairman, kicked off the evening with a welcome address to the group and a gentle ribbing of the new SCL member’s decision to wear a suit and tie in 30 degrees! After this, everyone was invited to tuck into some excellent food and fill up their glasses with free flowing wine and beer.

Typically, the event provided a relaxed environment for professionals from a variety of different areas of the construction industry to come together to greet one another, exchange stories and business cards, put faces to names, and generally enjoy themselves. Guests and non-members were given the opportunity to hear more about the SCL and its future events. SCL members had the chance to meet up with old acquaintances and make new introductions that will hopefully flourish into successful business relationships.

At the end of the evening, the attendees headed home well fed and watered after another successful social event.



Expert Witnesses: Are Tribunals Expecting Too Much From Them?

- 2 June 2011

Mark McGeoch
Gardiner & Theobald Fairway Pte Ltd



The SCL organised a seminar entitled “Expert Witnesses: Are Tribunals Expecting Too Much From Them?”, a well attended event, which was delivered by Mr. Michael Charlton, Chairman of the Charlton Martin Group, a construction contracts consultancy that provides services throughout the Far East Region. Michael acts as an expert witness and is well experienced in this sometimes difficult role.

The seminar opened with an explanation that the expert’s duties were towards the tribunal and not his/her client. This was followed by specific case examples where expert witnesses were heavily criticised in judgments for failing to understand their duties. Examples of this failure included a bias towards the party (a lack of independence and objectivity), unfamiliarity with the report, failing to consider all evidence leading to unsustainable conclusions and a reliance on computer software techniques rather than the application of expertise to the facts and evidence. For RICS members of the SCL specifically, this was all emphasised by reference to the RICS Practice Statement for “Surveyors acting as expert witnesses – A guide to best practice” which outlines a) best practice and b) declarations that should be included within any RICS member’s expert report.

Michael then outlined some typical procedures in the life of an appointment including a) the appointment itself (and the importance of obtaining clear instructions), b) preparing the report, c) normal rules of procedure including meeting the other side’s expert, inspections, sharing information, concurrent expert evidence (“hot tubbing”) and advising council. An outline of a Single Joint Expert’s duties was followed by Michael’s views on the potential problems involved with such an appointment as opposed to each party instructing their own expert.



Michael concluded with a discussion of the English Supreme Court decision earlier this year in Jones v Kaney, which removed an expert’s immunity from liability. Michael gave his views on the changes that may follow this decision, in particular the increased cost and reduced availability of insurance to cover an expert’s activities during his or her appointment.

Chairing the event was Mr. Christopher Nunns, Chairman of the SCL, who contributed to the customary Question and Answer Session using his own experiences as an expert as well as ably chairing the discussion on the topic of experts being registered. The evening ended with the presentation of tokens of appreciation.



SCL Annual Dinner - 20 July 2011

Anil Changaroath
Aequitas Law LLP

The SCL (Singapore)'s 3rd Annual Dinner was held on 20th July 2011 at the highly acclaimed Coriander Leaf, Clarke Quay. The informal setting of its separate cocktail and dining rooms overlooking the Singapore River provide a bright and refreshing venue where about 65 SCL members enjoyed a 5-course Pan-Asian dinner, with a free flow of wines, draught beers & soft drinks.



Having taken into consideration the fact they were 'running out' of past SCL presidents to speak at this annual event, this year's organisers invited (for the first time) one of the SCL MOU partners to contribute. This year's after-dinner speaker was from our MOU partner, Singapore Institute of Architects. Its president, Ashvinkumar Kantilal delivered an entertaining, light-hearted take on 'Glocalisation of Practice'- The colourful ingredients and approaches that the Singapore Architect can embrace and adopt in endeavouring to become a successful professional, from small to large organisations, going beyond the shorelines to market themselves to secure new business and re-brand the 'Singapore Inc' approach.

This annual event kindly sponsored by Gammon Pte, FTI Consulting and Pinsent Masons MPillay LLP, has come of age and is now a regular tantalizing event on the SCL annual calendar.



