Hong Kong Concrete Institute
香港混凝土學會

Feasibility Study

Product Certification of Steel Reinforcing Bars for Use in Construction Works in Hong Kong

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Background

- CEDD commissioned the Hong Kong Concrete Institute (HKCI) to carry out a feasibility study in Dec 2013

- The study covers the production, supply, testing, handling, storage, transportation, traceability of steel reinforcing bars from steel mills to construction sites in Hong Kong.

- **Review** Phase and **Study** Phase.

Review Phase

- Comprehensive desk study, information search and data collection from various parties.
- Review of overseas PCCSs on steel reinforcing bars with a view to identifying suitable ones for benchmarking.
- The potential owners of the PCCS to be identified.

Study Phase

- The development of the draft PCCSs of steel reinforcing bars tailor-made for use in Hong Kong.
- Recommend pilot schemes for trial in public works projects.
- Prerequisites for embarking the pilot schemes.

Benefit of adopting product certification

- Product certification is an upstream quality control of the certified product.
- Cut and bend of steel reinforcing bars can be done centrally and more efficiently by using heavy machineries, wastage or scarps can be reduced significantly.
- On-site accidents due to inefficient handling and processing could be minimized.
- Processing costs can be reduced significantly by making use of high technology processes and machineries.
- Nevertheless, traceability and security of steel reinforcing bars in the entire supply chain is most important for successful implementation of a product certification scheme.

Benchmarks

Country/ Region	PCCS for Steel Mill	PCCS for Stockist	PCCS for Cut & Bend	PCCS for Prefab	PCCS System to ISO 17067	Standard of the Steel Reinforcing Bars	Number of Certification	Year of Start of Certification Business
United Kingdom	CARES	CARES	CARES	CARES	5	BS4449: 2005	Certified 250 organizations worldwide as at January 2014	1983
Singapore	TUV-SUB	ISO9001	ISO9001	ISO9001	1	SS2 & SS560	Only local Singapore	Early 2000
Australia	ACRS	ACRS	ACRS	ACRS	5	AS/NZS 4671	Certified 15 steel mills in Australasia and Europe as at January 2014	Early 2000

Review of Product Certification in Overseas Countries

- The United Kingdom (UK)
- Australia
- Singapore

The United Kingdom

- Certification Authority for Reinforcing Steels (CARES) under the "CARES Steel for the Reinforcement of Concrete Scheme" (CARES Scheme).

- CARES product certification is a requirement in major construction specifications such as the Specification for Highway Works, County Councils specifications, the National Building Specification and the National Structural Concrete specification.

Singapore

- The construction industry basically accepts the CARES and ACRS schemes as the recognized scheme.

- Singapore has its own product certification scheme for steel reinforcing bars.

- The scheme is designated as “Product Listing Scheme”. It is basically a System 1 of the product certification classification in accordance with ISO/IEC 17067.

Australia

- The Australasian Certification Authority for Reinforcing and Structural Steels (ACRS) administers an independent, expert, industry-based, third-party product certification scheme, certifying manufacturers and suppliers of reinforcing, prestressing and structural steels to Australian and New Zealand Standards.

PCCS Prepared under the Study

1. PCCS-MAN : Product Conformity Certification Scheme for Manufacturer of Steel Reinforcing Bars.

2. PCCS-STO: Product Conformity Certification Scheme for Stocking of Steel Reinforcing Bars.

3. PCCS-CB: Product Conformity Certification Scheme for Cut & Bend Processing of Steel Reinforcing Bars.

4. PCCS-PRE: Product Conformity Certification Scheme for Prefabrication of Steel Reinforcing Bars.

Consultation for the PCCSs

1. Stakeholders, institutions, testing laboratories, universities, Government departments, etc. have been consulted on the draft PCCSs.

2. As an independent expert reviewer, Mr. Ben Bowsher, Executive Director of CARES of the UK, has no adverse comment on the draft PCCSs.

Recommended Pilot Schemes

Manufacturing and Stocking Schemes

Type of Projects	Priority	Reasons
Flyover	Priority 1	This is a higher level of complexity of steel reinforcing bars fixing but it can give a more genuine picture of the difficulty that may be encountered for various bar sizes and shapes. And so it is ranked as the top priority.
Footbridge	Priority 2	This is a good start for small project of this kind. In addition, the steel reinforcing bars are of relatively simple types of fixing. Also good target for the trial run and it is ranked as the first priority.
Box culvert	Priority 3	This is a very regular type of structure and the steel reinforcing bars are quite typical and it can be a good choice with no difficulty at all for the pilot run. Hence, it is ranked as the second priority.
Service Reservoir	Priority 4	Again this is rather regular type of structures of retaining wall and base slab with possibility of columns inside the reservoir the rood slabs. Nonetheless, regular patterns of the use of steel bars warrant its priority.
Pump House	Priority 5	The very simple structure is always a good initial start of the pilot scheme. However, in view of its small scale, it is ranked as the last priority

Recommended Pilot Schemes

Cut & Bend, and Prefabrication Schemes

Type of Projects	Priority	Reasons
Bored Piled Foundation	Priority 1	The steel reinforcing bars are always in a form of steel cages and it is considered the simple and the regular nature of the reinforcement cage warrants it as a top priority.
Tunnel Lining	Priority 2	The concrete tunnel lining is just a slightly curved shaped panel. The scale of its use could be more than ten thousand in an ordinary project. The very high repetition nature of the steel reinforcing bars fixing deserved it with high priority.
Government Building	Priority 3	The standard concrete elements are primarily slabs, beams, columns and walls and so it is very easy to implement the PCCS.
Public Housing	Priority 4	The standard concrete elements are primarily slabs and walls. However, in view of its very huge scale in most of the public housing projects, it is ranked as the third priority.
Segmental bridge	Priority 5	The segmental bridge deck is most likely a box structure of walls and slabs. Very regular shape and size. But it is super large and complex scale for sea bridge making it the less priority.

Prerequisites for Embarking the Pilot Schemes

1. There should be a scheme owner of the PCCSs.

2. There are certification/accreditation bodies.

3. There are manufacturers, stockists, cut and bend processors, and prefabricators certified under the respective PCCSs, and

4. There are auditors to perform the auditing or assessment under the PCCSs.

Role and Responsibilities of Owner for the PCCSs

- To manage and update the PCCSs regularly.
- To promote the PCCSs.
- To serve as a platform to continuously solicit views to cope with the needs of the industry and the community.
- To provide the necessary resources for maintaining PCCSs and training.

Potential Owner for the PCCSs

- A public body is considered most appropriate to own and maintain the proposed PCCSs in a holistic and one stop shop approach.
- The next recommended potential candidates of the proposed PCCSs are HKCI and Hong Kong Institute of Steel Construction (HKISC).
- Co-own the PCCSs by the above organizations.

Recommendations

- Draft PCCSs should benchmark with the CARES scheme.
- Pilot projects should be identified for trial, say 3 years.
- During the trial period, regular review on the purchaser test results should be carried out.
- A public body to be the potential owner/co-owner of PCCSs.

Way Forward

- Scheme owner to be confirmed.
- Owner to review/follow up with the comments raised during the consultation with stakeholders. If necessary, the draft PCCSs might need to be further refined to suit/address the comments.
- To try the proposed PCCSs in pilot schemes of different works nature and complexity for at least three years.
- Depending on the works nature and complexity of pilot schemes, the number of end user tests may be reduced. During the trial period, regular review on the end user test results should be carried out.
- With the full implementation of the proposed PCCSs and subject to the results of pilot schemes, there is room for moving the end user tests upstream to the manufacturers or stockists.

End of the Presentation.