



GBI
PROFESSIONAL
SERIES 2016



Commissioning: Global & Local Development, GBI CxS Submission Compliance & BAS Impact

13th to 15th Apr 2016
Ir TL Chen DL&F.ASHRAE, PEng, CEng



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Paper 4: Evolution of Local CxS Industry

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ONE DAY COURSE BUILDING COMMISSIONING & AUDIT

28th July 2010, Petaling Jaya



ONE DAY SEMINAR ON COMMISSIONING

4th October 2010, Petaling Jaya



CxS: Demarcation of Scope & Is it VALUE FOR MONEY ?

13th to 14th March 2013, Petaling Jaya



Commissioning Process for Green Buildings

13th to 15th Feb 2014, Petaling Jaya





**Seminar & Workshop on
Commissioning for Building Systems:
Energy Efficiency & Performance**
5th to 7th Mar 2015, Petaling Jaya



**Commissioning: Global & Local Development,
GBI CxS Submission
Compliance & BAS Impact**
13th to 15th Mar 2016, Petaling Jaya



What is the definition of Cx?

- In a new building, commissioning services is a systematic quality assurance process to verify that building systems are fully operational and perform interactively according to the design intent and owners requirements
- Building commissioning is the process of verifying, in new construction, all of the subsystems for mechanical, plumbing, electrical, fire/life safety, building envelopes, interior systems, cogeneration, utility plants, sustainable systems, lighting, wastewater, controls, and building security to achieve the owner's project requirement

The History of Cx

- The US Navy was the first to implement the need for Cx to ensure that ships were seaworthy prior to leaving ports
- 1977: Public Works Canada was the first to use Building Cx in their project delivery system
- 1981: Disney World includes Cx in design, construction and start-up of the Epcot Centre
- 1988: ASHRAE publishes HVAC Cx Guidelines
- 1991: US Utilities require Cx on EE installations
- 1998: LEED criteria includes Cx
- 2009: GBI criteria includes Cx
- 2010: Cx helps Diamond Building achieve GBI Platinum

The Present & Future Scenario

Today the role of the building CxS/CxA/ICA has become a central component to the whole building design process as the built environment continues to include more complicated and interdependent systems and owners focus on energy efficiency to keep operational costs down.

What really is Commissioning?

- Commissioning is a standardized process lead by a professional, commonly referred to as a Commissioning Authority (CxA in LEED) or Commissioning Agent (CxA in BREEAM & ICA in Green Star) or Commissioning Specialist (CxS in GBI) who is knowledgeable in the **design**, **construction**, and **operation** of systems
- The CxA, ICA or CxS typically leads **a team** of system experts trained and certified in the facility commissioning field
- There are numerous certification organizations in the industry

Acceptance or otherwise of Cx services

Some of the emerging issues in Cx services include:

- **Slow Market Acceptance Within and Outside of GBI**
- The GBI rating system has had both positive and negative effects on the commissioning industry

Positive from the recognition and business development stand point, but negative because it has caused Cx to be viewed as a commodity rather than a custom solution to fit an owner's needs

- Owners not striving for GBI and unfamiliar with Cx also need to be educated as to its benefits instead of dismissing it when faced with a tight budget.

In the end, owners will realize that they can pay for Cx now, or they can pay (very much more) for energy and other inefficiencies later

Acceptance or otherwise of Cx services

- Lack of Training Beyond the Cx Process
- Upon entering this discipline one discovers that there are a number of resources to learn about the process of Cx.
Beyond this basic knowledge lies a gap in practical training. Experience and in-house expertise become the standard teachers at this stage which then begs the question, "Can you teach experience?"
- CxS that fail to gain this practical experience are in danger of becoming paper pushers and will bring little value to a project. A large opportunity exists for the organization that can bring this type of hands-on knowledge to this discipline.
- Litigation - not an issue yet in Malaysia

Relevant Codes and Standards on Cx

- ASHRAE Guideline 0-2005(2013): The Commissioning Process—The industry accepted model Cx Guideline
- ASHRAE Guideline 189.1-2014: Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings
- ASHRAE Standard 202-2013, The Commissioning Process for Buildings and Systems
- ASTM Standard E2813-2012, Standard Practice for Building Enclosure Commissioning
- The Building Commissioning Guide by U.S. General Service Administration, 2005
- CALGreen
- 2015 International Green Construction Code® (IgCC®)

