# Berita QS

**Issue No. 1, Session 2018/2019** **December 2018**

**FOR MEMBERS ONLY**

FEATURED INTERVIEW

Prof. Sr Dr Abdul Ghani Khalid

Planning the future ahead

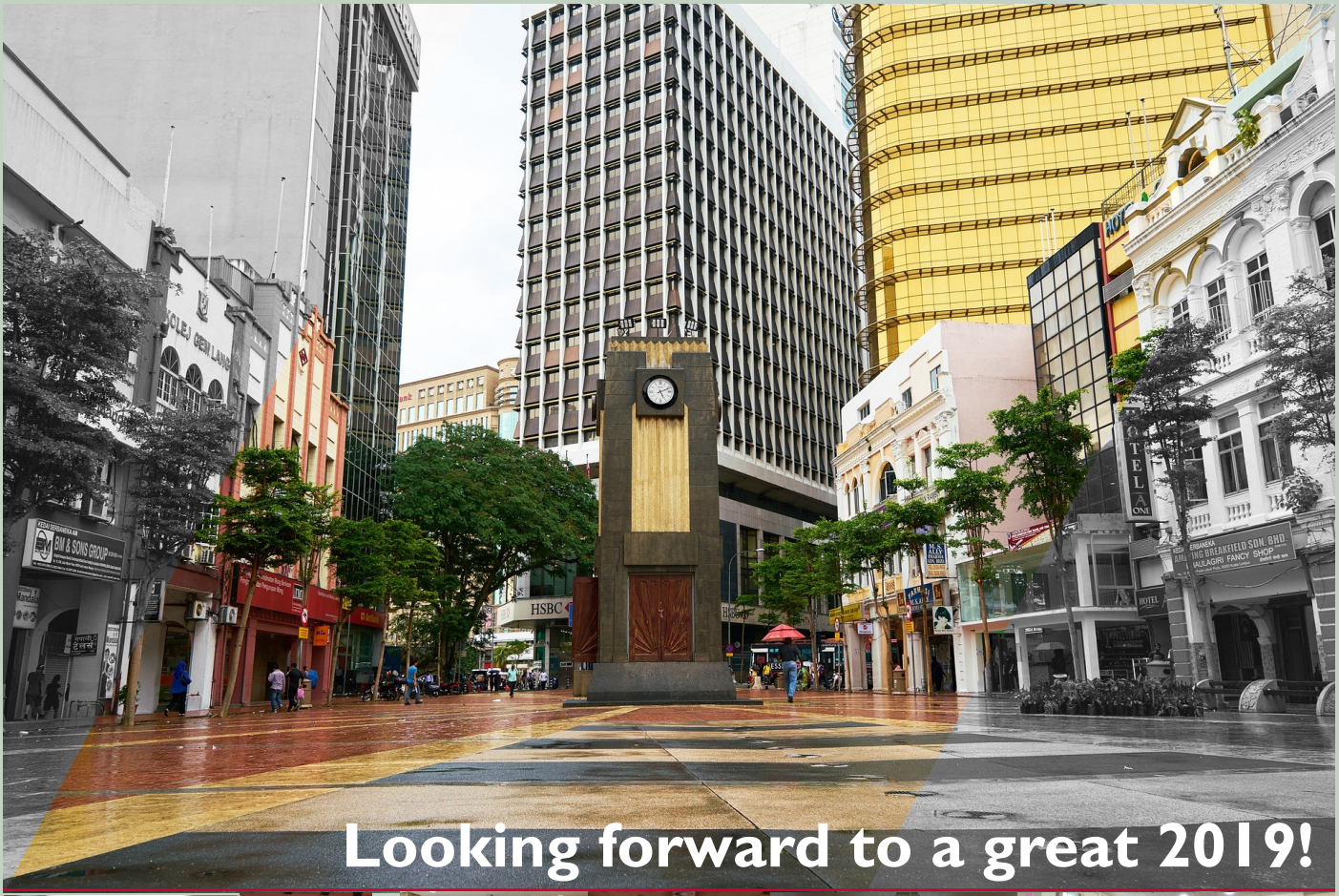
FEATURED ARTICLE

The young's mind

Heritage Building Information Modelling: The Rise of Quantity Surveyor

LESSON LEARNT

Terminal Perintis Sdn Bhd v Tan Ngee Hong Construction Sdn Bhd and another case [2017] MLJU 242





# Berita QS

Issue 1, Session 2018/2019

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## Contributors

Prof. Sr Dr Abdul Ghani Khalid, FRISM, CQS
Dr Lim Soon Kam
Associate Professor Dr Nuremma Mustafa
Koh Ben You
Content editors

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# Chief editor's message

Dear esteem readers, members of RISM,

It gives me a great pleasure to invite you to our latest edition of Berita QS. We are thrilled and delighted to be given the mandate in continuing the tradition, and the excellent foundation laid by the previous editorial committee has motivated us to search far and wide for the best content for our readers. Before you flip further, let us thank the past chief editor, Datin Sr Dr Norsiah Mohamad and her dedicated editorial team for invigorating the spirit of sharing and disseminating. The past two issues published in Session 2017/2018 were the testament of her hard work in keeping us updated in all aspects of the profession. We can't thank her enough for her effort but hoping that she will continue to contribute for Berita QS and RISM.

The editorial committee is also pleased to welcome our new Vice President, Prof. Sr Dr Abdul Ghani Khalid, with the rest of the newly elected Committee Members to QS Division. We are confident that the newly elected Committee Members for Session 2018/2019 will continue to elevate the profession to a greater height, following the solid foundation laid by the committee from the previous session. For this reason, we would like to dedicate a special thanks to Sr Ahmad Suhaimi Abdul Majid, along with his committed Committee Members Session 2017/2018 for all contributions made to the division. We hope that he will continue to provide his valuable wits and wisdom for the betterment of the profession.

In this issue, we continue the excellent groundworks laid by the previous editorial committee by keeping the regular sections as it was known before. The 'Lesson learnt' and 'Past activities' reports are the sections in which we believed, will revive our understanding and our place in society. Apart from that, our content editors have also compiled great interviews report of our very own Vice President and a quantity surveyor cum philanthropist, Dr Lim Soon Kam on their views and achievements. The interviews excerpt had uncovered some seminal notions of life, beyond the boundary of our comfortable setting which we all could ponder and practice in our life. Separately, for the first time, we have included a new editorial section called 'The young's mind'. Here, we have featured an award-winning article written by an undergraduate from a local quantity surveying programme on HBIM. This article complements our continued focus on BIM, which is featured in the other section as we march relentlessly towards a better technological advancement.

Now, before you start flipping to the next page, we would cordially welcome any reports, commentary, article of personal experience and advertisements to qsdiv@rism.org.my. We would also please to invite you to 'like' our Facebook page, @RISM QS Division and our sister page, @Pertubuhan Jurukur Diraja Msia and tag us your photos and news for our attention. We hope to connect with you better, using social media as the platform to interact.

As we gleam positively towards 2019, let me thanks the Berita QS Editorial Members Session 2018/2019 for their commitment and perseverance in sourcing the materials for publication. With the latest issue now is in your hand, we hope you will enjoy flipping through it and getting the most out of its contents. Happy New Year and we pray for a prosperous year of 2019!

Dr Shamsulhadi Bandi
*Chief Editor*
Berita QS (Session 2018/2019)

# Special acknowledgement

**"YOUR EXCELLENCE DRIVES OUR SUCCESS"**

**Special thanks to Sr Ahmad Suhaimi Abdul Majid and the QS Division committee members (2017/2018) for your dedication, contributions and hard work to RISM**

## Congratulatory Notes & Acknowledgement

# Thank you

**Sincere appreciation and thanks to the Chief Editor of Berita QS (Session 2017/2018), Datin Sr Dr Norsiah Mohamad and her dedicated editorial committee members for their commitment and contributions to Berita QS and RISM**

**Editorial members (2017/2018):**

Sr Eric Khoo Sui Lai

Assoc. Prof. Sr Hasmawati Harun

Dr Norfashiha Hashim

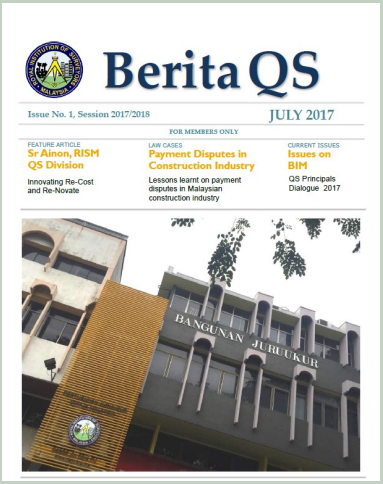
Dr Norazian Mohamad Yusuwan

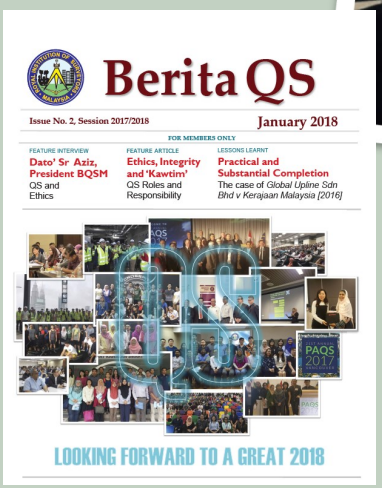
Ahmad Arzlee Hassan

Sharifah Nur Aina Syed Alwee

Sr Dr Rohayu Ab Majid

# Past issues



## RISM moments


**PAQS 2018, Sydney**



Image: Creative Common & RISM/QS Division Facebook page

# RISM calendar of events

## QS Division Activities

### July 07

14/07/18 1st QS Division Meeting

21/07/18 PAM BIM Summit @ Universiti Malaya

### August 08

2nd QS Division Meeting 17/08/18

Technical Visit

Nippon Paint Forward Coating Expo @ Shah Alam 01/08/18

Courtesy Visit

International Islamic University Malaysia (IIUM)

Road Show

CIDB Construction Law Report & Construction Contracts:

University of Reading Malaysia, Johor Bahru 06/08/18

Universiti Malaysia Sarawak (UNIMAS), Sarawak 08/08/18

Universiti Teknologi MARA (UiTM), Sabah 10/08/18

### September 09

07/09/18 3rd QS Division Meeting

Courtesy Visit

University Malaya (UM)

Visit & Career Talk

18/09/18 SEGI University by Sr Dainna

23/09/18 Universiti Teknologi Malaysia (UTM) Johor Bahru

24/09/18 University of Reading Malaysia, Johor Bahru

28/09/18 Universiti Sains Malaysia (USM), Penang

Event Launching Guest

21/09/18 BIM Development Centre by INTI International University

### October 10

4th QS Division Meeting 13/10/18

QSIC 2018 22-23/10/18

IQSAF 2018 21/10/18

BIM, Research & Sports Committee Site Visit

Visit to INTI International University 09/10/18

Visit & Career Talk

University College of Technology Sarawak (UCTS) 26/10/18

Kolej Laila Taib 26/10/18

Bandar Rimbayu (The ARC), Teluk Panglima Garang 20/10/18

### November 11

10/11/18 5th QS Division Meeting

17-20/11/18 PAQS 2018, Sydney, Australia

15-16/11/18 ICEC 2018, Sydney, Australia

RICSM-RICS Student Conference 2018

24/11/18 Taylor's University

Seminar

08/11/18 PAM Contract 2018 (Nippon), Shah Alam

Sports & Recreational

25/11/18 QS Division Charity Bowling Tournament

04/11/18 ZUMBA @ SEGI University

Courtesy Visit

02/11/18 Infrastructure University Kuala Lumpur (IUKL)

