



NEW WORK ITEM PROPOSAL		
Date of presentation 2013-03-26	Reference number (to be given by the Secretariat)	
Proposer KATS	ISO/TC 71 / SC 6	N 52
Secretariat JISC		

A proposal for a new work item within the scope of an existing committee shall be submitted to the secretariat of that committee with a copy to the Central Secretariat and, in the case of a subcommittee, a copy to the secretariat of the parent technical committee. Proposals not within the scope of an existing committee shall be submitted to the secretariat of the ISO Technical Management Board.

The proposer of a new work item may be a member body of ISO, the secretariat itself, another technical committee or subcommittee, or organization in liaison, the Technical Management Board or one of the advisory groups, or the Secretary-General.

The proposal will be circulated to the P-members of the technical committee or subcommittee for voting, and to the O-members for information.

See overleaf for guidance on when to use this form.

IMPORTANT NOTE: Proposals without adequate justification risk rejection or referral to originator.

Guidelines for proposing and justifying a new work item are given overleaf.

Proposal (to be completed by the proposer)

<p>Title of proposal (in the case of an amendment, revision or a new part of an existing document, show the reference number and current title)</p> <p>English title Test methods for fibre-reinforced cementitious composites</p> <p>French title (if available)</p>	
<p>Scope of proposed project</p> <p>This International Standard specifies the test methods for fiber-reinforced cementitious composite materials which are expected to be more commonly used in the field of concrete construction.</p>	
<p>Concerns known patented items (see ISO/IEC Directives Part 1 for important guidance)</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes", provide full information as annex</p>	
<p>Envisaged publication type (indicate one of the following, if possible)</p> <p><input checked="" type="checkbox"/> International Standard <input type="checkbox"/> Technical Specification <input type="checkbox"/> Publicly Available Specification <input type="checkbox"/> Technical Report</p>	
<p>Purpose and justification (attach a separate page as annex, if necessary)</p> <p>ISO/TC71/SC6 has developed ISO 10406-2:2008, which specifies test methods for FRP sheet reinforcement for concrete structures. However, no ISO specification is available for the test methods of fibre-reinforced cementitious composites for concrete structures. Therefore, it was agreed at its meeting in Hong Kong, 21 June 2011 that ISO/TC71/SC6 proposes as a new work item the development of test methods for fibre-reinforced cementitious composites with Korea, Republic of as the convenor. At the 2012 meeting at Costa Rica more specific discussion concluded that SC1 will join the workign group for this work because the Stadard develop regards a test method but the final publication will be further discussed.</p>	
<p>Target date for availability (date by which publication is considered to be necessary)</p>	
<p>Proposed development track <input type="checkbox"/> 1 (24 months) <input checked="" type="checkbox"/> 2 (36 months - default) <input type="checkbox"/> 3 (48 months)</p>	
<p>Relevant documents to be considered</p>	
<p>Relationship of project to activities of other international bodies</p> <p>No other international bodies are developing similar specifications.</p>	
<p>Liaison organizations</p>	<p>Need for coordination with:</p> <p><input type="checkbox"/> IEC <input type="checkbox"/> CEN <input type="checkbox"/> Other (please specify)</p> <p>None</p>

New work item proposal

6) The benefits to be gained by the implementation of the proposed standard; alternatively, the loss or disadvantage(s) if no standard is established within a reasonable time. Data such as product volume or value of trade should be included and quantified.

7) If the standardization activity is, or is likely to be, the subject of regulations or to require the harmonization of existing regulations, this should be indicated.

If a series of new work items is proposed having a common purpose and justification, a common proposal may be drafted including all elements to be clarified and enumerating the titles and scopes of each individual item.

e) Relevant documents and their effects on global relevancy: List any known relevant documents (such as standards and regulations), regardless of their source. When the proposer considers that an existing well-established document may be acceptable as a standard (with or without amendment), indicate this with appropriate justification and attach a copy to the proposal.

f) Cooperation and liaison: List relevant organizations or bodies with which cooperation and liaison should exist.

Test methods for fibre-reinforced cementitious composites: Bending moment-curvature curve

1. Scope

This specification specifies the test method for bending moment–curvature curve of fibre-reinforced cementitious composites (FRCC) that show separated plural cracks under pure bending stress by 4-point bending test.

