Seminar on T & C for Construction Materials –
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Sharing Experience on Product Certification in Hong Kong Housing Authority Development Projects

Prof Joseph Y W MAK
Head of Department of Civil Engineering,
Chu Hai College of Higher Education
Former Chief Structural Engineer,
Hong Kong Housing Authority

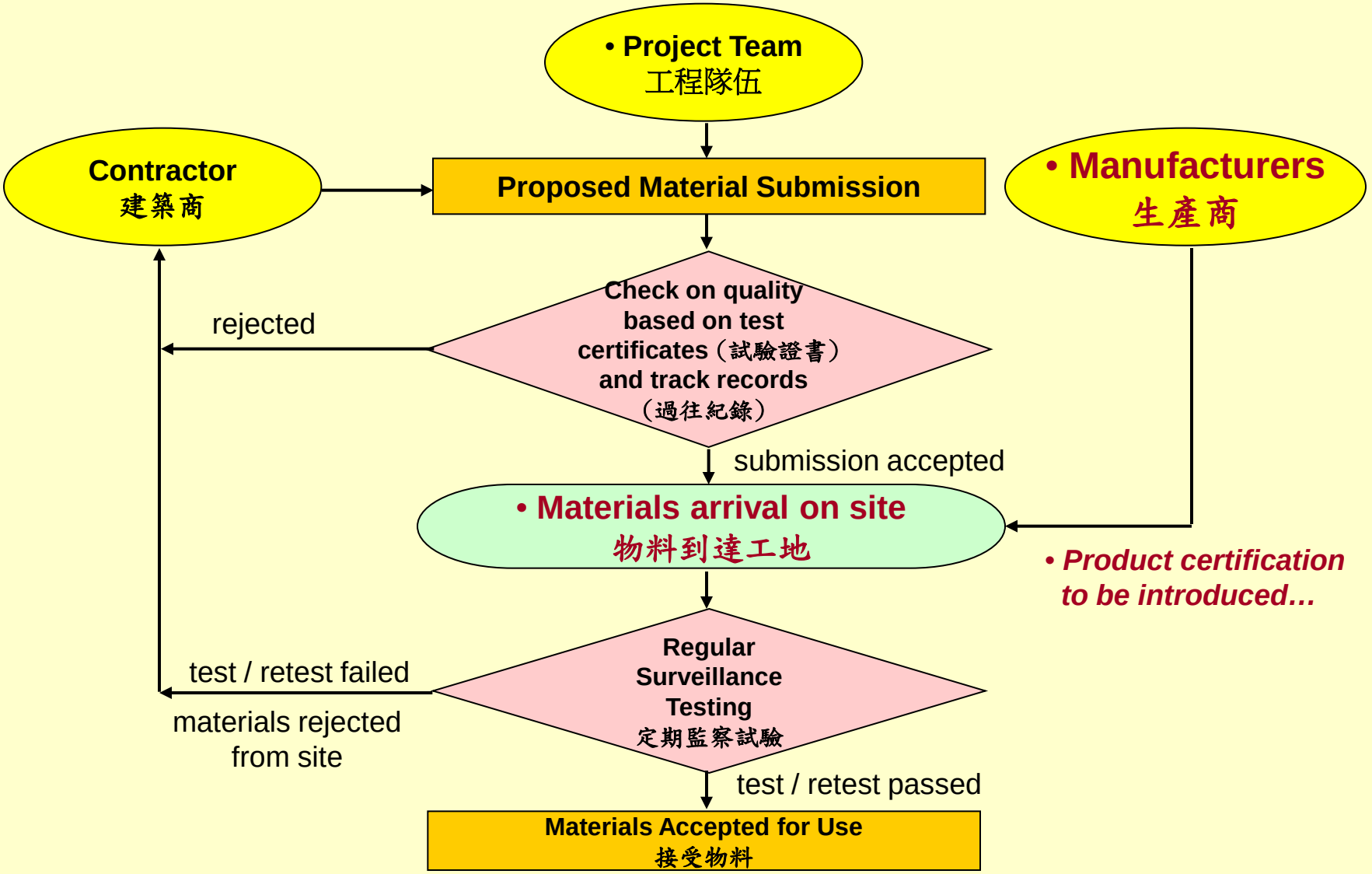
Quality Housing : Partnering for Change

Assuring built quality
保証建築質量

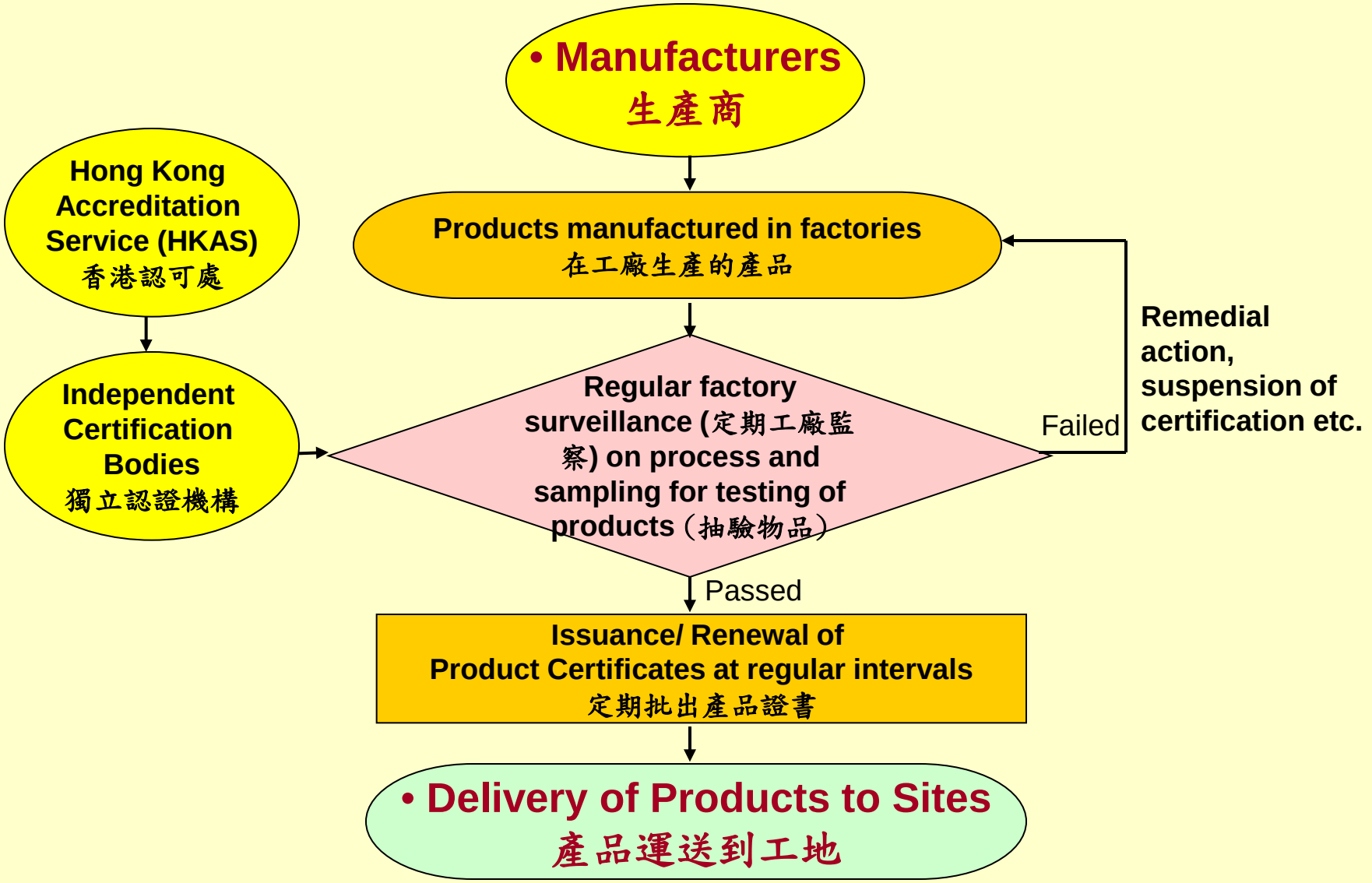
Assuring quality of workmanship and materials on site
保証工地施工及物料質量