### December 12

6th QS Division Meeting 08/12/18

Exhibition

Hari Profession Teknikal Negara 2018 04-05/12/18

Berita QS Publication

## RISM event's highlight

### 1 August 2018

Technical visit to Nippon paint forward coating expo, Shah Alam



### 6, 8 & 10 August 2018

Roadshow on "CIDB Construction Report and Construction Contract" at University of Reading Malaysia, UNIMAS & UiTM Sabah


### 20 Oct 2018

Site visit to Bandar Rimbayu, Teluk Panglima Garang

Image: Creative Common & RISM/QS Division Facebook page

## RISM event's highlight

**8 Nov 2018**

Seminar on PAM contract 2018


**24 Nov 2018**

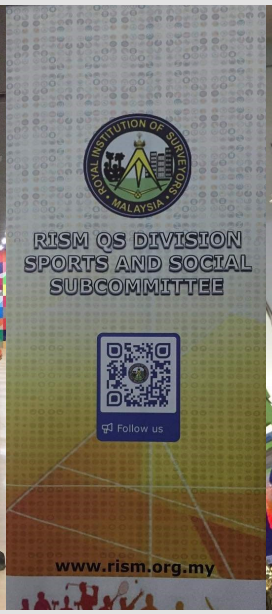
RISM-RICS International Surveying Conference for Undergraduates, Taylor's University


Image: Creative Common & RISM/QS Division Facebook page

# RISM sports and social

## 25 Nov 2018

QS Division Charity Bowling, 1 Utama





## Charity Run 2018


## Zumba for charity 2018


Image: Creative Common & RISM/QS Division Facebook page

# Congratulation!

## QS Division Session 2018-2019

**Vice President**
Prof. Sr Dr Abdul Ghani Khalid

**Deputy Vice President**
Sr Dainna Baharuddin

**Secretary**
Sr Richard Ooi Hoo Ong

**Treasurer**
Sr Syed Haris Syed Mustapa

**Member**
Sr Eric Khoo Sui Lai

**Member**
Sr Mohammad Faisal Abdul Rahman

**Member**
Sr Amnah Mohammed Salleh

**Member**
Sr Dr. Umi Kalsum Zulkifli @ Zolkafli

**Member**
Sr Lee Wing Tey

**Member**
Sr Lim Meng Heok

Immediate Past Vice President:
Sr Ahmad Suhaimi Abdul Majid

Co-opted members:

(1) Sr Wan Ainon Zuraiha Wan Abdul Khalid

(2) Assoc. Prof. Sr Dr Sarajul Fikri Mohamad

(3) Assoc. Prof. Sr Hasmawati Harun

## Sub-committee Representatives

| Sub-Committees | Representatives |
|---|---|
| Alternative & Dispute Resolution | Sr Dainna Baharuddin (Chair)<br>Sr Eric Khoo Sui Lai |
| Continuing Professional Development | Sr Amnah Mohammed Salleh |
| Green and Sustainability | Sr Lee Wing Tey |
| Junior Organization | Sr Dainna Baharuddin |
| Editorial/ Berita QS | Representatives from Universiti Teknologi Malaysia (UTM) |
| Qualifications & Membership Review | Sr Richard Ooi Hoo Ong<br>*Sr Eric Khoo Sui Lai |
| Sports & Social | Sr Eric Khoo Sui Lai |
| Professional Practice & Procedure | Sr Mohammad Faisal Abdul Rahman<br>Sr Lim Meng Heok |
| Building Information Modelling | Sr Syed Haris Syed Mustapa |
| Building Cost Information Centre | Sr Dr. Umi Kalsum Zulkifli @ Zolkafli |
| National Construction Cost Centre | Sr Wan Ainon Zuraiha Khalid |
| International Liason | Sr Ahmad Suhaimi Abdul Majid |

## Representatives of various boards and committees under council

| Boards/ Committees | Member |
|---|---|
| Editorial Board | Representatives from Universiti Teknologi Malaysia (UTM) |
| Education & Accreditation | Prof. Sr Dr. Abd. Ghani Khalid |
| Examination Board | Prof. Sr Dr. Abd. Ghani Khalid |
| Excellence Award | Prof. Sr Dr. Abd. Ghani Khalid |
| Information Technology & Library | Sr Amnah Mohammed Salleh<br>*Sr Lee Wing Tey |
| Globalisation & Liberalisation | Sr Ahmad Suhaimi Abdul Majid |
| Membership Review | Sr Richard Ooi Hoo Ong<br>*Sr Lim Meng Heok |
| Young Achievers' Award | Sr Dainna Baharuddin<br>*Sr Eric Khoo Sui Lai |
| Partnering Universities | Sr Eric Khoo Sui Lai |
| Scholarship & Education Fund | Sr Syed Abdul Haris Syed Mustapa |
| International Surveyors Congress | Prof. Sr Dr. Abd. Ghani Khalid<br>*Sr Richard Ooi Hoo Ong |
| Promotion & Publicity | Sr Amnah Mohammed Salleh<br>*Sr Eric Khoo Sui Lai |
| RISM Academy | Sr Dainna Baharuddin<br>*Sr Amnah Mohammed Salleh |

* indicate alternative. Source: QS Division Secretary as at 6th December 2018.

Featured interview

# Planning the future ahead

Berita QS content editor, Sr Dr Fara Diva Mustapa had the privileged of interviewing the RISM QS Division Chairman, Prof Sr Dr. Abdul Ghani Khalid for his insights on strategies and plans for RISM QS Division in upholding and strengthening the QS profession.

Prof Sr Dr Abdul Ghani Khalid, with over 30 years of experience in both academia and the industry is passionate to share his views on the importance to coalesce research and industry experience. He is optimist that research could improve our professional practice and the industry.

### What was the first thing that came into your mind when you were informed of your appointment as the RISM QS Division President?

I was caught by surprised but thankful for the trust and the opportunity to lead the QS Division. The majority of RISM members are relatively young, and therefore I somehow had anticipated that they would elect the new blood to represent them. Unexpectedly, they have chosen me instead. At my prime age, the strong mandate humbled me, and I will give my best for the division.

### What is your vision for QS Division?

I have much hoped that RISM will continue to spread its wings to the international level. Within the ASEAN region, RISM presence is much felt and one of my many visions is to bolster the roles and functions of RISM beyond the ASEAN region.

Given the right platform, I wish to call for our members to ponder upon the barriers which impede our effort to integrate our services with others in this region. Think of the new markets beyond our shores and the services that we could offer to them. To venture into the new markets, we somehow require a 'blue ocean' strategy where we will succeed when the others had failed. In countries other than the commonwealth, quantity surveying services are carried out mainly by the Architects and Engineers. We should be able to break this barrier, and should we wish to venture into these foreign markets, we need to collaborate with those professionals. By having partners, we could then able to create a common platform to discuss issues, potential and share our experience especially in the fields of cost management and contract administration.

I have high hope that our profession through the RISM will gradually be seen as the leader to our fellow ASEAN counterparts to develop a common standard form of contract, SMM and BIM application in our works in this region.

### What are your strategies and plans to ensure QS Division to maintain relevant and important in RISM?

It is important to keep our 'front' and 'backyard' green in this ever-challenging world. This is true when the only thing that is constant is change. This is inevitable and that the profession needs to embrace change to stay relevant. As demand for better services continue to grow, our profession must listen to the market, continue to reinvent our expertise and grow our knowledge base. There is no exact prescription to stay relevant, but by noticing what is constantly demanded from us, we will be able to weather the change and grow stronger than before.

To remain relevant to the profession, quantity surveying division must continuously work to improve the SMM, the standard form of contract and able to adapt with the new technologies. I am happy to hear that we are now progressing well with our new SMM and thanks to the committee members who have spent their time and valuable experiences in the effort. The QS division is also involved actively in the preparation of the PAM and CIDB form of contracts, assisting CIDB in providing cost analysis and actively involved in promoting the use of BIM in our practice.

## Featured interview

### How would you sum up the performance and achievement of the QS Division so far?

We are packed with activities and for this, I would like to thank the committee members of QS division (Session 2017/2018) headed by Sr Ahmad Suhaimi Abdul Majid for the great work. To sum up, we have jointly organised with our partners QSIC 2018, IQSAF, PQRS, and organised road show together with CIDB to promote the Construction Law Report. We recently signed a memorandum of understanding (MoU) with AIQS during the annual PAQS conference 2018 held in Sydney in which we will the host in 2019, and to date, we have organised not less than 5 CPD talks. I foresee a busy year for us in 2019, therefore I would like to call upon our members to remain close for continuous updates from RISM.

### What drives you? Could you please share with us?

We are hoping to collaborate with the professional bodies in the neighboring countries in order to expand our market base. We would also like to help our fellow ASEAN professionals to grow together with us and excel in the field of cost management and contract administration. If we can help, then why not? By doing this we would be able to expand our network around this region and RISM will also benefited from providing adequate and appropriate training and education, international conferences, and many other economic and social relationship to our members.

I believed in the philosophy "the more you give, the more you will get from our creator". In fact, sharing is caring! Tun Dr Mahathir Mohamad, our prime minister used to adopt the concept of "enriching our neighbor policy" during his previous tenure in the office and I think we can also apply the same concept in helping our ASEAN neighbors to progress. After all Malaysia Boleh!


Professor Abdul Ghani Khalid is a natural born visionary who started his career in 1980. He received his bachelor's degree in quantity surveying from Universiti Teknologi Malaysia (UTM) in 1979, a master and a doctorate degree in construction project management both from the University of Reading, United Kingdom. He is a member, holding various positions in CIOB, RISM, BQSM and other recognised professional institutions in the US and UK. He has made substantial contributions to the industry by actively involved in consultancy works, working closely with firms and construction organisations. Now in his prime age, Professor Abdul Ghani Khalid continues to contribute to the industry by forging partnership and cooperation across disciplines for the betterment of the industry. His network and linkage span across the seven seas, a testament of his contribution in both academia and the industry.