2. Test specimens

- 2.1 Dimensions of test specimens
- 2.2 Molding of test specimens
- 2.3 Preparation of hardened test specimens

3. Test equipment

- 3.1 4-point loading equipment
- 3.2 Load measuring equipment
- 3.3 Curvature measuring equipment

4. Test procedure

5. Calculations

6. Test report

**MINUTES OF THE MEETING****Date: 2012-07-20**

Reference

ISO/TC71/SC 6

N48

Title of / Titre du TC/SC

ISO /TC 71/SC 6**Non-traditional Reinforcing Materials for Concrete Structures**

Secretariat / Secrétariat

Dr. Toshiyuki Kanakubo
Japanese Industrial Standards Committee (JISC)
E-mail : kanakubo@kz.tsukuba.ac.jp

MEETING / RÉUNION

Meeting dates / 2012-06-20
Dates de la reunion

Host / Invitant

INTECO

Instituto de Normas Técnicas de Costa Rica
Barrio González Flores
Ciudad Científica de la Universidad de Costa Rica
San Pedro de Montes de Oca
CR-San José

Place / Lieu

Ramada Herradura Hotel
General Canas Highway
Alajuela
Costa Rica

P-and O-members are invited to review the document and send in any comments/corrections to inform the secretariat of the committee concerned, within one month of the receipt of this DRAFT MINUTES of meeting.

If no reply is received within one month, the DRAFT MINUTES shall be considered to be the APPROVED MINUTES of the Meeting.

Parallel meeting(s) / Réunion(s) parallèle(s):

- 19 June, 2012- meeting of ISO/TC71/SC8
- 20 June, 2012- meeting of ISO/TC71/SC3 and SC4
- 21 June, 2012- meeting of ISO/TC71/SC1, SC5, SC7 and SC8
- 22 June, 2012- ISO/TC71 Plenary Meeting

1. Welcome and Introduction

Chairman Prof. Taketo Uomoto welcomed the delegates.

2. Roll Call of the Delegates

Chairman asked the delegates for self-introduction in place of roll call, and the delegates introduced themselves accordingly.

3. Adoption of Agenda, Doc. ISO/TC 71/SC 6, N 46

The agenda was approved as circulated (refer to the circulated document No.1).

4. Confirmation of the minutes of ISO/TC71 Hong Kong meeting.

Chairman confirmed the acceptance of the minutes of the Hong Kong meeting (refer to the circulated document No.2), June 20-21, 2011 as published on the ISO website, since no comments were given within one month from its circulation. No further comments were given from the participants.

5. Appointment of Resolutions Drafting Committee

Dr. Sofia Diniz, Prof. Jongsung Sim, Dr Anil K. Sharma and Dr Jian-Guo Dai were appointed by the Chairman to form the resolutions drafting committee.

6. Report of the Secretary

6.1 Secretary reported the system review balloting results on ISO 104060-1:2008 (Fibre-reinforced polymer reinforcement of concrete-Test methods-Part1: FRP bars and grids) and ISO 104060-2:2008 (Fibre-reinforced polymer reinforcement of concrete-Test methods-Part2: FRP sheets) (refer to the circulated documents No. 3 and No. 4).

6.1.1 The balloting was closed on March 17, 2012 and the balloting results to the above two ISO documents are the same as follows:

To Q.1 Recommended action

- Confirm: 7 P-members (Australia, Brazil, Egypt, Japan, Korea, Sweden and USA) ;
- Confirm with correction of errors: 1 P-member (Canada);
- Revise/amend: 1 P-member (India) and Germany (neither a P-member nor an O-member);
- Abstain: 3 P-members (China, Columbia and United Kingdom), 1 O-member (Italy) and Malaysia (neither a P-member nor an O-member).
- Abstain with survey replies: none

To Q.2 "Has this International Standard been adopted or is it intended to be adopted in the future as a national standard or other application?"

- Yes: 2 P-members (Brazil and Japan)
- No: 7 P-members (Australia, Canada, Egypt, India, Korea, Sweden and USA) and Germany (neither a P-member nor an O-member)

To Q.3 "Is the national publication identical, or proposed to be identical, to the International Standard or modified?"

- Identical: 2 P-members (Brazil and Japan)
- Modified: 0

To Q.4 "Is this International Standard used in your country without national adoption or are products used in your country based on this standard?"