Assuring quality of workmanship and materials off-site
保証工地以外施工及物料質量

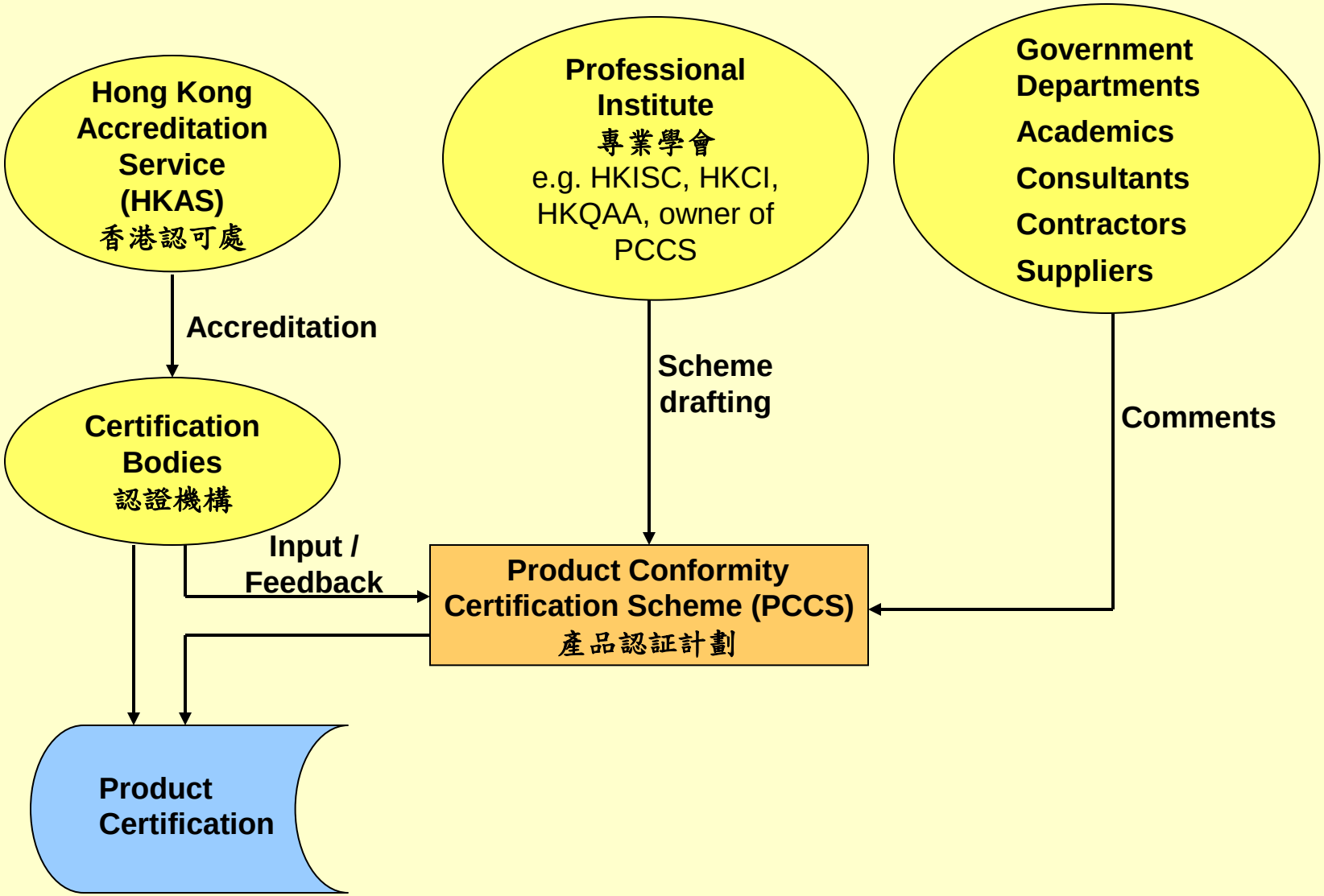
HA's Surveillance Check of Building Materials on Site