*"The more you give, the more you will get from our creator"*

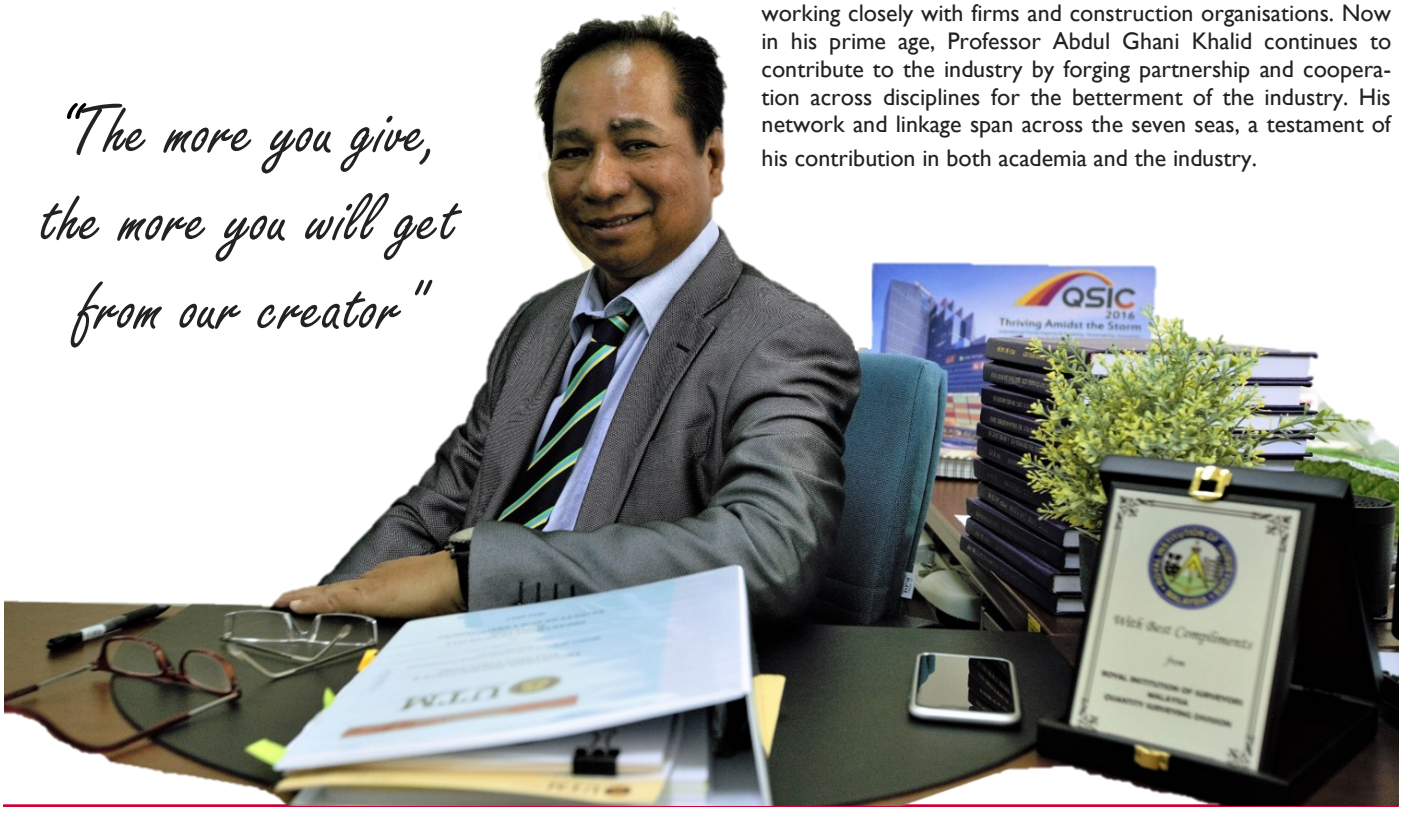



Image: Creative Common & personal collection

Bricks and mortar

# QS involvement in community building

The chief editor, Dr Shamsulhadi Bandi had the chance to speak with Dr Lim Soon Kam about his noble involvement in community building. The following is his report.

**Could you please briefly tell us your background and your past and current involvement in community building?**

I was a village boy, growing up in a village infamous for its drugs and gangsterism. A number of my childhood friends were killed in gang fights. This prompted me to think what I could do for my village when I was a teenager.

Together with my siblings, we started moral empowerment program to children and youth in my village back then till now. The program helps to build in them a sense of moral purpose in order to become a source of social good, with the aim of building a better community.

Over last 20 years, though painstaking at the beginning, the program grew and garnered good support from especially the parents and school teachers, as positive character change took place in children and youth attending the program. During later years, these children have grown up to be volunteer teachers themselves, teaching the younger ones. Accordingly, the program becomes self-sustaining.

It is a great bounty that I also have the opportunity to visit many communities in the country and around the world to share my vision, and to inspire others to arise to contribute positively for the common good. Opportunities also presented themselves that I take part in building schools and learning centers for the poor and under-privileged in Cambodia, Bangladesh and rural areas in Sabah.

**In relation to your past and current involvement in community building, what really motivates you?**

I believe in the nobility of man, that is, we are created noble and born into this world to carry forward an ever advancing civilization. In other words, human beings are noble beings who are called upon to carry out noble deeds in this world. To do this, however, it requires having high ideals.

One such high ideal which truly inspires me in my community work is the concept of "oneness of mankind", that's, we come from the same human family for each other. The other is the "service to humanity", that's, it's both an honor and bounty to care and serve the human family. I believe that when prompted by high ideals, one will constantly strive to bring about personal and social transformation, which is fundamental in building a sustainable society.

At the same time, it is truly a great joy to observe positive character change in people, particularly when they begin to learn to think for and serve the society in whatever way they can, alongside with their personal or professional life pursuits.

As for the children and youth in my community, I often rejoice over their accomplishments in academic and career during their later years, while they keep "service to humanity" close to their hearts. This motivates me further.

**Can you share with us how Jenjarom Learning Center was founded?**

After more than a decade renting a shop-lot, I saw the need to have a more proper facility to conduct the program. Hence, I rallied around my siblings to raise the necessary fund. All of us agreed that we should build a center and offer it as a gift to the community. I took a year off after my PhD studies to focus on and personally supervise the whole construction of the building.

To our village's delight, in November 2010, the Jenjarom Center of Learning for Advancement of Civilization was completed and officiated by two renowned professors from Hong Kong University (HKU) and New York University (NYU). Some thousand villagers, comprising parents, school teachers and community leaders attended the opening ceremony event.

Currently, the building is being used as a venue to provide moral empowerment programs and community development activities, serving some 250 children and youth from our village. Open to people from all walks of life, the center symbolizes as a platform where children and youth as well as their families work in unity of thought and action towards the regeneration and rebuilding of a better society in Jenjarom.

**The community center that you run has inspired many. In your personal opinion, why Quantity Surveyors should involve in community building?**

In my humble opinion, we cannot segregate our professional life from the environment outside us and say that once our career is advanced everything will be improved. This is because we are part and parcel of the society we live in, and there is so much left to be done out there in building a better community.

Image: Jenjarom community center

## Bricks and mortar

In short, our professional pursuits and acts of social good must go hand-in-hand. They are liken unto two wings of a bird, for unless both are equally developed, a society cannot truly soar and attain true and lasting prosperity.

It is a source of immense joy and delight to be able to contribute, however meager and in whatever way it may be, for the betterment of community we live in. It brings meanings to our life, and in our profession.

**How they (the Quantity Surveyors) could start and what are the forms and capacity that they could contribute?**

Perhaps the first thing we can do is to develop a consciousness in our professional life that, in this case, Quantity Surveyors are not only quantity-focused, but we are also looking out for ways to improve the life of our fellowmen and society, creatively through project involvement and at personal level.

Contribution to community welfare can take in many forms. Depending on the needs of a community, it ranges from caring for the poor and needy around us to building schools in remote villages and many others.

I always believe that Quantity Surveyors possess a unique set of skills by which we can creatively find ways and meaningfully contribute to community building. For a start, we may wish to reach out to an NGO or communal organization and involve ourselves, and at the same time, to offer our professional skills and services in communal project they are engaged in or create one. Of course, this is just one way. If there is a will, we will be inspired and guided to many ways.

**How do you juggle between your career, community work and family?**

You would agree with me that life is an on-going addition of "busy-ness", and it never stops since the day we make sense with the world around us, from being a student to becoming a working adult, then married, then parent and grandparent thereafter. Interestingly, there's this amazing hidden ability in man that helps us to balance it out somehow and move on further. As a suggestion, why not we also put the element of service to community into the equation of our life?

*"The betterment of the world can be accomplished through pure and goodly deeds, through commendable and seemly conduct"*

Personally, I always remind myself not to overly compartmentalize aspects of my life, because this can lead to unnecessary contradictions. In order words, I think them as one, and plan accordingly. This truly helps me in achieving a balance among the three. Of course at times it may be tensed and challenging, but overall it is a pleasant experience.

**What is your motto in life?**

"The betterment of the world can be accomplished through pure and goodly deeds, through commendable and seemly conduct".

# About

**Dr Lim Soon Kam**, a QS alumnus, was conferred the *Darjah Kebesaran Ahli Mahkota Selangor (A.M.S.)* by the Sultan of Selangor in Dec 2017. The award is in recognition of his 22 years of outstanding contribution towards social good in his village Jenjarom, Selangor. Besides service to community, Dr. Lim acquired a string of scholastic and exemplary awards in his life time. These include graduating as the top student in QS department at UTM in 2001, outstanding Masters graduate under a QUT university scholarship in Australia, and outstanding PhD scholar under a prestigious PhD scholarship award funded by the Australian government. Dr. Lim was named The Outstanding Young Malaysian (TOYM) in 2006, and became a top-30 finalist for The Outstanding Young Persons of the World (TOYP) Award in 2007. He is an international speaker on community building and the founder of Jenjarom Learning of Center for Advancement of Civilization. Dr. Lim also serves as a board member of the Bahá'í Community of Malaysia. Currently, he is the executive director of Aerofront City Development Sdn. Bhd., a master developer of 1287-acre land next to KLIA.

Image: Dr Lim Soon Kam and his involvement with the underprivileged communities.

Featured article

# Impact of BIM to Quantity Surveyor as a contract administrator

**Associate Professor Dr Nur Emma Mustaffa** is currently a lecturer at the Department of Quantity Surveying , Faculty of Built Environment and Surveying UTM, Johor. She holds a degree in law and has been assigned with teaching courses with legal inputs since she joined the department. She obtained her LLM in Construction Law from Strathclyde University, Glasgow and PhD from Heriot Watt University, Edinburgh Scotland. She is also an Accredited Adjudicator from Asian International Arbitration Centre (formerly known as KLRCA) and Fellows of the Asian Institute of Alternative Dispute Resolution (AiADR). She was the former course coordinator for two programs; BSc in Construction and MSc in Construction Contract Management for several years. Her research interests' centers around Construction Law, Procurement, Dispute Resolution, Building Information Modelling contracts and is now involved in researches related to the themes. She developed the BIM Educational Framework for the quantity surveying students in Malaysia with her colleague. Apart from that, she is also the Editorial Board Member of the International Journal of Built Environment and Sustainability and has been appointed as reviewer for internationally acclaimed journals and conferences from time to time. She also has PhD and MSc students who have successfully completed their research under her supervision.