Rating Tools **with** Cx credits

- BREEAM (1990)
- LEED (1998)
- Green Star (2003)
- Green Globe (2004?)
- GBI (2009)

Rating Tools **without** Cx credits

- Green Mark
- CASBEE
- All regional rating tools
- All local rating tools except for GBI

CxA vs ICA vs CxS

CxA	ICA	CxS
LEED's Commissioning Authority	Green Star's Independent Commissioning Agent	GBI's Commissioning Specialist
Verify project's energy related systems are installed, calibrated and perform according to Owner's Project Requirements (OPR), Basis of Design (BoD) and construction documents		
<p>CxA can be from the design or construction team if project GFA<4,645m². For GFA>4,645m², CxA must be independent of project, design and construction teams, but can be employee of the firms providing those services</p>	<p>ICA to be suitably qualified and independent of the design team – must not be an employee of organisations involved in the design or construction of the commissionable systems</p>	<p>CxS to be suitably qualified and independent of the design team – must not be an employee of the organisations involved in the design or construction of the commissionable systems. CxS and GBIF can be from same organisation but must be different individuals.</p>

CxA	ICA	CxS
<p>LEED awards additional points if the CxA is appointed prior to the construction documentation phase and if the CxA is independent of the design and construction team</p>	<p>GreenStar does not impose having an ICA on the project; it merely awards projects 1 point for appointing an ICA</p>	<p>GBI does not impose having a CxS on the project; it merely awards projects related credits under CxS' scope where carried out</p>
<p>LEED requires CxA to be appointed otherwise you won't get a rating!</p>	<p>Green Star requires ICA to be appointed at the beginning of schematic design phase</p>	<p>GBI requires CxS be appointed at the beginning of schematic design phase</p>
<p>CxA needs to be involved at the beginning of each stage of the design process, and they need to provide greater information for the Commissioning Plans (provided to the consultants for inclusion in Tender Specifications)</p>	<p>In Green Star projects the client undertakes the review of the design process themselves</p>	<p>CxS needs to be involved in reviewing all stages of the design process</p>

CxA	ICA	CxS
<p>During construction a CxA/ICA/CxS undertakes installation inspections, creates test procedure for system performance testing and attends system performance tests as needed,</p>		
<p>CxA needs to provide a system manual for handing over to owner (in addition to O&M manuals by the contractors)</p>	<p>ICA need not provide system manual</p>	<p>GBI needs to develop a systems manual that provides future operating staff the information needed to understand and optimally operate the commissioned systems</p>
<p>CxA must review the building operation within 10 months of substantial completion, and provide a detailed report at the end of the project</p>	<p>ICA need not do this</p>	<p>CxS must review and verify the building operation within 12 months of CCC or earlier if the building is at least 50% occupied</p>
<p>CxA not required to verify training of operating personnel</p>	<p>ICA not required to verify training of operating personnel</p>	<p>CxS must verify that the requirements for training operating personnel and building occupants are completed</p>

Progress through GBI

At its onset in 2009, GBI rating system became the 1st rating tool in the region (and is still the only tool) to incorporate the following criteria;

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

Local Building Services Industry

2009

1st Class Design

2nd Class Installation

3rd Class Commissioning

NO Class Maintenance

The best designed and best installed building services last only until the end of the Defects Liability Period_{period}

Towards our Green future

1st Class Design

Got Class Installation

Best in Class Commissioning

Sustainable Maintenance

The best designed and best installed building services will last beyond the end of the Defects Liability Period no period

Cx: Who's Responsibility?

Typical Owner's response

- Shouldn't it be the M&E Consultant's scope?
- Shouldn't it be the respective trade contractor's scope?
- Should already be covered under both M&E Consultant and Trade Contractors

BOTTOM LINE: Why should the Owner pay extra for this scope!