Production Certification – An Upstream Quality Control



PCCS Preparation and Readiness of CBs Essential

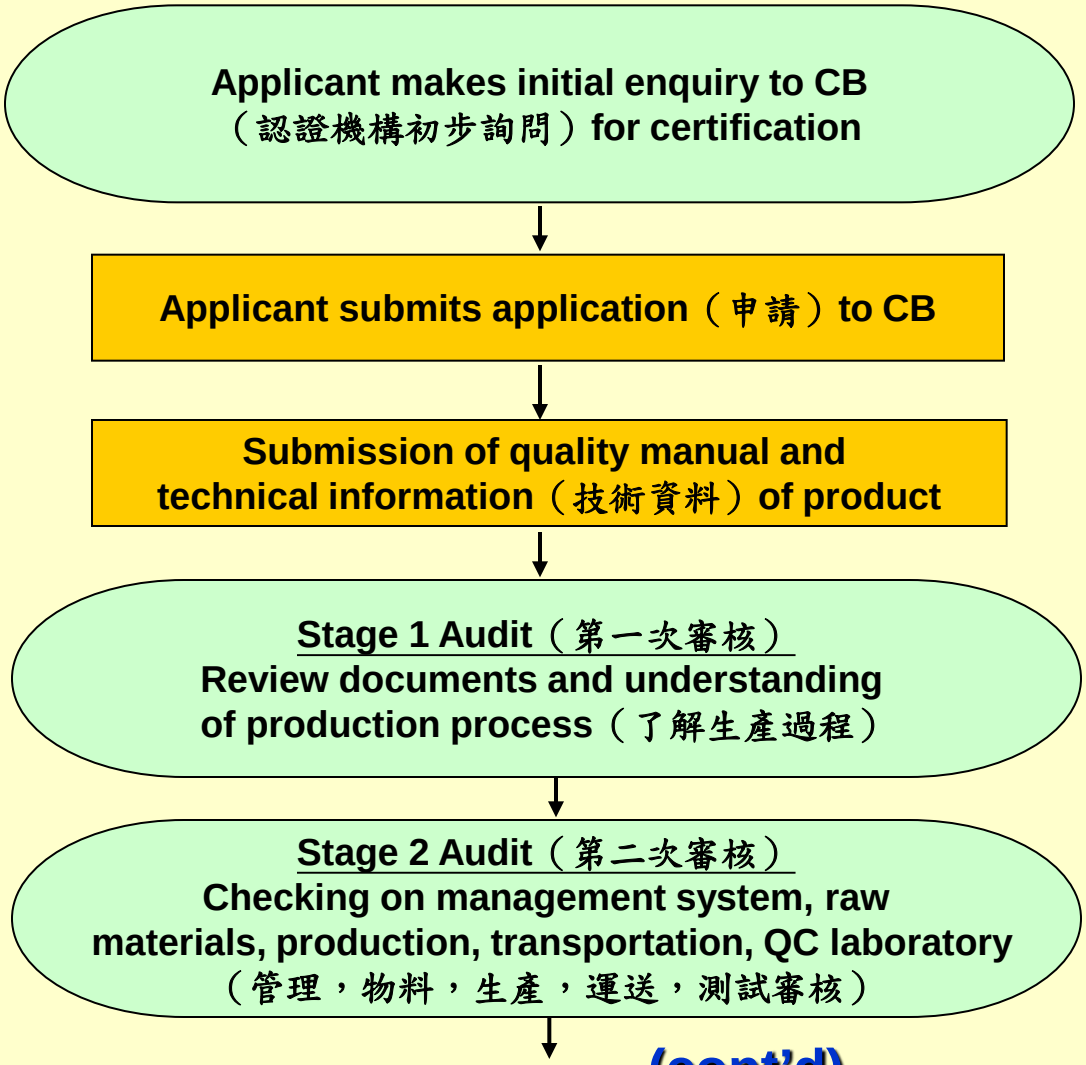


Product Conformity Certification Scheme

For Ceramic Tile 磁磚

For Repair Mortars 修葺砂漿

Workflow of Product Certification



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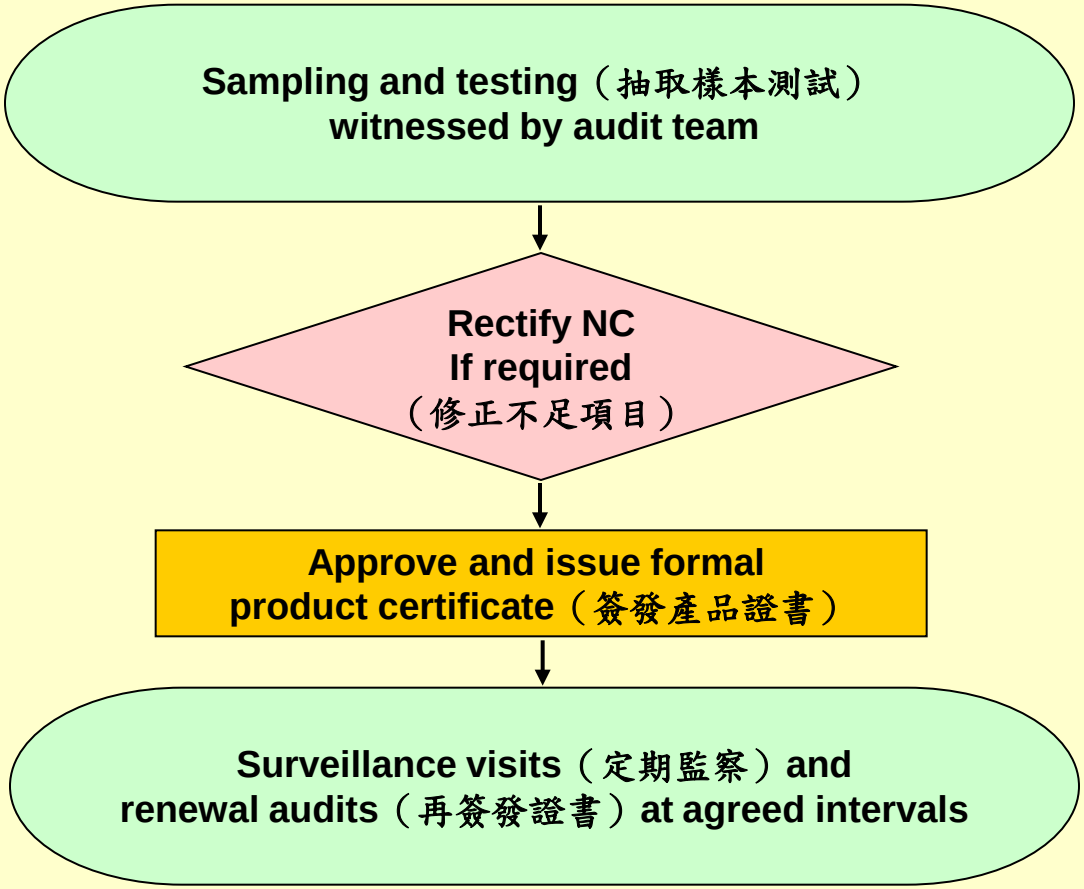
Workflow of Product Certification (cont'd)



Surveillance & Re-Certification Audit

Intervals	Fire product	QSPSC	Tile Adhesive	Repair Mortar	Cement
Surveillance Audit	6 – 9 months	3 months – 1st year	1 year	1 year	6 months
2nd Cycle (SV)	6 – 9 months	4 months – 2nd year 6 months – 3rd year	1 year	1 year	6 months
Re-certification Audit	3rd Year	3rd Year	3rd Year	3rd year	3rd year

Different Types of Products in HKHA Projects

Timber Doorsets
(Fire Resistance)

Wall Panels for Partition
(Fire Resistance)

Different Types of Products in HKHA Projects

Cement Products for Architectural Use

Tile Adhesives

Different Types of Products in HKHA Projects

Repair Mortars

Ceramic Tiles

Different Types of Products in HKHA Projects

Aluminium Windows

Process Control in Product Certification

- Under ISO 9001, the certification focuses mainly on the quality management system, though process control has been mentioned.

