

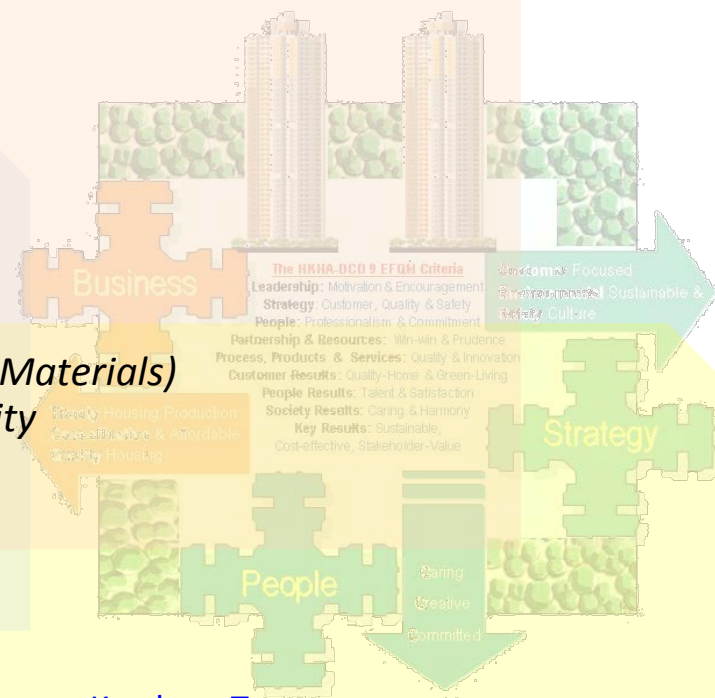
Organisers 主辦機構



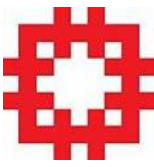
## Seminar on Latest Development of Certification 認證的最新發展研討會

# Certification Requirements for Works Contracts - Hong Kong Housing Authority's Experience

*Ir Dr Mckey HO*  
*Senior Professional (Components & Materials)*  
*Hong Kong Housing Authority*  
7 January 2019



Conference Hall, 4/F, HKPC Building, 78 Tat Chee Avenue, Kowloon Tong

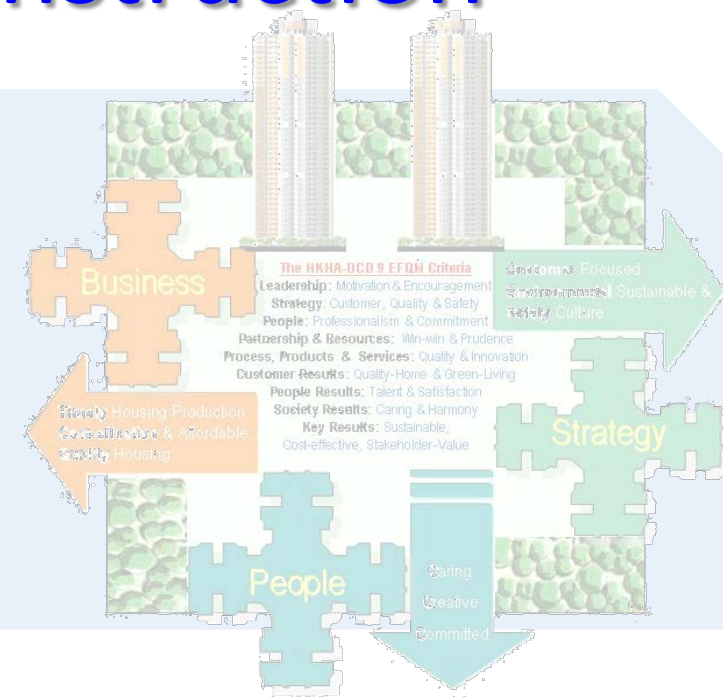


# Contents

1. Mechanized Construction in Works Contracts
2. Preventive Management & Continual Improvement
3. Certification Requirements for Works Contractors
4. Certification Requirements for Material Suppliers
5. Certification Requirements for Precast Concrete Factories



# 1. Mechanized Construction



# Mechanized Construction 機械化建設



- Mechanized construction comprise primarily the use of **Tower Crane** to move **Metal Formwork, Concrete Skips, Precast Components and Fabric Mesh**.
- 機械化建設主要是使用**塔式起重機**移動**金屬模板**，**混凝土吊鬥**，**預製件**和**編網鋼筋**去建造樓宇。
- The transportation is between ground and working floor and between different wings of working floors. The HA has adopted this approach **early in the 80's**.
- 建材及建築用具的運輸是在地面和工地樓板及在不同的翼之間。香港房委會在**八十年代**初開始採用這種建造方法。