Enforcing DAB Decisions Under The Fidic 1999 Red Book

Gordon Smith (Partner) and Glen Rosen (Associate)
Kennedys, Singapore

1 INTRODUCTION

- 1 This case summary discusses the recent decision of the Singapore Court of Appeal in *CRW Joint Operation v PT Perusahaan Gas Negara (Persero) TBK* [2011] SGCA 33, which expands upon the concept of a 'Final Partial Award' published by a tribunal to enforce a Dispute Adjudication Board (DAB) decision under sub-cl 20.6 of the Federation Internationale de Ingenieurs Conseils (FIDIC) Conditions of Contract for Construction (1st Edition, 1999) (1999 Red Book). This is the first judicial case in which this issue is considered.
- 2 The Court of Appeal upheld the High Court's decision to set aside a final award issued by the Majority Members in the ICC International Court of Arbitration Case No 16122/CYK under the Singapore International Arbitration Act (the IAA). The Court of Appeal dismissed CRW's application on the basis that the Majority Members had breached their jurisdiction and breached the rules of natural justice by failing to review the merits of the DAB's decision and accord PGN the opportunity to defend its position.

2 FACTS

- 3 PT Perusahaan Gas Negara (Persero) TBK (PGN) entered into a contract with CRW Joint Operation (CRW) to design, procure, install, test and pre-commission an optical fibre cable in Indonesia (the Contract). The Contract adopted the General Conditions of the 1999 Red Book.
- 4 A dispute arose between the parties regarding 13 different variation proposals issued by CRW to PGN. In accordance with the procedure set out in sub-cl 20.4 of the Contract, the dispute was referred to a DAB. The DAB issued a decision in favour of CRW for the sum of US\$17,298,834.57.
- 5 In accordance with the procedure set out in the Contract PGN issued a notice of dissatisfaction (NOD) alleging the amount awarded by the DAB was excessive. On 13 February 2008 CRW filed a request for arbitration pursuant to sub-cl 20.6 of the Contract with the ICC, with the seat of the arbitration being Singapore. The purpose of CRW's request was to give 'prompt effect to the adjudicator's decision'.
- 6 PGN filed its response submitting that the DAB's decision was not yet final and binding as PGN had issued a NOD in accordance with terms of the Contract. PGN further submitted that the DAB's decision ought to be re-opened and that CRW's request for prompt payment of the amount of the DAB's decision should be rejected.

2.1 ICC Arbitration

- 7 CRW referred to arbitration not the underlying dispute which formed the basis of the DAB decision but rather a 'Second Dispute' as to whether PGN was obliged to comply with the DAB decision and pay the sum of US\$17,298,834.57.

- 8 Following arbitration proceedings in Singapore, the Arbitral Tribunal issued a Final Award in favour of CRW entitling CRW to immediate payment of the sum of US\$17,298,834.57. In reaching this conclusion the Arbitral Tribunal found that PGN was not entitled in the arbitration to request the Arbitral Tribunal to open up, review and revise the DAB's decision.

2.2 Singapore High Court

- 9 CRW sought to enforce the Final Award in Singapore and on 7 January 2010 an order giving effect to CRW's application was made (Enforcement Order). PGN filed a separate application in the High Court in Singapore to have the Enforcement Order and Final Award set aside.
- 10 The High Court set aside the Final Award under the IAA on the basis:
 - (a) the Majority Members had issued a final award on the Second Dispute even though the dispute had not been referred to the DAB in accordance with the provisions set out in the Contract; and
 - (b) even if the Second Dispute was referable to arbitration, the Contract did not entitle the Arbitral Tribunal to make the DAB's decision final without first hearing the parties on the merits of the decision.
- 11 In effect the High Court's decision meant that where a contractor such as CRW was seeking to enforce a DAB decision for payment it needed to:
 - (a) first refer back to the DAB the dispute as to whether payment is owing, which is a timely process; and
 - (b) frame the Request for Arbitration so that the contractor is challenging the underlying disputes, which the DAB has already made a decision on and not solely whether immediate payment is owing.