- Yes: 3 P-members (Australia, Egypt and Korea)
- No: 4 P-members (Canada, India, Sweden and USA) and Germany (neither a P-member nor an O-member)

To Q.5 "Is this International Standard, or its national adoption, referenced in regulations in your country?"

- Yes: 0
- No: 9 P-members and Germany (neither a P-member nor an O-member)

6.1.2 Canada, India and Germany provided editorial and technical comments (refer to the circulated documents No.3 and No. 4)

6.2 There are 5 “yes” in total responded to Q.2 and Q.4. According to the “ISO/IEC Directives, Part 1: Consolidated ISO-Supplement –Procedures specific to ISO” (refer to the circulated document No.5), SC6 decided to retain the documents with necessary revisions.

6.3 Dr Corley (USA) mentioned that the answers to “Q2 to Q5” may not reflect the actual situations in member countries and the answers to these questions should be carefully interpreted. A simple “No” from a member country may not necessarily indicate that the ISO documents are not being adopted in that country.

6.4 Secretary reported the balloting results on the ISO/DIS 14484 “Performance guidelines for design of concrete structures using fibre-reinforced polymer (FRP) materials”.

6.4.1 The balloting was closed on August 11, 2011 and the results are as follows: P members voting: 12 in favor out of 12 (100% approval) (refer to the circulated document No. 6).

6.4.2 India and USA provided technical and editorial comments (refer to the circulated document No.6)

6.5 Following the suggestion of Ms Rossi (ISO), SC-6 decided to bypass the FDIS process and to publish the ISO 14484 after necessary revisions, according to the approval of 12 P-members.

7. Discussions for Future Work and Revised Work Plan

7.1 Discussions on the revisions of ISO 10406-1: 2008 and ISO 10406-2: 2008

7.1.1 Secretary reported the “Secretariat observations” into all the comments on ISO 10406-1: 2008 (refer to the circulated documents No. 3). After discussions, SC6 agreed to make the following revisions:

- A general comment 1 from India: “Include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and humidity of 65 ± 5 percent at appropriate places for warm countries. The specified provisions for conditioning are not suitable to tropical countries like India; therefore, ISO standards include alternative conditioning requirements for tropical countries/warm countries. For example, ISO 679:1989 specifies an alternate temperature of $27 \pm 2^{\circ}\text{C}$. The same approach has been adopted in ISO 1920-11 & 12 being developed. The specific comments with respect to the above have been highlighted clause-wise. This is in accordance with the global relevance policy of ISO.”
 - Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document to address India’s concern. Nevertheless, it remains unclear how sensitive the properties of FRP materials are to the concerned temperature range (i.e. from $20\text{-}2^{\circ}\text{C}$ to $27\text{+}2^{\circ}\text{C}$). It was also realized that the definition of “warm countries” is not clearly mentioned in ISO documents. This should be a common issue for the whole ISO/TC71 committee rather than SC6 only.
 - Action: Considering ISO documents under the development of other SCs may encounter the similar situation, SC6 decided to suggest that ISO/TC71 perform a systematic review on the temperature range specified for all types of concrete testing.

b) Comment on Clause 5.2 (e) from India: “Upper limit of temperature range may be changed to take care of tropical climate. During the preparation stage of the standard, as per the

secretariat's observation on India's comments on DIS as given in the report of voting, the prescribed range was proposed to be modified as 20-30°C in place of existing 15-25°C. However the standard still carries 15-25°C. ”

- Action: The sentence has been changed to “The test temperature shall be within the range of 15°C to 25°C or 20°C to 30°C when the climate is hot”.

Note: After the Costa Rica Meeting, the chairman and the secretary of SC6 decided to replace as “The test temperature shall be within the range of 15°C to 25°C. The temperature range of 20°C to 30°C is applicable for warm countries” to avoid the confusion.

c) Comment on Clause 7.1.9 from India: “Curing temperature cannot be unrelated to the climate of the region/country. Therefore, notwithstanding the provision of ISO 1920-3, the temperature needs to be modified as above for warm countries. Even ISO 1920-3 may need to be corrected on this account. Also see India's general comments”

- Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document.

d) Comment on Clauses 9.3 and 12.3 from India: “Curing temperature cannot be unrelated to the climate of the region/country. Therefore, notwithstanding the provision of ISO 1920-3, the temperature needs to be modified as above for warm countries. Even ISO 1920-3 may need to be corrected on this account. Also see India's general comments”

- Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document.

e) Comment on Clauses 10.3, 13.3 and 14.2.6 from India: “The mention that test temperature should generally be within the range 5-35°C will not suffice in case of test pieces sensitive to temperature variations, used in tropical climate situations.”

- Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document.

f) General comments from Germany: “Test methods do not reflect state of the art knowledge of testing for alkali resistance and do not take into account the variety of products on the market to date”; “No evaluation for the durability of the product is given”.

- Action: Due to the significant lack of information and considering that Germany is neither a P-member nor an O-member, SC6 decided to take no action on the comments at the moment but may consider these comments for future development if more information is provided.

g) Comments from Canada on Section 8.1.3.2, 9.2.1 and 14.3.2: “a strain rate of 1% strain per minute +/- 50%”. This could be misinterpreted as a range from -49% to +51%. The wording needs clarification”

- Action: SC6 agreed to change the sentence to “a strain rate of 1% strain per minute +/- 0.5%”.

7.1.2 Secretary reported the “Secretariat observations” into all the comments on ISO 10406-2: 2008 (refer to the circulated documents No. 4). After discussions, SC6 agreed to make the following revisions:

- a) A general comment 1 from India: “Include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and humidity of 65 ± 5 percent at appropriate places for warm countries. The specified provisions for conditioning are not suitable to tropical countries like India; therefore, ISO standards

include alternative conditioning requirements for tropical countries/ warm countries. For example, ISO 679:1989 specifies an alternative temperature of $27^{\circ}\text{C}\pm 2^{\circ}\text{C}$. The same approach has been adopted in ISO 1920-11 & 12 being developed. However, the specific comments with respect to the above have been highlighted clause-wise. This is in accordance with the global relevance policy of ISO”

- Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in ISO 10406-2: 2008 to address India’s concern.
- b) Comment on Clauses 5.1.5, 6.1.5, 7.1.5 and 8.1.4: “The second sentence seems to be redundant. If there is no or negligible effect of humidity on any property, the standard should not simply prescribe any humidity requirement.”
 - Action: SC6 agreed to take no action since the sentence is needed to differentiate the test conditions from those specified in ISO 291.
- c) Comments on 7.1.2: “Substitute ‘maximum nominal size’ for ‘maximum diameter’ in para 2 and Substitute ‘0.5 and 0.6’ for ‘50% and 60%’ in para 2 During the preparation stage of the standard, as per the secretariat’s observation on India’s comments on DIS as given in the report of voting, they have mentioned that the above corrections have been incorporated in the draft, however, the standard still does not reflect the corrections.”
 - Action: SC6 agreed to make corresponding changes. Secretary explained that this change was not made because of some miscommunications between the SC6 secretary and the Central Secretary of ISO/TC71.
- d) Comments on 7.1.2: “Curing temperature cannot be unrelated to the climate of the region/country. Therefore, notwithstanding the provision of ISO 1920-3, the temperature needs to be modified as above for warm countries. Even ISO 1920-3 may need to be corrected on this account.”
 - Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document.
- e) Comments on 11.3.1.2(a), (b) and (c): “It would be necessary to specify an alternative standard temperature for warmer countries as mentioned in the general comments of India.”
 - Action: SC6 agreed to include temperature of $27^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for warm countries in the document.
 - SC6 agreed that WG1 will check all other places relevant to the temperature ranges in ISO ISO 10406-1 and ISO 10406-2 to keep consistency.
- f) Comments from Canada ““In Section 4, "bar or grid" should be replaced by "sheet"”
 - Action: SC6 agreed to make the change.
- g) General comments from Germany “Test methods for durability in alkaline environment are missing”; “Test methods for resistance in elevated temperature are missing”.
 - Action: Due to the significant lack of information and considering that Germany is neither a P-member nor an O-member, SC6 decided to take no action on the comments at the moment but may consider these comments for future development if more information is provided.