## Introduction

Building Information Modelling (BIM) is one of the promising advances in the construction industry that is significantly affecting the 21st century practice. BIM is increasingly being implemented in developed and developing countries. (Bui, Merschbrock and Munkvold, 2016). Adopting BIM for cost estimating is evolving and the roles and responsibilities of quantity surveyor as the cost specialist and contract administrator are changing. Because of these changes, it is imperative that these cost specialists cum contract administrator to dedicate their time and effort to be actively involved and be conversant not only in the advancement of estimating but also in the changing spectrum of contractual framework brought by BIM.

## What is BIM

BIM is regarded as one of the technological advances in the construction industry and it offers great opportunities for construction industry globally. It is being utilised to facilitate better collaboration and coordination throughout the building process. It is data rich, object-orientated, intelligent digital representation of a facility. Conventional method two-dimensional drawings encompass lines, arcs and circles are graphical entities only. BIM on the other hand define objects in terms of building elements and systems like spaces, walls, beams and columns. These models are much more than just three-dimensional representations of two-dimensional drawings as in fact, they enable the users to add cost, schedule, sustainability and other useful information to the model.

A widely cited definition of BIM through time is provided by the United States National Institute of Building Sciences;

*"a digital representation of physical and functional characteristics of a facility…and a shared knowledge of resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition.*

*A basic premise of BIM is collaboration by different stakeholders at different phases of life cycle of a facility to insert, extract, update and modify information in the BIM to support and reflect the roles of stakeholders* (NIBS, 2007, p 21)

What can be deduced from the definition is that there are two different sides of BIM. The first part of the definition focuses on the technical and tool side of BIM whilst the second part touches on the collaborative side of BIM stressing on the human aspect of BIM (McCuen, 2015). Accordingly, it highlights that BIM implementation can be achieved effectively when the parties in the project work together to achieve a common goal.

BIM is also regarded as an enabler as it offers better information flow and decision making thus demands a change in processes and relationships compared to non-BIM project delivery. It combines technology with new working practices and to improve the quality of the delivered product and enhance the reliability, timeliness and consistency of the process to create, control and amend the information. It demands the move away from the traditional sequential workflow, to an environment where all parties share and effectively work with a common information pool as depicted in Table 1.0. It is also necessary to have processes which support collaborative ways of working when BIM is adopted.

In BIM, the emphasis is on making the model as the primary repository for information, from which an increasing number of documents, or accurately information such as plans, schedules and bills of quantities may be derived. It is the information in the model which is the main asset of BIM. Thus, BIM is in practice is developing a digital prototype of the information of the building and simulating it in a digitalised format and uphold the model as the primary tool for the whole project team.

Maintaining the model as a single repository for information gives the opportunity for the project team members to have a common basis for design and delivery as compared to what have been an isolated information pool. It gives the opportunity to them to access to the same data whilst at the same information loss in the handling of the project from design, construction and

Image: Creative Common

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operation of the building is kept to a minimum.

Representation of the actual parts and components being used to construct a building together with the geometry, spatial relationships, geographic information, quantities and properties of a building components is what define a BIM model. It accords a common data environment (CDE) to store the vital information that can be accessed to demonstrate the entire asset lifecycle from construction stage to the facility management stage. The various subsets of BIM are commonly described in terms of dimensions – 3D (object model); 4D (time); 5D (cost); 6D (operation); 7D (sustainability). Eastman et al (2011), one of the prominent authors on BIM has defined the multidimensional of capacity of BIM as "*n*D" modelling as it has the capacity to add an almost infinite number of dimensions to the model.

The 4D links information and data in the 3D object model with project programming and scheduling data and facilitates the simulation analysis and construction activities. 5D integrates all this information with cost data such as quantities, schedules and prices. 6D represents the as-built that can then be used during the operational stages of the facility.

Table 1.0 highlights the findings on the differences between a traditional project delivery strategy and that utilises BIM from a research documented by Beaumont (2016).

**Table 1.0** Benefits of traditional against BIM projects

| Projects | Traditional | BIM-enabled |
|---|---|---|
| Information | 2D coordinated drawings | 3D federated model |
| Progress | Completed behind schedule | Completed on time |
| Information requests | High number of requests for information | Low number of requests for information |
| Service coordination | Additional resources required to resolve multiple issues | No issues reported |
| Management Resources required by the client to deliver the project | Two individuals full-time | One individual part time |

***Source:*** *Beaumont, 2016*

## BIM Implementation in Malaysia

BIM was introduced to the Malaysian construction industry by the Public Works Department (PWD) in 2007 (Latiffi et al, 2014) through the establishment of a BIM Committee within PWD itself with the purpose to identify a suitable BIM platform that could be utilized by it. Without doubt, the implementation of BIM in the Malaysian construction industry is to facilitate and materialise the achievement of the vision of the CIDB Transformation Plan as well as the nation's 2020 vision (CIDB, 2015). As highlighted by Ahmad Latiffi et al (2014) the aim of introducing the use of BIM in construction projects among construction players is to enhance the quality of the construction projects in Malaysia. There are several projects in Malaysia which have applied BIM and amongst others are the National Cancer Institute of Malaysia, Healthcare Centre Type 5 in Pahang and MACC Shah Alam Administrative Complex.

## Quantity Surveying and BIM

The professional disciplines providing specialist project cost management services globally may be addressed as cost engineers, quantity surveyors, construction economists and project managers. Quantity Surveying is a profession with origins in the United Kingdom and is a professional title recognised mainly in Commonwealth countries. On the other hand, Cost Engineering is a popular term amongst North and South America, China and some parts of Europe. European Countries and in other parts of the world, the cost management specialist is known as Construction Economist. In

***The National Cancer Institute, Putrajaya. Source:*** *NRY Architects*

other regions, particularly in Europe, the cost management services commonly carried out by these three professionals are carried out by Project Managers.

BIM and automated quantities technologies provide both opportunities and challenges for the quantity surveyors. A quantity surveyor working in project which utilises BIM should be able to simulate and explore various design and construction scenarios in real time for the client in real time through their cost data and integrally linked in the live BIM model. As quantification increasingly becomes automated and BIM models develop the role of the quantity surveyor as the project cost manager will need to adapt accordingly to provide more sophisticated cost management services that 5D cost modelling and sharing cost information/data with the project team as part of the BIM integrated project delivery approach.

In practice, a quantity surveyor has been trained to think three dimensionally while carrying out his duties and that requires him to translate three-dimensional information into costs. Therefore, extraction of exact quantities and areas may be made accurately with high reliability as BIM tool can recognise and relate how the total project cost is made up by each elements and spaces. Thus, the integration of BIM in the automatic production of cost will enhance the cost management in construction projects as the estimating tasks which a quantity surveyor carries out will be simple and straightforward and paperless as it is carried out digitally (Zainon et al, 2016).

One of the key roles which a QS play is to administer the contract. As a result, it is vital that he observes the needs to incorporate BIM-related obligations into construction contracts.

## QS as a contract administrator

The QS roles as a contract administrator in BIM-enabled projects is summarised in Table 2. Nonetheless, to comprehend the roles, it is important that the key terminologies used in BIM projects should be grasped first. Amongst the common key terminologies associated with BIM utilisation in a project which a QS should be conversant with to administer a BIM contract include:

### *BIM Specification, Standards, Codes of Practice or guidelines*

These are series of documents for achieving the BIM level required through the establishment of a framework for collaborative working and information requirements. In the United Kingdom, it is called Publicly Available Standard (PAS). United Kingdom has a series of PAS documents which set out the requirements for achieving BIM Level 2 and is called PAS 1192. This standard framework sets the requirements for the level of model detail, model information (non-graphical information), model definition and model information exchanges. For example, PAS 1992-2: 2013 contains standards for construction phase (CAPEX) that specifies the framework, roles and responsibilities for collaborative BIM working; builds on the existing standard of BS

Image: As shown.


1192, and expands the scope of the CDE. **PAS 1192-3: 2014** deals with the operational (OPEX) phase, focusing on use and maintenance of the Asset Information Model for Facilities Management.

Recent development in terms of these standards in UK is the transition of the PAS Series of standards to international standards. The first two international standards published for Building Information Modelling (BIM) BS EN ISO 19650–1 Organization of information about construction works – Information management using building information modelling – Part 1: Concepts and principles and BS EN ISO 19650-2 Organization of information about construction works – Information management using building information modelling – Part 2: Delivery phase of assets will be adopted at the end of 2018. These two standards will supersede BS 1192 (principles) and PAS 1192 part 2 (capital/delivery phase) respectively.

*BIM contract*

One of the biggest obstacles to implementing BIM has been the fact that most, if not all, of the standard form contracts employed by construction professionals has inadequately addressed BIM as part of the construction process. In construction contracts the terms and graphical representation define the agreement. Typical contract documents consist general conditions, plans and specifications and any other written conditions which the parties have agreed upon. It should be highlighted here that changes take place when BIM replaces the traditional definition of contract documents and replaces some or all the two-dimensional drawings, specifications and other written conditions with BIM based information and data.

Several researches have been done to investigate the legal and contractual changes that BIM may give if it is implemented in the construction project. They highlighted that amongst the issues may arise include the question of ownership and responsibility of the various design, issues on accuracy and precision, interoperability, model management, professional design liability and insurance (Ashcraft, 2008; McAdam, 2010; Sweet and Schneider, 2013) .

Malaysia is currently at an infancy stage in terms of BIM adoption. To ensure that the adoption of BIM reaches its maturity and full adoption stage, the legal risks associated with BIM implementation needs to be fully addressed. Contracts incorporating BIM clauses in construction industry are more challenging to be drafted. Currently, there is no specific contract in the Malaysian construction industry which specifically laid down the provisions for BIM (Abd Jamil and Fathi, 2018)

Countries such as USA, UK, Sweden and Australia have established their own sets of BIM contracts.

*Employer's Information Requirements (EIR)*

Employer's Information Requirements (EIR) is a document which spell out the client's desired BIM outcomes and should be established prior to tendering of the project. Therefore, ideally the client should have developed and make decision on the BIM requirements in advance before the tender document is issued. The EIR sets out the organisational information requirements necessary to manage the technical, commercial and management aspects of BIM delivery as depicted in Figure 1.0. The content of EIR normally covers three areas constituting management, commercial and technical. A QS therefore must ensure that the EIR established by the client is clear and realistic. With such document in place, the QS as a contract administrator has the opportunity to verify whether the project is failing to the contract requirements and if appropriate, put in place appropriate corrective actions.

The type and level of details of a client's EIR would depend on various factors such as BIM maturity of the client organisation, BIM maturity of the stakeholders and supply chain, technology platforms available to facilitate the delivery of the requirements and the type and complexity of the project (Al Hahbabi and Alshawi, 2015).

*BIM Execution Plan (BEP)*

A robust BIM Execution Plan which responds to EIR must be in place. It is a document describing on how BIM is going to be implemented in the project across the project phase encompassing work flow and data input which need to be adhered to by users. BEP also ensure that upstream information is fit for downstream use and they are delivered in the most efficient and productive manner to control rework, waste, claims and litigations (Pandit and Bangale, 2015). It is important to ensure that clarity of objectives, responsibilities and deliverables and validation process in the BEP are determined in advance to avoid unnecessary disputes. The vital elements of BEP processes include BIM goals, BIM use, responsible parties and decision making whilst the important information exchanges gathered from the process include responsible parties, level of development, collaboration and modelling requirements (Hadzaman et al, 2016). There are two types of BEP; a pre-contract and post-contract BEP.