# Mechanized Construction 機械化建設

- Metal Formwork for walls is used which replace timber formwork.
- 使用金屬模板代替傳統木制模板來建造結構牆。
- It was a pioneer environmental initiative to reduce the use of timber.
- 環保倡議，減少使用木材





# Prefabrication 預製

- Prefabrication of concrete components is essentially the construction method which transfers some of the **difficult insitu reinforced concrete** construction from working floor **at height** to factory **on ground level**.
- 混凝土樓宇的預製建造方法基本上是將一些困難的工序從高空工地帶到在地面的工廠。

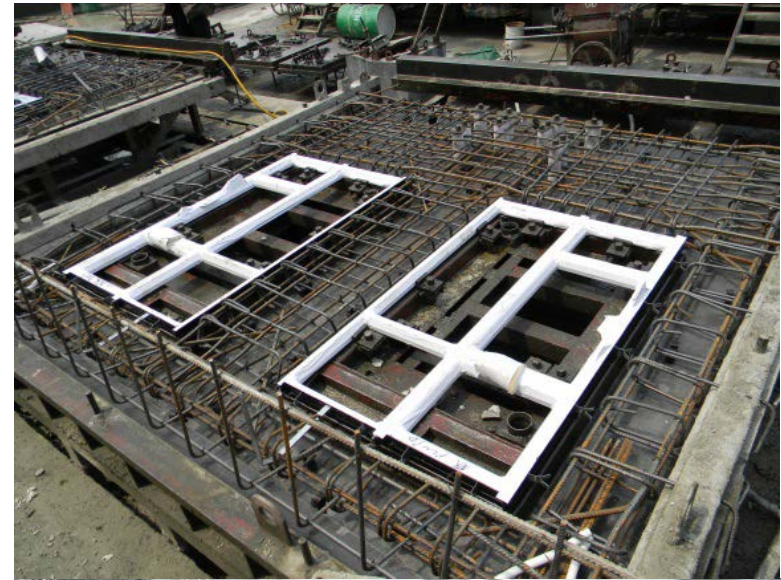






# Prefabrication 預製

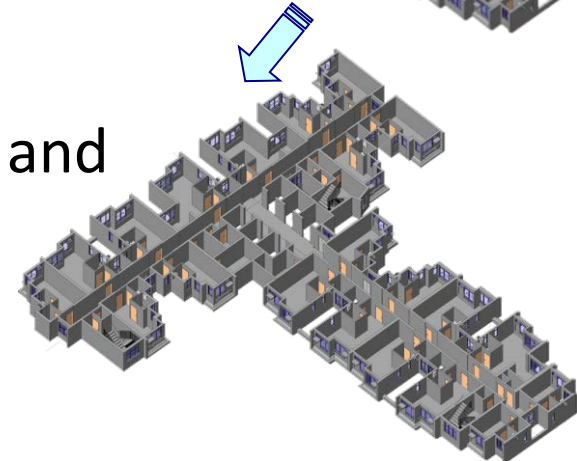
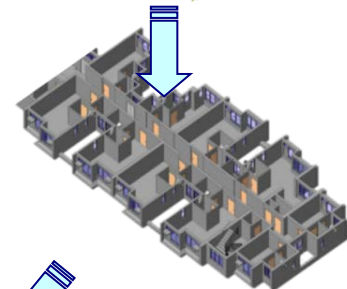
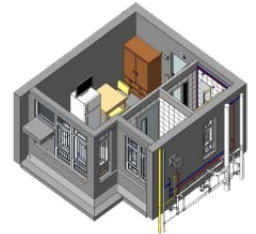
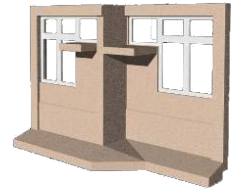
- Currently, about **20-35%** of total concrete volume was precast components depending on the adoption of VPB.
- 目前約**20-35%**的混凝土是預製構件，取決於有否採用預製浴室。
- Typically, **6-day** working cycle per floor is a norm
- **典型層**的建造週期一般是**6天**。