3 COURT OF APPEAL

- 12 CRW appealed the High Court decision and on 13 July 2011 the Court of Appeal dismissed CRW's appeal.
- 13 In reaching the conclusion that CRW's appeal should be dismissed the Court of Appeal held that the scope of the Arbitral Tribunal's jurisdiction was defined by sub-cl 20.6 of the Contract and the terms of reference (TOR) of the arbitration. The Court of Appeal held that sub-cl 20.6 of the Contract and TOR made it clear that the Arbitral Tribunal was to decide not only whether CRW was entitled to immediate payment but also additional issues of fact or law which the Arbitral Tribunal deemed necessary to decide.
- 14 Sub-cl 20.6 of the Contract provides:

'Unless settled amicably, any dispute in respect of which the DAB's decision (if any) has not become final and binding shall be finally settled by international arbitration...

The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Engineer and decision of the DAB relevant to the dispute...

Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DAB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction'.

- 15 The Court of Appeal held that it was quite plain that a reference to arbitration under sub-cl 20.6 of the Contract in respect of a binding but non-final DAB decision is clearly in the form of a rehearing so that the entirety of the parties' disputes can be resolved afresh, and therefore the Majority Members had not issued its Final Award in accordance with sub-cl 20.6 of the Contract.
- 16 In coming to this conclusion the Court of Appeal referred to the Dispute Board Federation September 2010 newsletter noting the ICC decision (in which Kennedys acted for the successful party), where the tribunal made it clear that whilst the DAB's decision was enforceable under a partial award the subject matter of the DAB decision could be opened up, reviewed and revised by the arbitral tribunal in the same arbitration in accordance with sub-cl 20.6 of the 1999 Red Book.
- 17 In reaching the conclusion that the Final Award should be set aside, the Court of Appeal noted that this issue turned on whether the Majority Members had the power to issue the Final Award without opening up, reviewing and revising the Adjudicator's decision. The Court of Appeal held that the Majority Members had exceeded their jurisdiction (contrary to Art 34(2)(iii) of the Model Law) by failing to consider the merits of the DAB's decision prior to the making of the Final Award.
- 18 The Court of Appeal noted that they found it difficult to understand why the Majority Member ignored the clear language of sub-cl 20.6 of the Contract to "finally settle" the dispute between the parties and instead abruptly enforce the DAB's decision without reviewing the merits of that decision.
- 19 The Court of Appeal noted the Majority Members should have made an interim award in favour of the CRW for the amount assessed by the DAB and then proceeded to hear the parties' substantive dispute afresh before making a final award. Accordingly, the Court of Appeal held that the Final Award was not issued in accordance with sub-cl 20.6 of the Contract.
- 20 The Court of Appeal also held that the Majority Members had breached the rules of natural justice (contrary to s24(b) of the IAA) by failing to allow PGN an opportunity to present its case on the DAB decision. In addition, the Court of Appeal held that PGN suffered real prejudice as a result.

4 IMPLICATIONS

- 21 This decision will have a number of implications for contractors and tribunals alike in which DAB decisions under the 1999 Red Book (and indeed the 1999 Yellow and Silver Book equivalents) are referred to arbitration:

- (a) from a contractor's perspective if it wishes to enforce payment of a DAB decision it needs to refer the DAB's underlying decision itself to arbitration, in the course of which it could seek an interim award for payment of the DAB's decision. Like CRW, this may not be a contractor's first inclination in circumstances where the DAB's decision is in its favour; and

- (b) from the Tribunal's perspective, if it intends to issue an award for payment of the DAB decision, it needs to ensure that it is a final interim award pending its determination of a final interim or partial award on the underlying issues.