*Common Data Environment (CDE)*

The strength of common data environment (CDE) is in its ability to facilitate collaboration between project team members and helps avoid duplication and mistakes common data environment. It is a single source of information used to collect, manage and disseminate documentation, the graphical model and non-graphical data for the whole project team. By having a CDE platform, everyone is spared the risk from working with obsolete information. Instructions can be issued and shared electronically providing an integral task system which lead to contemporaneous communication trail.

It should be highlighted that the ownership of information within the CDE remains with the originator of that information in the models. This indicate that the individual models produced by different project team members do not interact, specifying clear authorship which remain separate. This means that the liabilities of the originators do not changed by the incorporation of their model into the federated model. Ownership changes, for instance replacing design team objects with specialist sub-contractor objects do not change the liabilities of the originators.

*Construction Operations Building Information Exchange (CoBIE)*

This is a structured, universal database where data sets for a wide range of products can be stored providing information for the commissioning, operation and maintenance of a project. It captures and record important project data at the point of origin, including equipment lists, product data sheets, warranties, spare parts lists, preventive maintenance schedules and so on. This information is essential to support operations, maintenance and asset management once the built asset is in service.

It can be viewed and edited in standard spreadsheet software enabling engagement at all levels of the design, operations and supply chain. CoBIE

**Figure 1.0** Employer's Information Requirements (Pittard and Sell, 2015)

| Management | Commercial | Technical |
|---|---|---|
| • Roles and responsibilities | • Programme | • Software |
| • Objectives | • Information exchange and data drops | • Quality Control |
| • Common data environment | • Purposes requiring information | • Level of development |
| • Collaboration process | • Asset information model | • Competence and capability |

***Source:*** *Pittard and Sell, 2015*


structures the information in a more accessible format, so that it is easier to use and re-purpose. The format is intended to be easy to manage by any organisation, irrespective of size and IT capability. The format also 'insulates' the client from unnecessary complexity, technology changes, interoperability problems and proprietary software issues.

*Level of Model Definition (LOMD)*

Level of Model Definition (LOMD) comprises of two different features: -

- Level of Detail (LOD) – defines the graphical detail required to describe a feature at each stage of the project's development. It increases as the project proceeds, often based in the first instance on existing information, then developing from a simple design intent model through to a detailed virtual construction model. The employer defines the level of detail that is required in the (EIR) and it might be appended to a BIM protocol, incorporated into the contract by addition of a 'model enabling amendment', making the delivery of required information a contractual obligation.

- Level of Information (LOI) - defines the specification for non-graphical data required to describe a feature at each stage of the project's development

*Federated Model*

To put it simply, a federated model is a model which links several mono-discipline together that do not lose their identity or integrity by being linked. These distinct models do not interact directly so a change to one component in the model does not trigger an automatic change in another component within the federated model. Each component has clear authorship indicating that the liabilities of the originators of the separate models do not change by the incorporation in the federated model. It is useful for design coordination, project development, clash detection estimating, and approval processes.

*Data Drops*

To ensure projects are properly validated and controlled as they develop, data is extracted from the evolving building information model and submitted to the client at key milestones as defined in the EIR. The main reason is to make sure that it is properly controlled and can continue to meet the employer's requirements and can be delivered to budget and on time.

*BIM Implementation Plan (BIP)*

**Table 2.0** Contract Administration and the impact of BIM (Adapted from Beaumont, 2015)

| Contract Administration function | Traditional activity | Impact of BIM |
|---|---|---|
| General administration including managing the provision of information, finance and supervision | Interim valuation and certifying payments<br><br>If quality and standards have been identified as the CA's role then they shall be to the CA's reasonable satisfaction<br>Maintain accurate and accessible records<br>Archive on completion<br>Recording actions and events that take place during the project relevant to the performance and contractual obligation of all parties | Models assist in the valuation of completed and remeasurement works.<br>Implementation of the CDE in accordance with established specification or standards.<br>CDE adoption from the beginning improves understanding, change management and information exchange.<br>Utilisation of mobile technology to share updates on photos/defect lists etc |
| Records, inspection and general correspondence | Regular site inspection may include all or part of the following responsibilities (subject to agreed roles and responsibilities of the CA)<br>• Workmanship quality related to the contract documents<br>• Progress review<br>• Material checking<br>• Check whether work conforms with specifications and drawings<br>• Record any work measurement | Compliance with the identified specification/standards may assist in managing change control by comparing iterations of the model(s) to identify changes, amendments or omissions.<br><br>The CDE document structure and uploading process should be documented in the BIM Execution Plan (BEP) and thus places contractual obligations for project facilitation process. |
| Site inspection, quality progress | Agree a programme of design team meetings at project inception and programme meetings (set agendas) at the commencement of the contract | Mobile technology expediate the tasks carried out by site personnel –photographs taking, storing and sharing provide contemporaneous records of elements constructed. |
| Meetings, general and statutory matters | Ensuring compliance instead of authorising including witnessing /administrating testing<br><br>Identification of the obligations of all parties – report on the progress of parties discharging their obligations<br><br>Reporting on the financial position of the projects regularly | BIM encourages collaboration and sharing of information. Information is open and transparent between the project stakeholders. |
| Reporting to the client, dealing with claims and variations | Issues instructions to change work. Omissions management of the project | Models are shared frequently in line with a defined level of detail (LOD) and assess to determine compliance with EIR. Variations may be assessed to determine the impact. |

***Source:*** *Adapted from Beaumont, 2015.* *Continue in the next page.*


**Table 2.0** Contract Administration and the impact of BIM (continue from the previous page)

| Contract Administration function | Traditional activity | Impact of BIM |
|---|---|---|
| Reporting to the client, dealing with claims and variations | Issues instructions to change work. Omissions management of the project | Models are shared frequently in line with a defined level of detail (LOD) and assess to determine compliance with EIR. Variations may be assessed to determine the impact. |
| Client instructions, changes and cost savings | Under the obligation to advise on risk delay risk to the contractual completion date and monitor work progress | Ability to better monitor design development improving understanding and facilitate change management<br><br>Better informed decisions made at the earlier stage of the project lead to less redesign and rework due to collaboration and hence avoiding disputes. Cost associated with change orders would be minimised. |
| Programming and impact of changes | Administrating the process in accordance with the contract rather than authoring<br><br>Advise and report the cost implications of variations | Use of schedule-based BIM to assess the contractor's intent associated with construction sequencing and coordination<br><br>BIM integrated with cost and scheduling can provide more accurate cash flow forecasting<br><br>Can assist in the funding and planning and assessment of progress against planning |
| Contract instructions/variations | Issue the correct notices and certificates aligned with the contract requirements<br><br>Assess entitlement for extension of time, the requirement for early or partial possession and completion of all works | Adoption of cost based compatible software to monitor design development and change<br><br>Utilisation of based BIM software to monitor time implications of instructions to variations. |
| Contract completion date, extension of time (EoT) partial possession and practical completion | Contract administrator will assess and decide whether to approve or reject | Employment of based BIM software to monitor and manage the programme facilitate the contract managing process. Contractor to keep the programme up to date and publish to the contract administrator |
| Loss &/or Expense | Maintain and report by the contract administrator | Use of BIM integrated with cost and scheduling to monitor and assess claims for loss and/or expense speed up the whole process |
| Adjustment to the contract sum/final account | Maintain and report by the contract administrator | Application of BIM and cost-based software speed up the maintenance and reporting the likely adjusted contract sum |

***Source:*** *Adapted from Beaumont, 2015.*

It is a blueprint for integrating BIM at an organisational level. It should align to the objectives and aspirations of the organisation, its business partners, its skill base, levels of investment and the nature and scale of projects that it wishes to undertake now and in the future.

Having explained the different common terminologies used in BIM projects, the impact of BIM is summarised in Table 2.0. It takes into consideration the usual tasks a quantity surveyor undertakes as a contract administrator in the traditional and BIM-enabled project settings.

## Conclusion

BIM is not a panacea, it remains just as possible to produce a poor model, in terms of its functionality, constructability or its values, as it is to produce poor drawings or any other, more traditional form of information. Nonetheless, it must also be remembered that the greatest value with the modern-day quantity surveyor professional services lies in their ability to be 5D literate and be able to utilise electronic models to provide detailed 5D estimates and living cost plans in real time and also be an efficient contract administrator associated with BIM- enabled projects.

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The young's mind

# Heritage Building Information Modelling: The Rise of Quantity Surveyors

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## Abstract

Quantity surveyors are highly demanded especially in preparing cost estimation of heritage building conservation works which recently, becoming increasingly important for the urban development as heritage buildings are icons for a country and the buildings represent the historical and cultural backgrounds of a nation. However, cost estimating for heritage building conservation works is not a simple task because it is of different approach from a conventional estimating for new building work. In contrary to new building work, conservation work may not have much detail especially if the as-built drawing is outdated or unavailable. In response to the demand for more efficient and safe as-built drawing production as well as accurate cost estimation for heritage building conservation works, Heritage Building Information Modelling (HBIM) technologies with the utilization of 3D laser scanner have been introduced to replace the conventional approach. Previous studies on HBIM and utilization of 3D laser scanner have only focused on the creation of as-built Building Information Modelling (BIM) model architecturally and structurally. Very little is known about the potential for quantity surveyors to perform their professional practices on HBIM platform and utilization of 3D laser scanner for heritage building conservation works. Therefore, this study seeks to investigate the potential for quantity surveyors to perform their professional practices on HBIM platform and utilization of 3D laser scanner for heritage building conservation works by means of single case study method and Istana Bukit Zaharah is chosen as the case study for this study. This paper provides the basis of research approach that will be conducted in order to achieve the aim of this study and the approach consists of four main phases: (1) 3D data acquisition, (2) data processing, (3) as-built BIM creation and (4) cost estimation. It is believed that this study is extremely significant in expanding the traditional roles and professional practices of quantity surveyors in the context of heritage building conservation works.

## 1. Introduction

Quantity surveyors are one of the vital specialists in construction industry and often found collaborated with other professionals in many sub-fields (Lee and Lim, 2009). Mustapa et al. (2005) highlighted that since the past years, quantity surveyors are also highly demanded in heritage building conservation works which recently, becoming increasingly important for the urban development. Heritage building conservation works are extremely crucial as heritage buildings indicate symbols for a country and the buildings represent the historical and cultural backgrounds of a nation. Therefore, it is important to conserve heritage buildings for the future generations. Based on an inventory research undertaken in 1992 and 1993, Mustapa et al. (2005) reported that there are approximately 39,000 heritage buildings in Malaysia. The buildings were built between 1800 and 1948 and located in 247 cities and towns. Moreover, Li Woon and Yoke Mui (2010) pointed out that the declaration of Malacca City and Georgetown as UNESCO World Heritage Sites has imposed additional attention and demand for conservation works. This has drawn more attention from property owners to conserve their properties and due to this, the need for construction professionals particularly quantity surveyors in building conservation works increase as well.