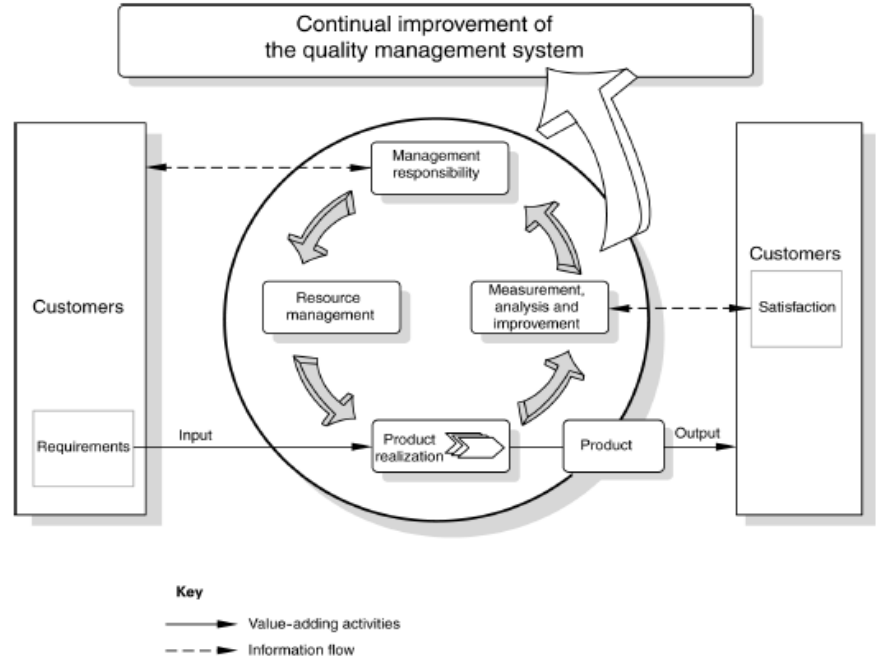


Figure 1 — Model of a process-based quality management system

Process Control in Product Certification

- Product Certification, on the other hand, should address more on the technical aspects of process control.
- This direction is very important because only with proper scrutiny on the various steps of the process and checking on the technical aspects and procedures can then assure the technical quality of the end products. Just looking at the quality management system cannot achieve the purpose.

Process Control in Product Certification

- In the past, when I served as the technical expert for Product Certification audits, I have found occasionally some auditors spent a great portion of their time to go through ISO9001 and checked on the quality documentation.
- This not only duplicates the effort because it is a prerequisite for factory to have ISO9001 before they are eligible to apply for product certification. It also undermines the significance of process control.

Technical Aspects of Process Control

(a) Timber doorset

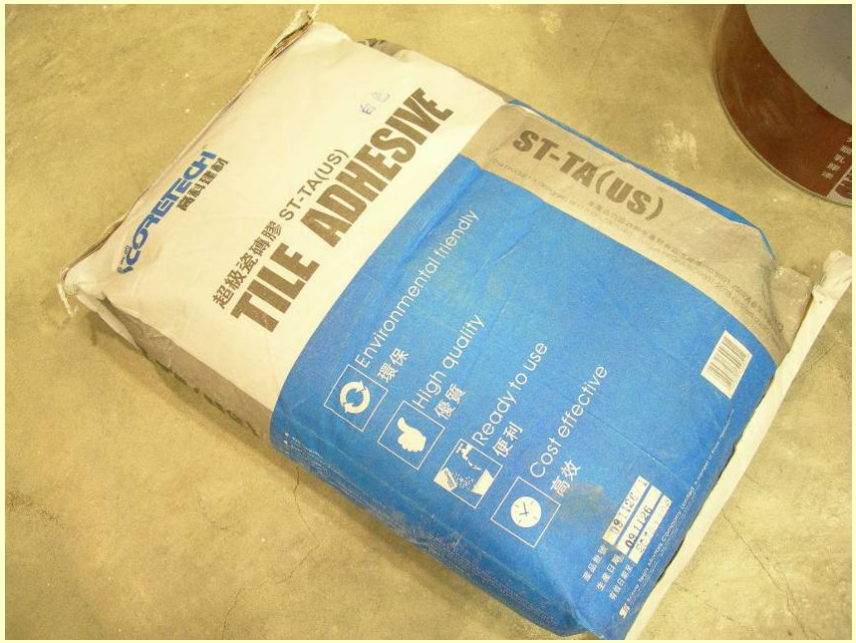
Technical Aspects of Process Control

(a) Timber doorset

- Deinsectization – Timber is put into an oven at 65 degree C for 7 hours for removal of insects and eggs. The CB is to ensure whether the past records, equipment (i.e. oven) are proper.
- Moisture content has to be measured with calibrated equipment.
- Assembly of doorset using different timber planks and adopting various combination pattern.

Technical Aspects of Process Control

(b) Tile Adhesive



Technical Aspects of Process Control

(b) Tile Adhesive

- Traceability of incoming sources of materials with proper identification is crucial to the performance of tile adhesive.

- The relative proportion of ingredients before mixing is another important control. If there happens to have non-conformance later on, it can be traced back and maybe ring-fence those materials affected. In a particular audit, we have found a worker added on some materials with a bucket without weighing.