- 22 One issue the Court of Appeal did not address was the High Court's view that a dispute between the parties concerning immediate payment of the DAB decision (which will always be disputed by the employer) must first be referred to the DAB prior to the contractor seeking a final interim award from the Tribunal. With respect, we do not consider this to be the intended purpose of sub-cl 20.4. If a DAB has given its decision, it has clearly done so on the understanding that "The Decision shall be binding on both Parties who shall promptly give effect to it..." (sub-cl 20.4), and it would be otiose for the contractor to spend a further 112 days under sub-cl 20.4 to go through a procedure of having the DAB confirm this.

- 23 Importantly, for the guidance of readers, the authors have been involved in the enforcement by arbitration of numerous DAB decisions in which a referral back to the DAB was not deemed to be necessary for the effective enforcement of a DAB decision by an arbitral tribunal. One such case was referred to by the Court of Appeal.

- 24 The reader should note that sub-cl 20.9 of the FIDIC Conditions of Contract for Design, Build and Operate Projects (1st ed, 2008) (the Gold Book) addresses this situation by providing for a situation whereby a failure to comply with a DAB decision can itself be referred to arbitration rather than the underlying dispute. Sub-cl 20.9 states:

'In the event that a Party fails to comply with any decision of the DAB, whether binding or final and binding, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under Sub-Clause 20.8 [Arbitration] for summary or other expedited relief, as may be appropriate...'

- 25 It is the authors' view that there is already a settled practice at the level of international arbitration where DAB decisions can be enforced directly by an arbitral tribunal, at least on a temporary basis pending a Final Award. It is significant that the Court of Appeal shares this view (to our knowledge being the first common law Court to rule on this), at least with respect to binding but not final DAB decisions rendered under the 1999 FIDIC Conditions of Contract.

About Construction and Construction Law - Productivity, Buildability and Constructability

This is part of a series of articles written by engineer, Audrey PEREZ, the author and presenter of SCL's Engineering 101 series of seminars.



By now, in this section of the SCL Newsletter, published for more than two years, quite a few building features most commonly associated with contemporary constructions, including associated defects and/or related disputes have been

introduced: Building Defects' definition and limitations, Waterproofing, Stone, Building Enclosures, Curtain Walls, various Facades' finishes, related maintenance and defects.

There are a plethora of features yet to be explored and equally numerous areas of potential disputes. Contemporary constructions are mostly constructed in reinforced concrete, steel structures, bricks, light partitions and finishes which would vary in substance and appearance infinitely, regardless of the nature of the building. Common finishes are timber (for instance parquet floors, timber laminates on walls, doors, trimmings, furniture), tiling, stone, paint, glass (doors, shop fronts, claddings and railing, ceilings and even glass floors), steel, upholstery, fabric, gold, silver, platinum leaves, fiber optic inserts in all the above and other more noble and mixed finishes to achieve a new, different, outstanding, trendy and/or luxurious appearance to a given place (and all of them very common in history): whether a house, a shopping center, a theatre, a hospital, a worship place, institutional buildings, housing developments, etc. Some of these features will be selected and be looked at in future publications with, as always, a focus on related challenges, pitfalls and disputes. Related issues of concept, design, procurement, appropriate specifications, materials sourcing, their transport, suitability of use in a given environment, installation, protection and maintenance will be equally pointed out for their importance and to show how neglecting any of them could lead to serious issues such as defects, delays and other consequential losses.

However, in this article, an exception will be made in order to take a short break from technicalities and materialistic considerations of construction. This article shares thoughts about concepts which are very prevalent in the Singapore construction sector today.

Construction productivity is the latest concept getting the attention of the entire construction sector as mandatory obligations are coming into force on 1st September 2011. It's the talk of the town! Closely related concepts are buildability and constructability. This article will deal with these concepts. Earlier in time and less than 5 years ago, sustainability, green designs and green construction trends flooded the industry

not only in Singapore but worldwide while such concepts are still today and internationally under definition!

DEFINITIONS FIRST!