Building conservation indicates action taken to enhance the heritage building's lifespan (Harun, 2011). Yoke Mui et al (2016) and Quah (1992) further explained that building conservation is of different approaches from construction of a new building but has similar characteristics to building refurbishment. Building conservation requires small workforces but intensive operations and the works are dispersed throughout the existing building. In Malaysia, the heritage building conservation works generally adopt the traditional procurement process whereby the Bills of Quantities is used for tendering of works (Cunningham, 2016; Lim and Ahmad, 2015). This approach is appropriate in order to select a capable conservation contractor that submit a competitive tender (Lim and Ahmad., 2015). Hence, an accurate cost estimation is extremely significant to establish the approximate cost of resource elements of the tender price for conservation work (Li Woon and Yoke Mui., 2010). To produce an accurate cost estimate, adequate and accurate as-built design drawings and specifications are essential to the quantity surveyors to carry out quantity take-off to establish the amount of work required (Lee and Lim, 2009; Skitmore and Wilcock, 1994; Chandler, 1991).

However, it is difficult to estimate heritage building conservation works because it is of different approach from a conventional estimating for new building work. In contrary to new building work, conservation work may not have much detail especially if the as-built drawing is outdated or unavailable (Amano and Lou, 2016; Pawlowicz and Szafranko, 2015; Lim and Ahmad, 2015; Highfield and Gorse, 2009). Klein et al. (2012) added that even if the as-built drawings are available, it might not be necessarily useful as they are generally inaccurate and do not represent the current condition of buildings (Amano and Lou., 2016; Shamkhi and Al-hajj, 2014; Highfield and Gorse, 2009; Ramsey, 2007). Ramsey (2007) further explained that the inaccuracy of as-built drawings might be due to building defects, improper maintenance or changes to the structure that may have occurred without any documentations to hand. Therefore, there is a need for re-measurement to reproduce measured drawings for quantification purposes and to clarify discrepancies between the old as-built drawings and actual building information (Lee and Lim., 2009).

The conventional re-measurement method involves a detailed investigation of building, recording measurement details by means of photograph taking, on-site measurement and observation (Lee and Lim., 2009). Barbosa et al., (2016), Megahed, (2015) and Jung et al., (2014) further explained that the use of traditional tools for on-site measurement include total station, laser distance meters, digital cameras and measuring tapes. In these ways, all the dimensions of all building elements are manually measured and documented. However, this conventional process is rarely that simple and it is rather laborious, tedious and error-prone (Baik, 2017; Megahed, 2015; Jung et al., 2014; Arayici and Hamilton., 2005). Apart from that, there are issues related to health and safety, accessibility and alteration done to the building fabrics when doing on-site measurement (Beckmann and Bowles, 2012; Woodly, 2006). To achieve a more efficient and safe as-built drawing production as well as accurate cost estimation for heritage building conservation works, Heritage Building Information Modelling (HBIM) technologies with the utilization of 3D laser scanner have been introduced to replace the conventional approach (Baik, 2017; Cheng et al., 2015). At present, 3D laser scanner is gaining rapid attention and usage in the architecture, engineering and con-

Image: Creative Common/Pixabay


struction (AEC) industry in conservation works of heritage buildings and sites as it offers significant advantages over the conventional approach (Bassier et al. 2017; Jung et al., 2014). Djuricica et al. (2016) added that 3D laser scanner has the capability to produce valuable and accurate measurement of objects in-situ in a non-destructive manner.

Previous studies on HBIM and utilization of 3D laser scanner have only focused on the creation of as-built Building Information Modelling (BIM) model architecturally (Bassier et al., 2017; Jung et al., 2014) and structurally (Yang et al., 2016). Very little is known about the potential for quantity surveyors to perform their professional practices on HBIM platform and utilization of 3D laser scanner for heritage building conservation works. Frei (2010) pointed out that in order for the quantity surveyors to stay connected, globally competitive and successful, they must always scan their business landscape to identify and accommodate to imminent changes to their professional practices. Hence, this study aims to explore the potential quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner. In order to accomplish the aim of this study, potentials of 3D laser scanner utilization for cost estimation of heritage building conservation works will be explored, a demonstration of the processes of cost estimation of heritage building conservation works based on the 3D model captured by 3D laser scanner will be provided and future quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner will be exposed.

## 2. Literature Review

### *2.1 Heritage Building Conservation Works*

Malaysia is well known for its vast cultural and multiracial diversity often stands among most countries with its amusing and rich diversity of historical and architectural buildings. A report "Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)" issued by the United Nations Educational, Scientific and Cultural Organization (UNESCO) defined heritage buildings as a group of isolated or connected structures which, due to their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science. While, in Malaysia, the National Heritage Act 2005 defined the heritage buildings as tangible heritage and they are nine criteria required to be fulfilled in order for a potential heritage building to be declared as national heritage property: (1) the buildings consist of historical significance in some form, and there is some sort of connections to the Malaysian's history; (2) the buildings are of decent design and architectural values; (3) the buildings consist of scientific advancements or achievements; (4) the buildings that associate with social or cultural values; (5) the buildings that have potential to be studied and investigated scientifically in relation to cultural heritage of Malaysia; (6) the buildings that have potential to show unusual characteristics or features to be investigated; (7) the buildings that consist of rarity or uniqueness of the natural heritage, tangible or intangible cultural heritage or underwater cultural heritage; (8) the buildings that capable of representing the nature of a site or object as part of a class or type of a site or object; and (9) the buildings that consist of any other matter that is important in defining the cultural heritage significance.

Obviously, there are many heritage buildings in Malaysia and essentially, conservation works are highly demanded in order to conserve these valuable and cultural buildings for the upcoming generations.

In Malaysia, heritage building conservation works are practiced and originated by both the public and private sectors (Harun, 2011). It can be defined as a technical activity carried out to heritage buildings that generally involves preservation, refurbishment, rehabilitation, maintenance, restoration, reconstruction, repair and adaptive reuse (Yoke Mui et al., 2016; Dann and Wood., 2004). It is also a process to preserve the heritage building's materials and fabrics to prolong the life cycle of the buildings (Harun., 2011). The two main activities involve in conservation of heritage buildings are mainly to care and provide protection to buildings from being destroyed or altered without cautious considerations and planning (Harun, 2005).

**Table 1.0** Number of heritage buildings in Malaysia

| State | Number of historical buildings |
|---|---|
| Sabah | 10 |
| Perlis | 25 |
| Kelantan | 373 |
| Terengganu | 420 |
| Pahang | 831 |
| Negeri Sembilan | 999 |
| Sarawak | 1010 |
| Selangor | 1166 |
| Kedah | 1282 |
| Kuala Lumpur | 1763 |
| Malacca | 2177 |
| Johor | 2323 |
| Perak | 3351 |
| Penang | 5057 |
| **Total** | **20787** |

**Source:** Adapted from Kamal, 2008.

### *2.2 Issues of Heritage Building Conservation Works*

Yoke Mui et al. (2016) emphasized that heritage building conservations works are totally different from new building works. Some of the noteworthy difference is the execution of works where conservation works follow top down approach while bottom up approach is followed for new building works. Heritage building conservation works normally begin at the highest level which is roof then moves on to the internal spaces, windows, doors and external façade of the building.

Moreover, construction in structural level is not required in building conservation works as contrary to new building works (Lim and Ahmad, 2015). Heritage building conservation works are laborious although they require smaller works as compared to the construction of new buildings. Also, the work schedules are dispersed throughout the existing building and absence or lack of as-built drawings commonly hindered the effective implementation of heritage building conservation works (Lim and Ahmad, 2015; Harun, 2011). These characteristics often create issues especially in cost estimating for building conservation works due to uncertainties in the degree of works required and these uncertainties does not generally appear in new building works as details of works required are well-defined (Lim and Ahmad., 2015). Furthermore, building conservation works and refurbishment works are generally performed in a poor site condition and this has created a harsh working setting as compared to new building works (Lee and Ebu., 2006).

Pawlowicz and Szafranko (2015) agreed with Lim and Ahmad (2015) that the original documentations such as as-built drawings are often found missing for heritage buildings. This statement was also supported by Amano and Lou (2016) and Highfield and Gorse (2009) where they agreed that as-built drawings is often absent for heritage buildings as opposing to new building works where design drawings and specifications showing each part of building elements are readily available. Even if there is a presence of as-built drawings, they might be unusable due to outdated and inaccurate information (Amano and Lou, 2016; Shamkhi and Al-hajj, 2014; Klein et al., 2012; Highfield and Gorse, 2009) and may not able to represent the current condition of buildings due to deterioration (Ramsey, 2007). Without the aid of as-built drawings, it is difficult for quantity surveyors to be able to visualize and quantify

the amount of works needed to prepare the cost estimation for heritage building conservation works. To address the issues mentioned, there is a need to reproduce the as-built drawings.

The process of reproducing the as-built drawings is called the remeasurement of work and it is crucial in order to generate an accurate cost estimate and to identify discrepancies between the old as-built drawings and actual building information (Lee and Lim, 2009). The conventional method of remeasurement for heritage building generally involve an in-depth and detailed dilapidation survey, building investigation (Harun, 2011). This can be done by using the traditional means, such as written and descriptive analysis, photos, sketches and drawings, and manual surveys (Barbosa et al., 2016; Megahed, 2015; Jung et al., 2014). After that, a measured drawing or 'as found drawings' will then be produced. Measured drawings are a set of line drawings that show the existing interior and exterior condition of building (Harun, 2011). For dilapidation survey, it is an action of identifying and recording building defects by the aids of photographic and digital documentation prior to the commencement of any conservation work. The building or site is usually surveyed with aid of traditional measurement tools such as laser distance meters, digital cameras and measuring tapes to collect and list down the building cost information required based on observation. In these ways, all the dimensions of all building elements, for example walls, windows, and doors are manually measured and documented (Jung et al., 2014) and a priced bill of quantities will be produced for tendering purposes.