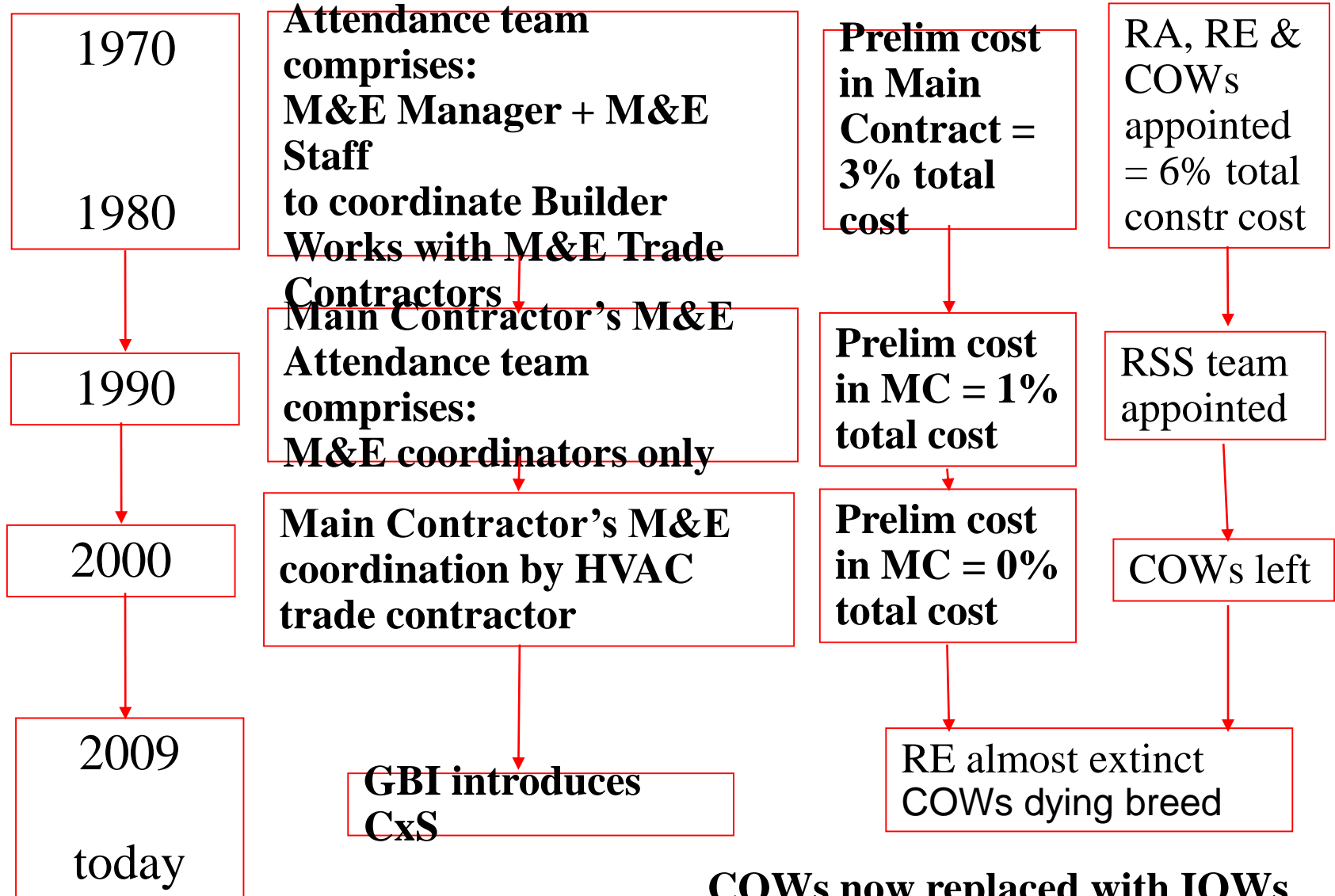
Cx: Who's Responsibility?

Why and how did this situation evolve over the years?

- Deterioration of MC's M&E coordination scope
- Deterioration of trade contractor's supervision, T&C staff and maintenance outfit
- Deterioration Consultant's site staff
- The evolution of TAB consultants

How much is CxS cost to a project?

Main Contractor's M&E



COWs now replaced with IOWs

What is our progress since 2009?

As of 15/3/16

GBI registered CxS = 23

Active CxS = 12

Total GBI registered projects = 673

Total GBI certified projects = 350

(RNC = 144, Townships = 7, Others = 199)

(Note that CxS is not applicable to RNC and Township projects)

(Others comprise NRNC, NREB, INC, IEB projects)

Total GBI projects with CxS = 121 (60% of 199)



MALAYSIA CHAPTER

THANK YOU