# Advantages of Prefabrication 預製的優點

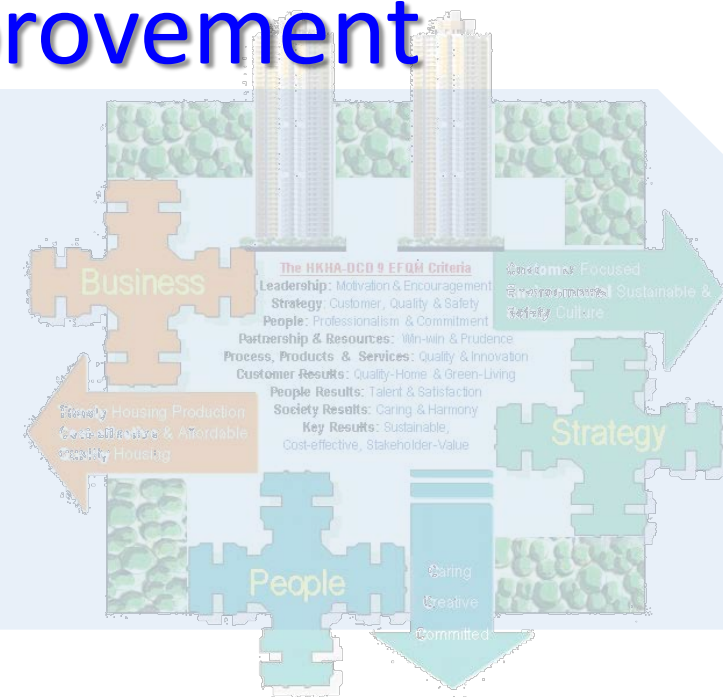
- **Improve Quality:** Fair face off-form finishes with paint to exterior and tiles/paint to interior.
- **提高質量：** 無瑕面的混凝土結構表面，外牆面用油漆及內牆用瓷磚或油漆。
- **Environmental Friendly:** Reduce use of Timber Formwork
- **環保：** 減少使用木制模板。
- **Safety:** Reduce Wet Trades & Labour forces and Working at Height
- **安全：** 減少勞動密集的工序和高空工作







## 2. Preventive Management & Continual Improvement






# Certified System Standards in HA

- **ISO 9001:2015 - Quality Management System**  
*(1st certified to ISO 9001:1987 in 1993 )*
- **ISO 14001:2004 - Environmental Management System**  
*(certified since 2009)*
- **HKQAA CSR Index** with respect to ISO 26000 criteria  
*(performance verification since 2010)*
- **ISO 50001:2011 - Energy Management System**  
*(certified since 2012)*
- **OHSAS 18001:2007 - Health & Safety Management**  
*(HD Materials Testing Laboratory certified since 2013)*

# Preventive Management and Continual Improvement



Under the  **EFQM Excellence Model** and **ISO 9001 certification**, HA seeks to identify every opportunity to improve the efficiency and effectiveness of the **Quality Management System (QMS)** continually. At system level, DCD applies the following 14 means/sources to track the service and product quality:

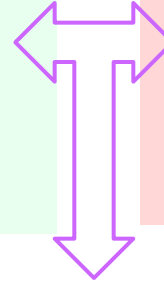
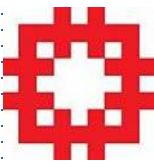
1. Management reviews;
2. Progress review;
3. Process review;
4. Financial performance review;
5. Internal audits;
6. Technical audits;
7. Customer feedback *(including directly from owners and tenants, and indirectly from District Council, Ombudsman, ICAC, interest groups, media, etc.)*;
8. Contractor feedback;
8. Technical feedback *(from staff and Professional Service Providers)*;
9. Perception measures *(e.g. staff barometer survey)* ;
10. Performance measures *(e.g. time, cost, quality, environment, energy, safety, customer satisfaction, etc.)*;
11. Benchmarking;
12. Research and development;
13. Systems review *(by ICAC, Internal Audit, Technical Audit, Management Services Office)*.

# Building Materials Quality Control System





# Materials Risk Management



IN

2,000 +

OUT



RISK



# To ensure Quality through Supply Chain Management

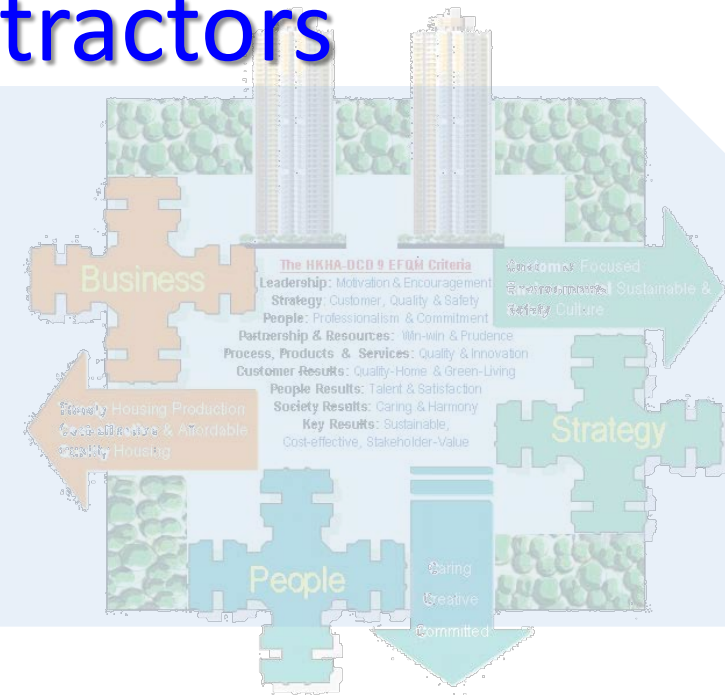


We have been applying measures in works contracts:

1. **Full-time Works Inspection**
2. **Material Surveillance Testing**
3. **Contractors' Performance Assessment Scoring System (PASS Assessment)**
4. **Third Party Systems Certification**
5. **Product Certification** to selected building products
6. **Radio Frequency Identification (RFID) for traceability** of selected building products



### 3. Certification Requirements for Works Contractors



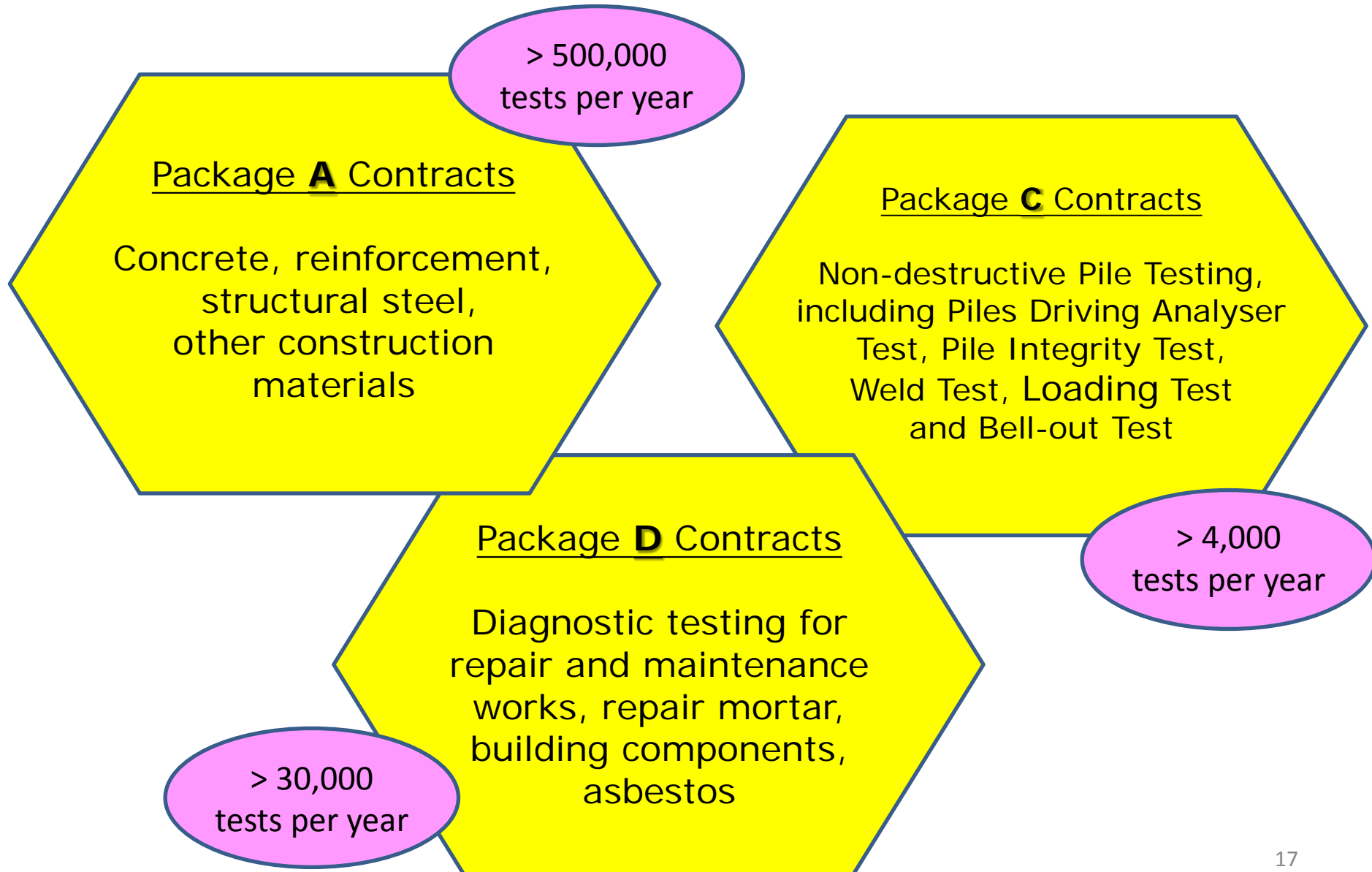
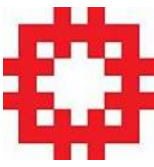