However, the reproduction of as-built drawings is rarely that simple because it is rather laborious, time-consuming and error-prone (Jung et al., 2014; Klein et al., 2012; Anil et al., 2011). There are issues to be considered especially when estimating for work involves historical buildings and structures. According to Woolley (2006), some of the specific difficulties associated with the conventional method of remeasurement for heritage buildings are:

**(1) Accessibility:** Heritage building conservation works are generally conducted within a very confined space in an existing building (Lim and Ahmad., 2015). The old building structure often found to be structurally unstable, issues such as safe access to high level often create difficulties for quantity surveyors while performing manual measurement (Woodly., 2006). For measurement work that taken in tall building structure such as cathedral or church the only way of measuring high level stonework is by abseiling or, in certain cases, via a cherry picker where the accuracy of information collected are questionable. Therefore, due to the insufficient cost information provided by poorly prepared bills of quantities, the conservation contractors would have to make certain assumptions to the exact amount of conservation works needed (Lim and Ahmad., 2015). Moreover, it is not possible for a quantity surveyor to perform manual measurement, if the building elements such as columns, beams or windows are in distant height and can be only be seen somewhat obliquely from ground. The use of binoculars might be helpful, but nothing compares to standing on a scaffold which build up cost to client (Barbosa et al., 2016) as well bringing health and safety hazards into question. Not only that, there are strict conservation principles and guidelines to be followed to ensure that the authenticity of the heritage building is not damaged by the measurement works (Lim and Ahmad., 2015). The quantity surveyors need to be extra careful to ensure there is minimum contact and alteration done to the historic fabrics when doing measurement to ensure there is no harm to be done to the heritage significance which cause altered appearance and loss of features;

**(2) Health and safety concerns:** While performing manual measurement in the heritage building, Beckmann and Bowles (2012) mentioned that there are principal risks of falling from a height or becoming trapped or incapacitated in a confined space. Moreover, due to aging, the heritage buildings often associated with poor indoor air quality, condensation and mould growth which will affect the human health. Furthermore, quantity surveyors also face health and safety issues where hazardous materials (Amano and Lou., 2016) such as asbestos and fungus as they are commonly found in the heritage buildings (Woolley, 2006);

**(3) Timescale:** The process of manual remeasurement consumed significant amount of time and should not be rushed in order to produce a consistent and accurate cost estimate. In such a case, sufficient time frame is required for collecting of data and any necessary consultations. (Wooley, 2006);

**(4) Experience:** Lastly, the quantity surveyor that performing the estimate need to be very well-informed in the historic world (Wooley, 2006). However, Wee Li and Yoke Mui, (2010) and Kamal et al. (2007) pinpointed that heritage building conservation work is a relatively new practice in Malaysia as contrary to the other countries. As such, the researches carried out on heritage building conservation works, especially in the costing aspect is rather limited (Wee Li and Yoke Mui, 2010). The lack of researches accompanied with the quantity surveyor's lack of understanding in heritage building conservation works might create great difficulties in collecting data for building elements for further production of accurate cost estimation.

### *2.3 Building Information Modelling for Heritage Building Conservation Works*

In order to optimize conservation of heritage buildings, all the relevant professionals must be able to collaborate with each other with accurate building information on a digital and common platform called the Building Information Modelling (BIM) (Amano and Lou., 2016; Bryde et al., 2013). BIM is an unprecedented new approach to building design, construction and management (Raphael and Priyanka., 2014; Bryde et al., 2013) and it enables automation of the entire project team by utilising a digital model. Amano and Lou. (2016) defined BIM in further that it is a digital representation of a building or structure that capable of showing its functional and physical properties. It is also worth-mentioning that the concept of BIM was presented in the Malaysian construction industry since many years ago and has been increasingly appreciated by all the construction professionals from the Architecture, Engineering, Construction and Facility Management communities (Kulasekara et al., 2013).

While BIM had initially been proposed for new building construction, there is a trend that modern BIM software is being adopted and presented as Heritage Building Information Modelling (HBIM) for the conservation, management, maintenance and quality control of heritage buildings (Baik, 2017; Bassier et al., 2017; Cheng et al., 2015; Megahed, 2015; Volk et al., 2014; Fai and Rafeiro, 2014). Moreover, the use of laser scanning and photogrammetry as part of HBIM are increasingly utilized for cultural heritage sites documentation (Bassier et al., 2017). In the case of heritage buildings documentation


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and modelling, the processes involved are to obtain, manage and integrate the building data into a single data structure through BIM tools (Cheng et al., 2015; Eastman et al., 2011). The processes commence by getting the spatial data of heritage building through surveying technologies, such as laser scanning, photogrammetry or the combination of both (Cheng et al., 2015). The 3D data acquisition process indicates the creation of HBIM objects or as-built BIM that represent all the building information including its sections, details, orthographic projections and schedules (Megahed, 2015; Rua and Gil, 2014; Murphy et al., 2013). This process is called as the "reverse-engineering" solution where the completed engineering drawings can be generated through the 3D data acquisition process (Megahed, 2015; Dore and Murphy, 2012).

Prior knowledge related to the potential of HBIM achieved by 3D laser scanner has been considered for the creation of as-built BIM of heritage building. This knowledge is crucial for quantity surveyors to build an as-built 3D model of the heritage building and subsequently, to produce cost estimation of works required for the necessary conservation works.

Apparently, based on the extensive literature review on similar researches that have been conducted in the area of heritage building conservation works, it is found that most of the studies have tended to focus only on creation of as-built BIM rather than production of cost estimation for heritage building conservation works. Also, it is not yet known if there is any potential for quantity surveyors to contribute their professional practices for heritage building conservation works. Essentially, there is a necessity to explore the potential quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner.

## 3. Methodology

### *3.1 Case Study Method*

This study utilised case study method in order to investigate the potential quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner. Yin (2003) defined case study research method as an experiential inquiry that explores current phenomenon within its actual context and when the limitations between phenomenon and actual context are not evidently defined and in which numerous bases of evidence are used. Case study denotes to the exploration of a single case or multiple cases by utilizing various data collection methods during a constant duration. Johnston et al. (1999) was once pin-pointed that a fruitful case study research should comprise of the following features: (1) the research must start with assumption developed based on theoretical findings; (2) the research must be systematic and logic in design; and (3) the results of the research must be evaluated individually.

### *3.2 Single Case Study Method*

In this study, single case study method is adopted as it is believed that the main aim of investigating the potential quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner can be achieved effectively by means of the single case study. However, no generalisation will be made to other similar case studies because heritage buildings are unique in nature and have their own characteristics and requirements of necessary conservation works. Still, the principles and approach used in this study is applicable to be used and tested on other case studies. Amaratunga et al. (2002) supported this statement and mentioned that the main feature of case study method is not the data but the understanding of the processes. Case study method is considered to be the most appropriate for this study because it has been asserted by Yin (2003) that case study is suitable to be adopted when researcher is investigating a poorly defined phenomenon. Evidently, based on the extensive literature review, there is limited research that has been carried out in the area of this study. Single case study method has been adopted successfully by many researchers, for example, Baik (2017) adopted the method to create as-built level of development and project delivery time for Nasif Historical House in Jeddah. Similarly, Oreni et al. (2013) used single case study method to develop a HBIM model of Filarete's Ospedale Maggiore ice house and Angelini et al. (2017) conducted 3D reconstruction of Papal Basilica of Saint Francis by means of single case study method.


***The Istana Bukit Zaharah, Johor Bahru. Source:*** *As shown.*

### *3.3 Istana Bukit Zaharah*

Istana Bukit Zaharah or also known as Istana Bunian Sultan Abu Bakar in Johor Bahru, Johor is chosen as the case study for this study. The building was completed in 1858 and was used as temporary palace for royal ceremonies such as the inauguration of the sultan and royal weddings (Ikhwan., 2011; Kamal, 2008). The building is now abandoned and located nearby the Muzium Diraja Abu Bakar and Istana Besar Johor. Furthermore, it is now under the protection of Yayasan Warisan Johor, Istana Besar Johor and Muzium Diraja Abu Bakar.

### *3.4 The Research Workflow*

Faro laser scanner Focus 3D X 130, a 3D laser scanner that capable of performing detailed measurement and documentation will be employed to scan Istana Bukit Zaharah. In contrast to photogrammetry, it can produce comprehensive three-dimensional images of surroundings and geometries in just a single scanner setup. This laser scanner covers a range of view of 300° in the vertical direction and 360° in the horizontal direction, and this feature enables for capturing full panoramic views. Moreover, the scanner can scan up to 976,000 times per second. The scan-station points will be indicated prior the commencement of scanning in order to generate a good overlap between these scan-stations. The use of laser scanner reference spheres will also be employed to achieve high-quality scanning. The building

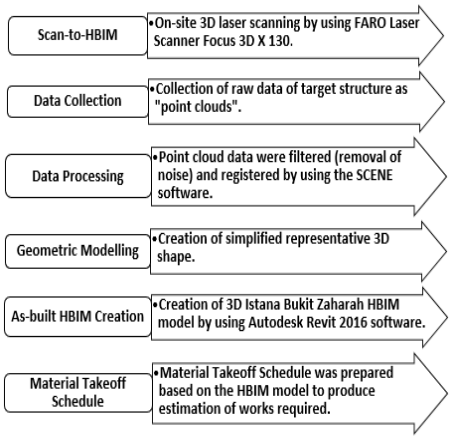



**Fig. 1.** The research workflow

Image: As shown.



will be scanned from the different scan-station points covering all the external and internal building elements such as roof structures, walls, floors, windows and doors and columns to capture all the necessary data for the creation of HBIM model.

The scanned data of Istana Bukit Zaharah will be collected and represented in three-dimensional coordinates, and these data are known as 'point cloud data'. After having the laser scanner's data exported, the SCENE software will be employed to filter and register the dense point cloud data as a single point cloud. The next step is the geometric modelling, in which the single point cloud will be refined and having their planes detected and boundaries traced so that the 3D building components will be reproduced as a simplified representative 3D shape (Jung et al., 2014). The final step involved the creation of the HBIM by using the Autodesk Revit 2016 software, these consisted of grid creation, walls and floor creations, roof creation and detail modelling to create a completed 3D Istana Bukit Zaharah HBIM model. The resulted HBIM model is a digital documentation of fully detailed as-built drawings that capable of showing in two-dimensional and three-dimensional sectional views.

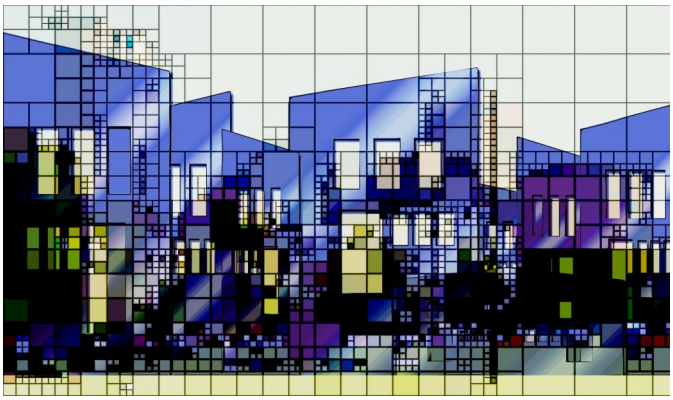
The Istana Bukit Zaharah HBIM model will then be analysed by using Autodesk Revit 2016 software to produce material takeoff schedules for the estimation of works required for the necessary conservation and restoration works. The Revit software will automatic compute the selected building elements on the HBIM model in terms of their number, area, volume and length then display in the material takeoff schedule. A take-off list of the items will be prepared based on the RICS New Rules of Measurement. After the completion of take-off list, the Microsoft Excel software will be used to produce the take-off in an electronic form. The quantities of each items will then be squared to produce an unpriced Bill of Quantities (BQ).