Technical Aspects of Process Control

(b) Tile Adhesive

- In a particular tile adhesive manufacturer, they have adopted a computerized automatic system for production. However, it was found that there is no computer programme validation for the system.

- The programme controller of the same manufacturer adjusted the mix proportion based on the chemical composition test results. However, it was found that there is no specification or guidelines as to how the proportion are adjusted.

Technical Aspects of Process Control

(c) Mesh Reinforcement

Technical Aspects of Process Control

(c) Mesh Reinforcement

- On the mechanical properties, such as tensile strength, yield strength and elongation of the raw materials, some materials did not meet the material specification. These raw materials should be clearly identified, stored and disposed properly.

- For packaging of finished products, an overhead hanger was used to grab two middle points of the mesh. This has caused significant bending of the mesh and is likely to overstress the wire mesh and even induce some broken welds.

Technical Aspects of Process Control

(c) Mesh Reinforcement

- The number of broken welds shall not exceed 4% of the total number of cross welded joints in the sheet, nor exceed half the number of cross welded joints along any bar. The manufacturer did not record the total number of cross welded joints.

Technical Aspects of Process Control

(d) **Water Closet**

Technical Aspects of Process Control

(d) Water Closet

- The production of water closet is by first mixing two types of clay, one is white clay and one is black clay. The relative proportion is 70:30. In a particular manufacturer, they very roughly apportion the mixes, without weighing, saying that from experience there is a lot of tolerance (10%).

- When the clay is put into the moulds, it would be allowed to dry and the water being absorbed by the moulds. After that, it would be demoulded, then dried in the open air, and later put into oven.

Technical Aspects of Process Control

(d) Water Closet

- The duration of moulding, air dried and oven dried need to follow work instructions.
- Within the oven, the temperature is first raised for a certain period, then kept steady and then temperature returned to ambient.

Technical Aspects of Process Control

There are also some general control over the technical aspects:-

- The manufacturer should ensure the availability of documents (e.g. workflow, instruction, work procedures) at the location of production for workers. We have found that some supervisors themselves are familiar with the procedures and only verbally instruct the workers to follow. As a result, the workers may miss out some important parameters and hence affect the quality of works. This particularly applies to some workers new to the job.

Technical Aspects of Process Control

- The manufacturer should check the competence of the workers with the particular areas of work, based on the past in-house training records. During the audit, auditor would ask the worker to carry out the work by himself, instead of doing it by the supervisor.
- Internal quality control tests are part of the production process. Proper equipment and trained personnel are required.

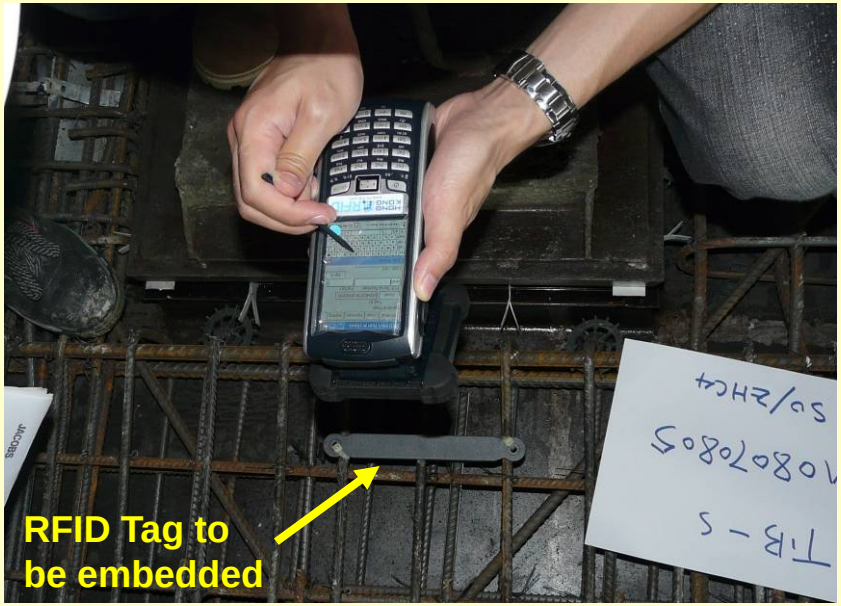
Product Conformity Certification Scheme

- The aforesaid examples show that Product Certification in fact requires specific technical control on the production process.
- At the current stage, many of the Product Conformity Certification Schemes (PCCS) have yet to include these technical process control specific to individual products. From experience, there is difficulty for the Certifying Bodies to give NCs because they cannot make direct reference to the PCCS for same.