# Minimum Scope of Certification for **contractors** of different works categories

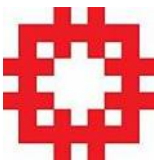
	ISO 9001	ISO 14001	ISO 50001	OHSAS 18001 / ISO 45001
Building Contractor	✓	✓	✓	✓
Piling Contractor	✓	✓	✓	✓
Demolition Contractor	✓	✓		✓
Electrical Contractor	✓	✓		✓
Fire Services and Water Pump Contractor	✓	✓		✓
Ground Investigation Contractor	✓	✓		✓
Lift and Escalator Contractor	✓	✓		✓
Direct Testing Contractor (Laboratory)	(HOKLAS)	✓		✓



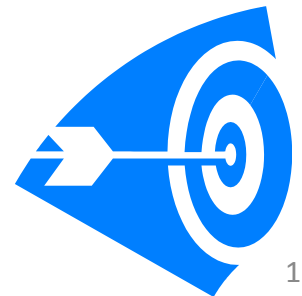
# Types of Direct Testing Contractors (DTCs)

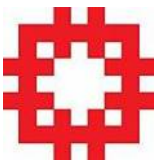


# Surveillance Tests by Housing Department Material Testing Laboratory



- HA runs a Material Testing Laboratory (**HDMTL**) which is accredited under **HOKLAS** and certified to **ISO 14001 & OHSAS 18001**.
- HDMTL conducts **Parallel and/or Policing Tests** to monitor the performance of DTCs
  - ① *Concrete cubes*
  - ② *Aggregates*
  - ③ *Steel reinforcement bars and fabric*
  - ④ *Piles, including Sonic Logging Test and Pile Driving Analyzer Test*

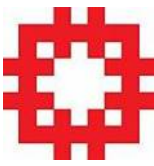




# Certification for Testing Laboratories

- **Direct Testing Contractors (Testing Laboratories)**
  - Testing on main construction materials to be accredited under **HOKLAS** as required in HA Specification.
  - All Direct Testing Contractors are also required to be certified to **ISO 14001** and **OHSAS 18001/ISO 45001**.

# Specification Requirement for Testing Laboratory engaged by the Contractor



The laboratory for carrying out the tests and issuing test certificates shall be approved by the Housing Department,

Or

Accredited either by Hong Kong Accreditation Scheme (HKAS) under the **Hong Kong Laboratory Accreditation Scheme (HOKLAS)**,

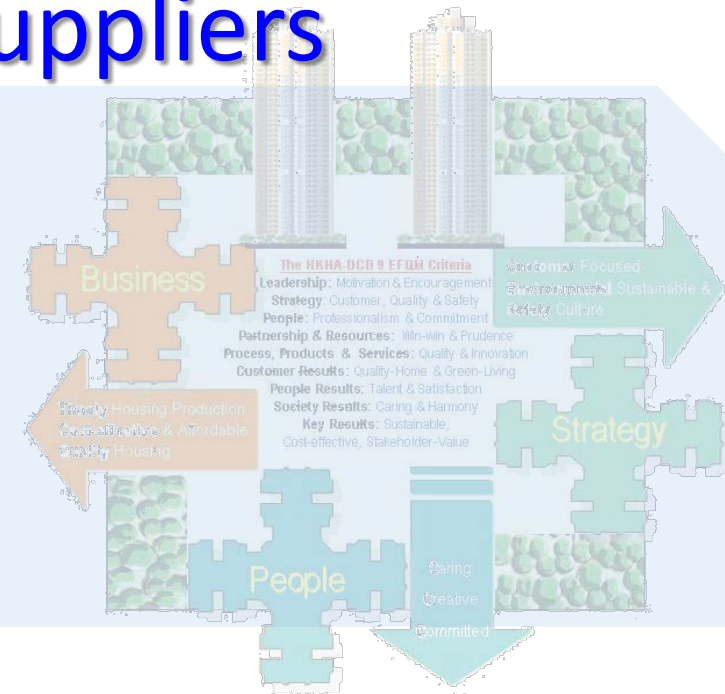
*or*

an equivalent organization which has signed a **Mutual Recognition Agreement (MLA)** with HOKLAS.

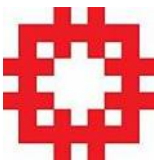




## 4. Certification Requirements for Material Suppliers



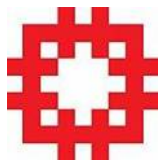
# Sustainable Products



- Suppliers/Manufacturers are to be certified to **ISO 9001, ISO 14001**
- Valid **test certificate** *(a HOKLAS endorsed test report to which the report is issued within 3 or 5 years from the commencement date of the building contract)*
- **Surveillance tests** upon material delivery
- HA spearheads implementation of **product certification** in stages in 2010/2011 for 12 major building materials



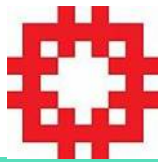
# Certification Requirements for Material Suppliers