### 4. Expected Finding

The expected finding of this study is the potential expansion of quantity surveyors' professional practices in context of heritage building conservation works. This is achievable by means of the utilization of 3D laser scanner in producing the as-built BIM model of the Istana Bukit Zaharah. Based on the as-built BIM model, cost estimation will be carried out in order to estimate the total works necessary for the purpose of conserving the building. The expected finding is considered to be extremely significant for the future pathway and career expansion of quantity surveyors so that align with the other construction professionals, quantity surveyors could also be part of the emerging world of digital construction particularly on HBIM platform. Also, as the as-built BIM will be created based on the utilization of 3D laser scanner and the aid of SCENE software, it is expected that the model will be accurate and as accordance as the current condition of Istana Bukit Zaharah. Subsequently, by using Autodesk Revit software, the cost estimation of the necessary conservation works will be calculated and similarly, as the as-built model is accurate, it is expected that the cost estimation will also be accurate.

### 5. Conclusion and Further Work

The aim of this study is to investigate the potential quantity surveying professional practices in heritage building conservation works on HBIM platform and through the utilization of 3D laser scanner. In order to achieve the aim of this study, a demonstration of the processes of cost estimation of Istana Bukit Zaharah based on 3D model captured by 3D laser scanner will be performed. Additionally, this methodology will be evaluated, showing that the possibility of HBIM is achievable by laser scanning survey technology for heritage documentation of the Istana Bukit Zaharah. The achieved outcomes of this study are significant for the future expansion of quantity surveying practices in digital construction especially on HBIM platform. However, such integration of HBIM and 3D laser scanning technology should be further explored in which the quantity surveyors may enhance their skills and knowledge so that it can provide advantages to further support the purpose of estimating and documenting the cultural heritage buildings in the future.



*The paper explores a new perspective of QS roles in BIM, particularly in the area of heritage buildings conservation works*

### Content's Editor Note:

The paper by Koh Ben You from University of Reading Malaysia entitled *"Heritage Building Information Modelling: The Rise of Quantity Surveyor"* has won the Best Paper Award during the 10th RICS-RISM International Surveying Conference for Undergraduate 2018. This paper is featured in this section as it contains useful insights towards an extended application of BIM and the manner which QS could possibly get involved.

Essentially, the paper explores a new perspective of QS roles in BIM, particularly in the area of heritage buildings conservation works. It was reported that there are 39,000 heritage buildings in Malaysia that needs to be conserved and preserved, and the availability and inaccuracy of the as-built drawings might be due to building defects, improper maintenance or changes to the structure that may have occurred without any documentations to date. Estimating of heritage buildings conservation works may be affected by several factors, namely accessibility, health and safety concerns, timescale, and experience.

The used of advance technology such as 3D laser scanner proof to be very useful to assist QS in preparing the cost estimate, by deriving the as-built design drawings, as well as the specifications to carry out quantity take-off. The author urged the QS to equipped and enhance skills in utilizing the available technology that was beyond our imagination before, but certainly will help QS today and in near future and align with the other construction professionals.

**Sr Dr Zuhaili Mohamad Ramly, PQS**
**Content Editor**

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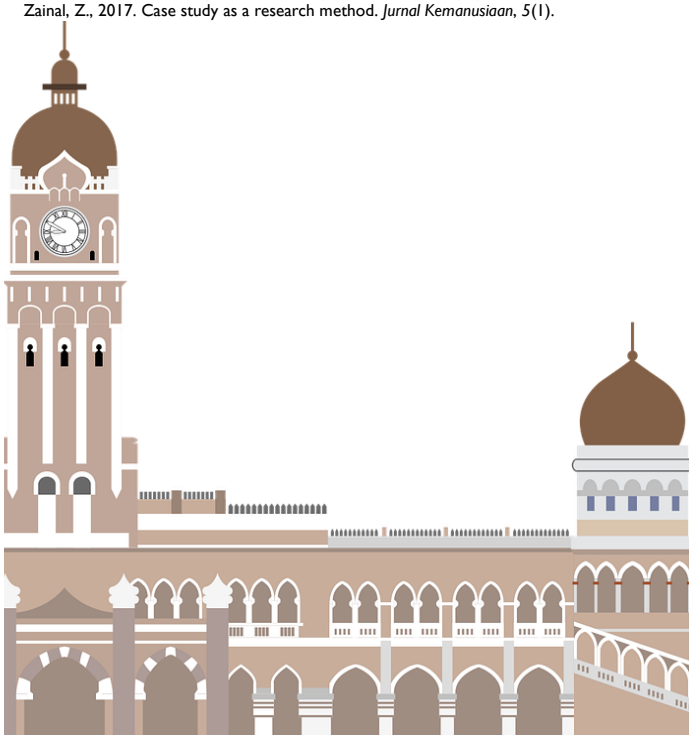

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Lesson learnt


# Summary of legal case

## Terminal Perintis Sdn Bhd v Tan Ngee Hong Construction Sdn Bhd and another case [2017] MLJU 242

Commentary by Dr Hamizah Liyana Tajul Ariffin
Universiti Teknologi Malaysia

This landmark High Court Case looks at an Adjudicator's decision in regard to what constitutes a valid Payment Claim pursuant to Section 5 of the CIPAA and looking into the jurisdiction of the Adjudicator in the validity of its appointment and competence to adjudicate.

Terminal Perintis Sdn Bhd as Employer had entered into a contract with Tan Ngee Hong Construction Sdn Bhd as Contractor for a construction project. The commencement date of the contract is on 1.4.2014. The formal contract was executed on 23.12.2014. The Employer has issued the Contractor with a Notice of Default on 4.8.2015. On 10.8.2015, the Respondent responded the Notice of Default as it would try to its best endeavour to solve matters that cause delay and later the Employer gave a Notice of Determination of the Contractor's employment on 18.8.2015.

The Contractor (the Claimant) commenced Adjudication proceedings claiming outstanding payments under the contract on 11.11.2015 pursuant to Section 5 of the CIPAA, however it failed to raise the validity of the determination of employment in its Payment Claim. The Employer served the Payment Response on 30.11.2015. In its Payment Response, the Employer claimed, *inter alia*, that it was not obliged to make any further payments, however it failed to object therein to the validity of the Payment Claim. The Adjudication Decision were delivered in favour of the Claimant. The Respondent filed an application to set aside the Adjudication Decision because the Adjudicator had acted in excess of jurisdiction, meanwhile, the Claimant had applied an application to enforce the Adjudication Decision as a Judgment of the Court under Section 28 of the CIPAA. The Court dismissed the setting aside application and allow the enforcement of the Adjudication Decision.

### Issue 1 – Validity of a Payment Claim

The Respondent argued that the Payment Claim was invalid as it did not raise the validity of the determination, which it said was required for the Claim to have a cause of action including the provision in the construction contract to which the payment relates. It was further argued that such non-compliance on provision of the CIPAA in which that without a valid Payment Claim, the appointment of the Adjudicator is invalid and that the whole adjudication proceedings and decision is null and void.

The Court aware that the Adjudicator has the jurisdiction to determine whether the Payment Claim is valid where, *prima facie*, it has all of the elements of a Payment Claim as follows: (1) The amount that is due; (2) When it was due; (3) The cause of action and the provisions of the contract to which the payment relates; (4) The nature of the work done and (5) The fact that the claim is made under the CIPAA.

Court Decision - The Court opined that the subject Payment Claim was adequately particularised with the requirements of Section 5(2) of the CIPAA, in that the amounts claimed and the due dates for payment were stipulated therein. Then this Court would not interfere with the decision of Adjudicator. The cause of action for the Payment Claim is valid as it related to provisions in the contract, with the sums claimed not being paid before their due dates. The Court found that these claims were therefore not dependent on wrongful determination of the Claimant's employment.

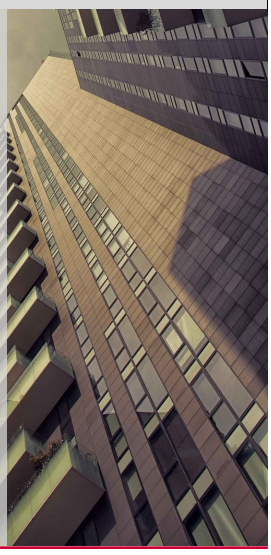

Image: Creative Common/Pixabay

## Editorial (Session 2018/2019)



## Lesson learnt

### Terminal Perintis Sdn Bhd v Tan Ngee Hong Construction Sdn Bhd and another case [2017] MLJU 242

**Issue 2 - Adjudicator exceeded his jurisdiction in deciding on the validity of the Respondent's determination of the contract was unlawful/wrongful**

The word "jurisdiction" is used in Section 15(d) of the CIPAA as in the Adjudicator having acted in "excess of his jurisdiction" as a ground for setting aside an Adjudication Decision. It is also used in Section 27(1) of the CIPAA with respect to an Adjudicator's jurisdiction being limited to the matters raised in the Payment Claim and the Payment Response. Then there is a reference to it in Section 27(2) of the CIPAA with respect to extending his jurisdiction by way of agreement in writing to deal with matters not specifically raised in the Payment Claim and Payment Response. Finally, there is the reference to a "jurisdictional" challenge, which when raised, does not prevent the Adjudicator from proceeding and completing the Adjudication without prejudice to the rights of any party to set it aside under Section 15 of the CIPAA or to oppose its enforcement under Section 28 of the CIPAA.

The Adjudicator has jurisdiction to hear the dispute as in he is competent and has the capacity to hear the dispute. For example, the dispute must be one falling within the matters raised in the Payment Claim and the Payment Response pursuant to Section 27(1). An Adjudicator could not, for example, decide on the defence of set-off arising out of costs of rectifying non-compliance to the specifications in the contract if this was not raised in the Payment Response. As a result, it would mean that the Court may set the decision aside. When a challenge is made to the Payment Claim filed as lacking in details in that it does not disclose a valid cause of action, which is assuming that the Payment Claim has not complied with the requirements of Section 5(2)(b) of the CIPAA. It has nothing to do with the validity of the appointment of the Adjudicator. The Adjudicator appointed would then have to consider whether there exists a valid cause of action with respect to the matters raised in the Payment Claim and the Payment Response.

Section 25 of the CIPAA sets out the powers of an Adjudicator while Section 26 of the CIPAA provides that the Powers of Adjudicator shall not be affected by some non-compliance with the Act. Section 26 of the CIPAA deals with the Jurisdiction of an Adjudicator. The power is with respect to matters of "non-compliance in respect of the adjudication proceedings or document produced in the adjudication proceedings" as stated in Section 26(2) of the CIPAA. In the subject case, the Court looked at whether the Adjudicator's decision to accept the validity of a Payment Claim that did not challenge the determination of employment is within the Adjudicator's jurisdiction, and whether that decision falls within the scope of Section 15 of the CIPAA.

Court Decision - As the Payment Claim held is a valid Payment Claim in that it has complied with the material requirements of Section 15(2) of the CIPAA, there is no necessity then to go under Section 26(2) of the CIPAA for the curing of any irregularity. In this case, the Court found that the Adjudicator did not decide beyond his jurisdiction in that he did not decide on the merits of the determination, but whether the Notice of Determination had been issued in compliance with the strict time frame requirement of Clause 25.2 of the PAM Contract.

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