Traceability of Products

- In HKHA, we will use Radio Frequency Identification (RFID) for four types of building products, namely precast facade, aluminum window, timber door and metal gateset.

Traceability of Products (cont'd)



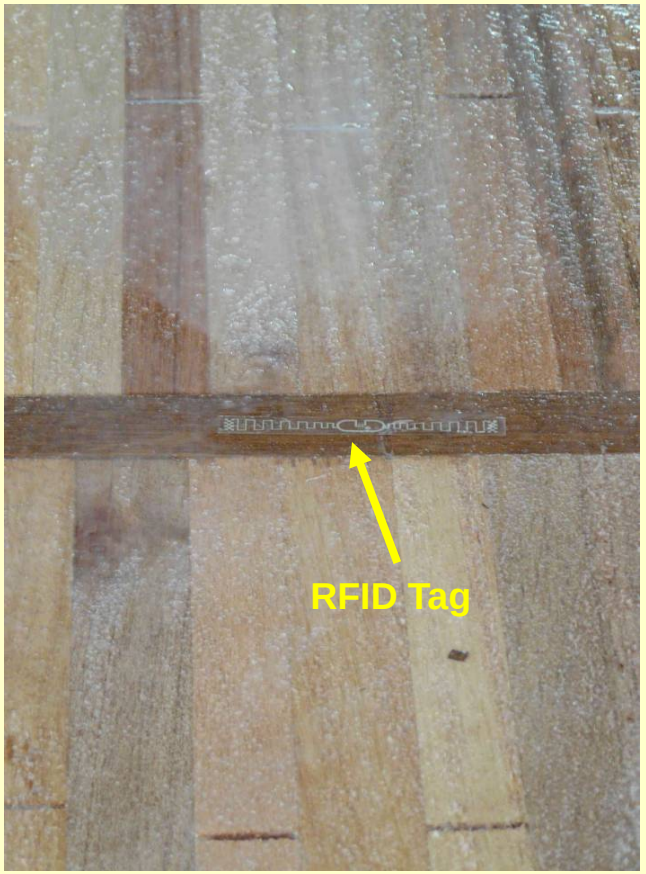
RFID in Precast Facade

RFID Reader

Traceability of Products (cont'd)

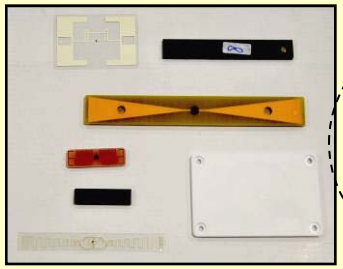
RFID in Aluminium Window

RFID in Metal Gateset



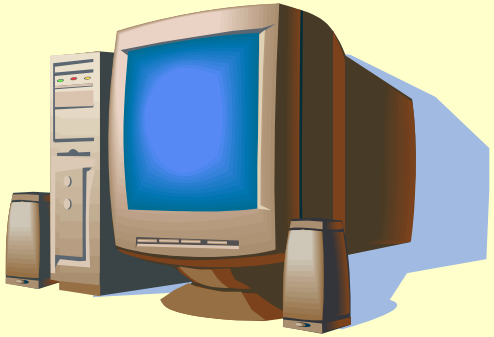
RFID in Timber Door

An RFID System



RFID Tags
Placed on Surface, or
Embeddd in
Building Components

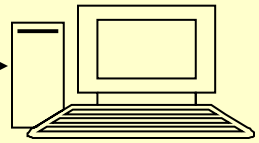
Read/Write Data
through RFID
Reader



All Data stored into a
Web-based System

Manufacturer
at factory

On-line
Access



Contract Manager or
his/her representatives

Contractor or other
authorized users

CONCLUSION

- Product Certification is an innovative initiative in the Hong Kong Testing & Certification.
- With the concerted effort of the stakeholders, it can effectively enhance the upstream production in the factories in Mainland. It gives more assurance to the clients, consultants and contractors to procure materials from the Mainland suppliers.
- Meanwhile, with the experience gained after launching the system for several years, the PCCS can also be enhanced.

Thank You