## ISO 9001

Aluminum Windows	Timber Doorsets	Lever Handle Door Furniture & Locks	Overhead Door Closers	Precast Concrete Components	Panel Wall Partitions	Multi-Layer Acrylic Paints
Emulsion Paint	Synthetic Paint	Tile Adhesives	Tile Grouts	Mixer (Shower /Basin /Kitchen Sink)	Shower Handsets	uPVC Drainage Pipes & Fittings
Ready -To-Use Mortars	Galvanized Mild Steel Gatesets	Float Operated Valves & Flushing Device	Close -coupled WC Suites	Flexible Hoses	Cement Sand Mortar w/ Latex	Epoxy Coated Cast Iron Pipe
Ready Mixed / Site Batch Concrete	Cooking Bench	Non-slip Homogeneous Floor Tile	Glazed Ceramic Wall Tile	Kitchen Sink Unit	Cement Product (for Arch. Use)	Repair Mortars
Fabric / Mesh Reinforcement	Primers for Galvanized Surfaces	Proprietary False Ceiling Sub-Contractor	Mortice Dead Locks	Porcelain Enamelled Cast Iron Baths	... ( > 40 )	etc.

# Certification Requirements for Materials Suppliers



## ISO 14001

Aluminum  
Windows

Timber  
Doorsets

Lever Handle  
Door Furniture  
& Locks

Overhead  
Door  
Closers

Precast  
Concrete  
Components

Panel  
Wall  
Partitions

Multi-Layer  
Acrylic  
Paints

Emulsion  
Paint



Synthetic  
Paint

Tile  
Adhesives



Tile  
Grouts

Mixer  
(Shower /Basin  
/Kitchen Sink)

Shower  
Handsets

Ready  
Mixed /  
Site Batch  
Concrete

Cooking  
Bench

Non-slip  
Homogeneous  
Floor Tile

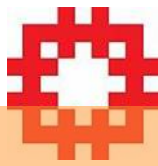
Glazed  
Ceramic  
Wall Tile

Kitchen  
Sink Unit

Galvanized  
Mild Steel  
Gatesets

...  
*More To Come*

# Certification Requirements for Materials Suppliers



## Product Certification

Ready Mixed  
/ Site Batch Concrete  
(QSPSC)

Panel Wall  
Partitions  
(PCCS-PFPP)

Timber  
Doorsets  
(PCCS-PFPP)

Cement  
Products  
(PCCS-CP)

Tile  
Adhesives  
(PCCS-TA)



Repair Mortars  
(PCCS-RM)

Ceramic  
Tiles  
(PCCS-CT)



Aluminum  
Windows  
(PCCS-AW)

Close-coupled  
WC Suites  
(PCCS-WC)



uPVC Drainage  
Pipes & Fittings  
(PCCS-UP)

Fabric / Mesh  
Reinforcement  
(PCCS-MR)



Paint  
Products  
(PCCS-PP)



Plumbing  
Products  
(Kitemark)





# Current progress of Product Conformity Certification Scheme (PCCS) development



Building Products	Product Conformity Certification Scheme (PCCS)
Timber Doorsets (Fire Resistance) #	PCCS-PFPP (3rd Issue 2017) published to accord with new Fire Code
Panel Walls (Fire Resistance) #	
Cement Products *	PCCS-CP (1st Issue 2010)
Tile Adhesives *	PCCS-TA (2 <sup>nd</sup> Issue 2017)
Ceramic Tiles *	PCCS-CT (1st Issue 2010)
Repair Mortars *	PCCS-RM (2 <sup>nd</sup> Issue 2017)
Aluminium Windows and 4-Bar Hinges Assembly #	PCCS-AW (1st Issue 2010) <i>(review in progress)</i>
uPVC drainage pipes & fittings +	PCCS-UP (1st Issue 2013) <i>(review in progress)</i>
Close-coupled water closet suites +	PCCS-WC (1st Issue 2013) <i>(review in progress)</i>
Mesh reinforcement *	PCCS-MR (1st Issue 2013)
Paint Product ^	PCCS-PP (1st Issue 2015)

We would like to express our sincere gratitude to the following professional institutes for preparing the above schemes:-

# Hong Kong Institute of Steel Construction (HKISC)

\* Hong Kong Concrete Institute (HKCI)

+ Hong Kong Institution of Plumbing and Drainage (HKIPD)

^ Hong Kong Association for Testing, Inspection and Certification (HKTIC)