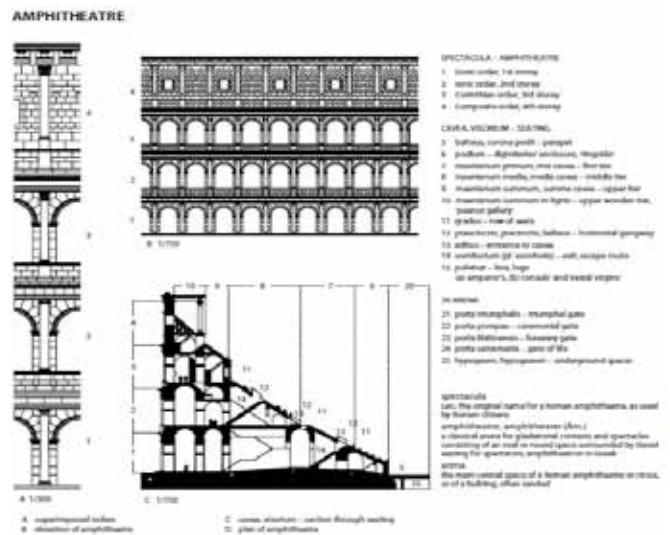
Whether in the construction context, in other sectors or nationwide, productivity is, in a nutshell a ratio made between a performance versus the resources deployed to achieve a given output. In a layman's words, this means what one spends versus what one gets! Therefore, it is easily understandable that there is not one common or international definition of productivity, even less in construction! Its definition varies depending on the environment in which it is considered, policies set in place and governments' initiatives to trigger progress and emulate healthy and durable competition that benefits a nation, a region or internationally. Its definition will obviously vary depending on the country, the industry or sector in question and the particular perspective and views taken on resources, performance and the output expected!

As such, the approach taken in Singapore with regards Construction Productivity is specific and hardly comparable to other sectors' and/or countries' definitions. The definition is clearly spelt out by the Building Construction Authority ("BCA"). It aims at making construction in Singapore more innovative, efficient and very much labour conscious. Indirectly, such initiative from the BCA undoubtedly invites various stakeholders to cooperate and objectively innovate in their own construction methods and organization to improve their performances and not just be content with past achievements. It is highly recommended, in order to properly understand productivity in the Singapore construction sector, to go onto BCA's website and read the accurate definition provided. Productivity related performance measurements, computations and incentives in place in Singapore are described accordingly.

Historically, the concept of productivity in construction is as old as construction itself! Each time man sought to progress and improve, innovations were brought to ease construction while achieving new challenges and therefore improving performance and raising productivity. Construction technology, methods and techniques, materials, equipment, labour required (including labour skills, know-how, experience, reliability), have been continuously studied and analyzed to make construction progress over the centuries. Surprisingly as it may seem, productivity was a concern to builders as early as the Antiquity, the Egyptian times, as well as for the Greeks and the Romans. New challenges, resource considerations and efficiency in constructing without compromising quality were undoubtedly what drove major discoveries and progress from Antiquity till today. Shocking as it may seem, the Middle Ages were a major reference point in technological progress in many sectors and mostly in construction. Prefabrication and the introduction of repetitive features for a more efficient and productive construction started when the first cathedrals were

built and later the race for the tallest cathedral took France and thereafter Europe in the Middle Ages. Once again, the underlying reason for such great inventions and progress related to sharpened resources for a faster and more efficient construction process!

It seems, to the construction professional, that nothing's new! Even earlier in Antiquity, the Egyptians faced similar issues as faced today in modern times when it comes to productivity improvement: sourcing, materials supply, human resources, equipment, standardization, costs, time, etc. are still issues at the heart of construction. It seems that policies set up to improve productivity changed over time but not the key areas of study that remain unchanged! In other words, construction principles and concepts are untouchable while construction technologies and methods may progress or not. In Antiquity, art, beauty and a strong spirituality drove ancient civilizations to progress such as the Egyptians and the Greeks.

