



**ONE DAY COURSE  
BUILDING COMMISSIONING & AUDIT**  
28<sup>th</sup> July 2010, Petaling Jaya



**ONE DAY SEMINAR ON  
COMMISSIONING**  
4<sup>th</sup> October 2010, Petaling Jaya



**CxS: Demarcation of Scope  
&  
Is it VALUE FOR MONEY ?**  
13<sup>th</sup> to 14<sup>th</sup> March 2013, Petaling Jaya



**Commissioning Process  
for  
Green Buildings**  
13<sup>th</sup> to 15<sup>th</sup> Feb 2014, Petaling Jaya



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**Local Practice of Green  
Commissioning & the CxS**  
(Day 1)

13<sup>th</sup> to 15<sup>th</sup> Feb 2014  
Ir TL Chen FASHRAE, PEng, CEng

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**Local Building Services Industry**

**1<sup>st</sup> Class Design**  
**2<sup>nd</sup> Class Installation**  
**3<sup>rd</sup> Class Commissioning**  
**Low Class Maintenance**

The best designed and best installed  
building services last only until the end  
of the Defects Liability Period **period**

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**Addressing the Issues through GBI**

In 2009, GBI rating system incorporated the following criteria;

- EE6 - ENHANCED COMMISSIONING OF BUILDING ENERGY SYSTEMS
- EE7 - POST OCCUPANCY COMMISSIONING
- EE8 - VERIFICATION
- EE9 - SUSTAINABLE MAINTENANCE

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**EE6 - ENHANCED COMMISSIONING**

- Ensure building's energy related systems are designed and installed to achieve proper commissioning so as to realise their full potential and intent.
- Appoint an independent GBI recognised CxS at the onset of the design process to verify that comprehensive pre-commissioning and commissioning is performed for all the building's energy related systems in accordance with ASHRAE Commissioning Guideline or other GBI approved equivalent standard/s by:

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**EE6 - ENHANCED COMMISSIONING**

1. Conducting at least one commissioning design review during the detail design stage and back-check the review comments during the tender documentation stage.
2. Developing and incorporating commissioning requirements into the tender documents.
3. Developing and implementing a commissioning plan.
4. Verifying the installation and performance of the systems to be commissioned.
5. Reviewing contractor submittals applicable to systems being commissioned for compliance.
6. Developing a systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems.
7. Verifying that the requirements for training operating personnel and building occupants are completed.

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**EE7 – POST COMMISSIONING**

Carry out post occupancy commissioning for all tenancy areas after fit-out changes are completed:

1. Design engineer shall review all tenancy fit-out plans to ensure original design intent is not compromised and upon completion of the fit-out works, verify and fine-tune the installations to suit.
2. Within 12 months of practical completion (or earlier if there is at least 50% occupancy), the CxS shall carry out a full post/re-commissioning of the building's energy related systems to verify that their performance is sustained in conjunction with the completed tenancy fit-outs.

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**EE8 – EE VERIFICATION**

Verify predicted energy use of key building services:

1. Use Energy Management System to monitor and analyse energy consumption including reading of sub-meters, AND
2. Fully commission EMS including Maximum Demand Limiting program within 12 months of practical completion (or earlier if there is at least 50% occupancy).

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**EE9 – SUSTAINABLE MAINTENANCE**

Ensure the building's energy related systems will continue to perform as intended beyond the 12 months Defects & Liability Period:

1. At least 50% of permanent building maintenance team to be on-board one (1) to three (3) months before practical completion and to fully participate (to be specified in contract conditions) in the Testing & Commissioning of all building energy services.
2. Provide for a designated building maintenance office that is fully equipped with facilities (including tools and instrumentation) and inventory storage.
3. Provide evidence of documented plan for at least 3-year facility maintenance and preventive maintenance budget (inclusive of staffing and outsourced contracts).

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**How much is CxS cost to a project?**

- In the 1970's & 80's, Main Contractor's M&E Attendance Cost = **3%** of total construction cost. MC's team comprised M&E Manager + M&E Staff to coordinate Builder Works with M&E Trade Contractors.
- In the 1990's, this Attendance Cost dwindled down to **1%** and subsequently to **0%**.
- Also in the 1970's to 90's, Owner paid for full complement of Resident Site Supervisory Staff: RA, RE(C&S), RE(M&E) and their respective COWs. Cost can amount to **6%** of total Construction Cost.
- Today, the RE(M&E) is a dying or even dead breed together with experienced COWs.

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**How much is CxS cost to a project?**

- Also during the said era, M&E trade contractors provided comprehensive staffing team ranging from site engineers, supervisors, in-house TAB and T&C team, to in-house maintenance team.
- Today, '**ALL**' M&E trade contractors have become merely Management Contractors with minimum site supervisors and out-source (inevitably to the cheapest) TAB, T&C and maintenance responsibilities.
- Today consultants are paid 'cut-throat' professional fees and many have degenerated into cut-n-paste designers.

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**How much is CxS cost to a project?**

**THE END RESULT TODAY .... AND REALITY HURTS**

- The industry have helped the owners to save and save .... and short changed owners in the process.
- Perhaps, a parallel comparison to the value of CxS would be to equate with the services provided by a Project Manager and his Team?

**AND STOP POSTPONING THE PROBLEM BY EXTENDING THE DLP TO 18, 24 ... HECK EVEN 60 MONTHS!!!!!!**

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