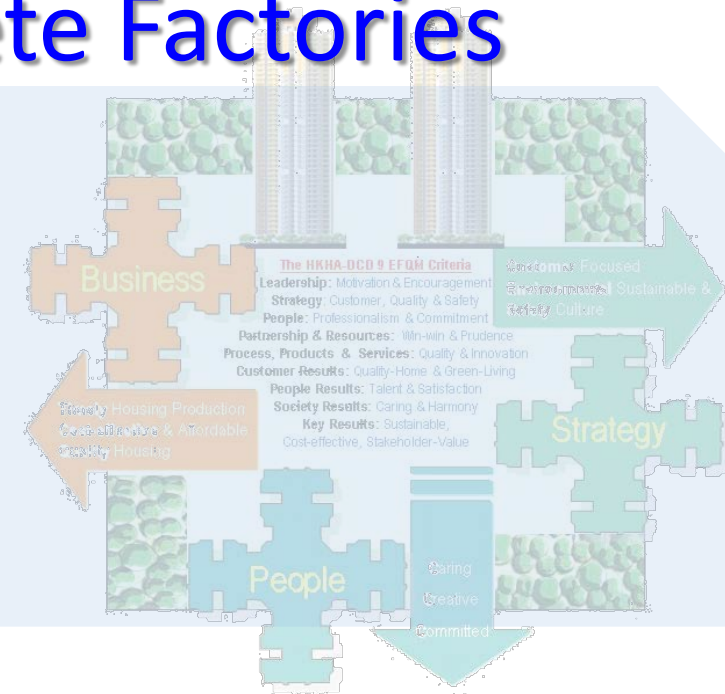
# Current Status of Certified Manufacturers / Suppliers

Building Products	Certified (as at Dec 2018)	Year of Implementation
Timber Doorsets	3	2010
Panel Walls	4	
Cement Products	5	
Tile Adhesives	5	
Ceramic Tiles	7	
Repair Mortars	6	
Aluminium Windows	6	2011
uPVC Drainage Pipes & Fittings	1 (1 in progress)	2013
W.C. Suites	2 (1 in progress)	
Mesh Reinforcement	5	
Multi-Layer Arcylic Paint	2 (1 in progress)	2017

- Since mid-2012, we have posted and updated regularly the details of Certified Manufacturers or Suppliers on HA website for access by public - (<http://www.housingauthority.gov.hk>)
- HKAS has also posted the Accredited Certification Bodies and their Scope of Accreditation on in its website - (<http://www.hkas.gov.hk>)



## 5. Certification Requirements for Precast Concrete Factories





# Quality Assurance (QA) for Precast Concrete Components (PCC)

**Buildings Department: PNAP APP-143**

Quality Control and Supervision of Precast Concrete Construction

- Precast factory : **ISO 9001** certified
- Quality Assurance Scheme (QAS)
- Qualified Supervision

Registered Structural Engineer

**RSE Stream**

**RSE**

**Str QC  
Supervisor**

**AUDIT  
at least  
Once a Month**

**SUPERVISION  
at least  
Once a Week**

Registered Contractor

**RC Stream**

**AS**

**QCC**

**AUDIT  
at least  
Once a Month**

**SUPERVISION  
Full Time**



# Quality Assurance (QA) for Precast Concrete Components (PCC)

## HA's Approach

### ➤ Qualified Supervision

- Professional Service Providers (PSP) are commissioned to represent the **RSE stream** for supervision of PCC production in the Mainland factories

## RSE Stream (PSP)

**RSE**

**AUDIT**  
at least  
**Once a Month**  
(required to  
cover all PCC in  
every 2-mth)

**Str QC**  
**Supervisors**

**SUPERVISION**  
**Full Time**

**Project**  
**Mgr**

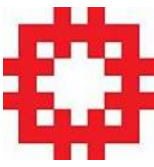
**REVIEW VISIT**  
at lesat  
**Twice a Month**  
(Resource  
& Quality)

**Registered**  
**Electrical**  
**Worker**

**AUDIT**  
(B.S. Works)  
**Monthly**



# Additional Certification Requirements for Precast Concrete Factories

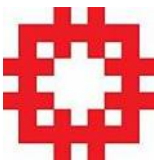


## ISO 14001



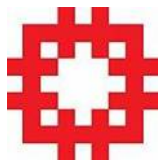
# Additional Certification Requirements for Precast Concrete Factories

## ISO 45001 / OHSAS 18001





# Additional Certification Requirements for Precast Concrete Factories



## Quality Scheme for Production and Supply of Concrete (QSPSC)

- Jointly developed by the HKHA and the Hong Kong Quality Assurance Agency (HKQAA) in 1991 for ready-mix concrete produced off-site.
- Subsequently specified in HKHA's contracts on top of in-situ quality control and testing regime.
- QSPSC was later widely accepted by the construction industry and became a policy requirement by Development Bureau for all public works, and a regulatory requirement by Buildings Department for private sector's construction projects.