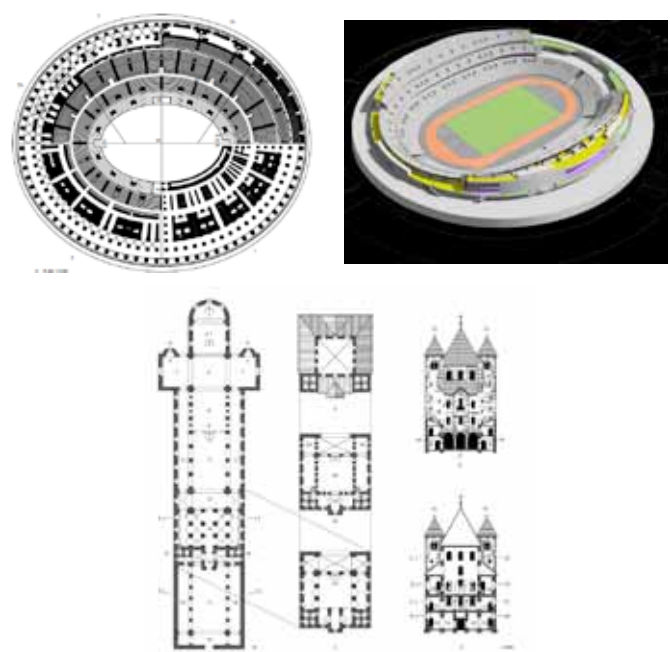


From Amphitheatre (Pictura.com, Rome, 19-20 AD)

Above: Illustration of standardization and construction productivity excellence from the Romans – Amphitheatre; 72-80 AD



Above: Greek and Roman walling systems showing standardization in designing repetitive features together with a practical concept design that allows an efficient construction process.



Upper left: Roman Arena; Amphitheatre; 72-80 AD; upper right: 21st century Sports Arena productive concept design; above: Exemplary productive design! Productivity principles such as standardization are old concepts that have led and still lead to major progress in construction.

The Romans were rather pragmatic and therefore noticeably revolutionized construction to make it the most innovative and productive ever! While inheriting outstanding and breathtaking innovations from past civilizations, the Romans, in their conquest rage, strived to be efficient in construction to develop and effectively maintain their Empire. The Romans' success resides in respecting and taking on board what they have inherited from the Greeks yet they strived to improve it for their contemporary interests: construct and develop colonies and make them flourish for Rome's benefit. This allowed them to spread tremendously and maintain their empire for more than 700 years! It is only excessive expansion and excessive success and wealth that led the Romans to neglect their development, led by decadence over a few generations and their inevitable fall. The Romans created new, revolutionary, construction techniques (the arch, high rise constructions such as aqueducts, theatres and other circular covered arenas, infrastructures and highways, bridges, new lifting equipment, prefabrication). They systemized standardization and set the base of our professions: architects, engineers, clients, contractors. They were probably the fathers of construction law and the founders of a very useful profession in maintaining peace by assisting the commoner in resolving disputes in appropriate forums according to set rules and codes: Lawyers!

In the Middle Ages, various stakeholders became more structured and shared tasks to be able to face orders made by the new major developer of that time, the Church! Construction stakeholders had no choice but to improve their performances: Architects produced design concepts and managed the works, Engineers calculated and resolved technical issues to face higher expectations (higher cathedrals to display higher powers of a given diocese) and professionals built with skilled, specialized and organized workforce. Breathtaking structures, beautiful architectures requiring progress for realizing them were mainly driven by spiritual considerations and the passion of builders. Productivity improved through a better organization and creativity. Technical challenges, immaterial dreams and spirituality once again led to major improvement in construction productivity.

The first and second industrial revolutions respectively in the 18th and 19th centuries introduced more new concepts for systematically improving productivity such as: Anticipation, Standardization (Gutenberg), Regulation (Colbert), dividing the work process into small repetitive simple tasks (A. Smith) to list a few only. These have heavily influenced the construction sector as well as many other sectors. Mechanization was introduced and led all and everything: With Watt's steam machine invention, productivity has remarkably progressed once more in a very short period of 50 years in all sectors including construction.