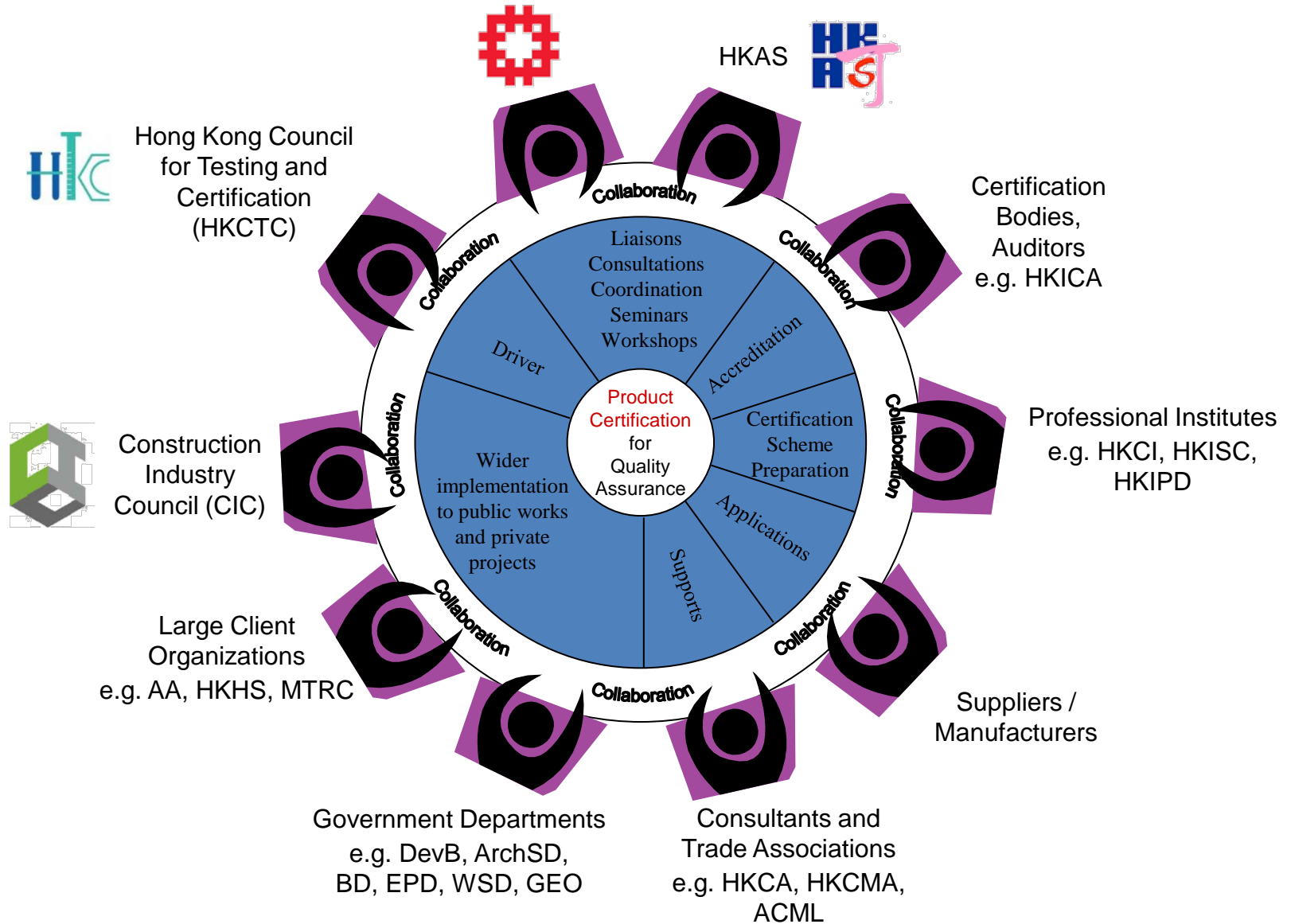
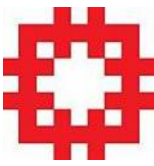


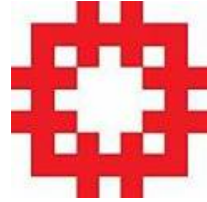
Computer screen showing a concrete mix design interface. The screen displays a table with columns for sequence number, code, name, target quantity, and capacity. The table lists various concrete components and their quantities.

序号	代码	名称	目标量	容量 (m³)	时间 (h)
1	819	水泥	104.00	02	00
2	001	水泥 (1)	450.00	02	00
3	002	水泥 (2)	0.00	02	00
4	003	水泥 (3)	0.00	02	00
5	004	SP4.30	5.50	05	00
6	701	CALL-B15C	501	00	00
7	801	20mm 碎石	0.25	02	00
8	802	30mm 碎石	1.75	02	00
9	803	40mm 碎石	0.00	02	00
10	804	10mm 碎石	305.00	02	00
11	805	砂	0.00	05	00



# Continuous Collaboration with Stakeholders at all Fronts





Thank you