Several inventions came along in modern days. Intelligent Technologies and/or computerized calculations and simulations once again revolutionized constructions by allowing more complex, thinner and/or taller and/or larger designs in construction, yet these did not have much effect on productivity. Today's productivity's progress is more related to a "just in time" concept, with no stocks, maintenance free, better quality, more flexibility and adaptability to customers with more controlled and stronger processes. Putting it differently, two centuries ago, what was produced was sold and then, what was produced had to be sold, and so on... Today, we produce what is already sold! Productivity evolved in this manner since the first industrial revolution regrettably neglecting, and leaving to the past, essential concepts to human kind progress such as the art, beauty and a sense of spirituality necessary to any lasting civilization. No major breakthrough came along in productivity improvement for the past half a century to change the world!

Understandably, in Singapore, productivity is very much connected to driving the industry in employing, more efficiently, foreign labour and skilled labour. However, it is very much focused as well on creativity and technological progress through respectively buildability and constructability.

The definition of "Buildability" in Singapore is, in a nut shell, the encouraging of architects and engineers or design and build contractors to conceive efficient and standardized structures and be able to incorporate prefabricated feature to demonstrate labour efficient and good quality results. Buildability performance in Singapore is objectively measurable and incentivized.

Constructability in Singapore focuses more on material resources such as equipment and construction methods connected to labour savings. Construction projects are attributed, against an objective score sheet a C-Score (constructability score) for each project for benchmarking.

In the next article, issues faced by construction productivity will be shared, including conflicts of interests between various stakeholders when it comes to making a noticeable progress in construction productivity.

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LIST OF NEW MEMBERS WHO HAVE JOINED SCL (SINGAPORE) IN APRIL – AUGUST 2011

- | | | |
|----------------------------|--------------------|----------------------------|
| 1. Lay Theng Kua | 10. Wee Siong Khor | 19. Liang Ren, Tricia Tang |
| 2. Lim Ek Heng | 11. Scott Ramsden | 20. Simon Silbernagl |
| 3. Vimalan Sivasubramaniam | 12. Yu Yen Wee | 21. Shemane Chan |
| 4. Ramana Boyani | 13. Wye Liam Kam | 22. Guat Moi Lee |
| 5. Blaise Mark Pearce | 14. Wooi Sin Teoh | 23. A.J. Tan |
| 6. Yi Peng Ong | 15. Helen Waddell | 24. John Baker |
| 7. Terence Ng | 16. Ben Bury | 25. Stephen Wright |
| 8. Kee Hwee Tan | 17. Stephen Evans | 26. Kevin Ong |
| 9. Koon Fat Econy Mou | 18. Paul Antliff | |

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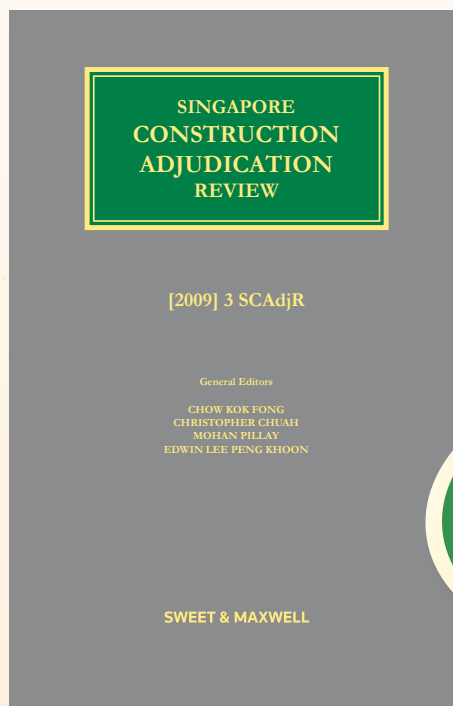
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