7.1.3 Secretary reported the “Secretariat observations” into all the comments on ISO DIS14484 (refer to the circulated documents No. 7 and No.8). After discussions, SC6 agreed to make the following revisions:

- a) General comments on Sections 4. 5.2 and 9 from India “Considering the nature of FRP material, the performance with respect to fire safety should be covered in more detail.”
 - Secretary observation: It is noted that in Section 5.2.1, the following sentence is available conceptually: “If necessary, the temperature-sensitive characteristics of FRP materials should be appropriately considered in design with attention to its weakness at elevated temperatures”.
 - Action: SC6 suggested changing “weakness” to “possible strength and stiffness loss”
- b) Comment on 4.2 from India “Typical values of linear elastic properties of FRP and the properties of bond between FRP and concrete may be included for guidance“.
 - Secretary observation: It is difficult to give such values. Different products have different values. It is not suitable to exclude any potential products from use by giving the values. For the reviewer’s information, the committee has launched a new work item “FRP reinforcement for concrete structures – specifications of FRP materials”. Relevant information is supposed to be given in this specification
 - Action: SC6 agreed to change “Design of concrete structures with FRP materials should consider the linear elastic material properties and the properties of bond, **if available**, between the FRP and concrete” to “Design of concrete structures with FRP materials should consider the linear elastic material properties and the properties of bond, **if applicable**, between the FRP and concrete, **based on quantitative performance evaluation at the ultimate limit states**”.
- c) Comment on 5.1 from USA: Actual is not a good word choice for the sentence, change “actual” to “in situ” or “as built”.
 - Action: SC6 agreed to change “actual” to “in situ”
- d) Comment on 8.2.2 from USA: NSM can also debond, so debonding should be considered in this case, Change “In cases of FRP sheets/plates” to “In cases of FRP sheets/plates and NSM”.
 - Action: SC6 agreed to make the change and use the word “NSM FRP reinforcement”.
- e) Comments on 8.3.1 and 8.3.2 from USA: NSM can also debond, so debonding should be considered in this case, Change “In cases of FRP sheets or plates” to “In cases of FRP sheets, plates, or NSM”.
 - Action: SC6 agreed to make the changes and use the word “NSM FRP reinforcement”..
- f) Comments on 9.2.1 and 9.3.2 from USA: The development length is defined as the length of bond REQUIRED to meet some objective (i.e. yield before split). In this case, you don’t want the development length confirmed, you want the assure that the bonded length is at least as long as the development length.
 - Action: SC6 agreed to make the changes.

- g) Comments on Section 1 from USA: It appears that the document mainly addresses cases of repair (EB and NSM). I do not think that is truly covering RC and PC with FRP or external FRP tendons. Much is missing (e.g., Section 9 should include splicing of bars as we have provision for splicing for sheets and plates; anchors for tendons is missing; etc.); Change title to “Performance guidelines for design of concrete structures repaired using fibre-reinforced polymer (FRP) materials and delete mention to internal FRP reinforcement”
- Secretary’s observation: The scopes of this design guideline include both FRP for new construction and FRP for repair and strengthening of existing concrete structures. To address the reviewer’s concern on the application of FRP reinforcements in new concrete structures, a new section, Section 9.1.3 “Splice of FRP reinforcements” has been added in the draft.

9.1.3 Splices

The FRP reinforcement should be sufficiently spliced by the bonding force between the FRP and concrete or by mechanical splicing.

- Action 1: SC6 agreed to add the above section; Action 2: SC6 agreed to change “FRP sheet/plates and or/NSM FRP reinforcement” to “FRP reinforcement” to avoid conveying a wrong message to readers that the guideline is orientated for FRP strengthening applications only;
- Action 3: SC6 agreed to add “FRP bars” and “FRP grids” in “Terms and Definitions”;
- Action 4: SC6 also agreed to make the following revisions:
 - a) Section 3.1 : Delete “made of concrete or other materials” from “attachment between FRP and substrates made of concrete or other materials”
 - b) Section 3.2: Delete “substrate” from “concrete substrate” and delete “original” and “repair” from “original concrete or any cementitious repair materials used to repair or replace
 - c) Section 3.3: Delete “concrete” from “separation at the interface between the concrete substrate and near surface....”
- h) Comment on 3.5 from USA: Don’t need to say NSM is an alternative to external bonding. It is a form of external bonding; Delete “as an alternative technology to external FRP bonding”.
 - Action: SC6 agreed to delete “as an alternative technology to external FRP bonding”.
- i) Comment on 3.6 from USA: “Need to make it clear that plates are precured”; change “single or multiple layers of fabric or mat reinforcement bound together in a cured resin matrix.” to “Single or multiple layers of fabric or mat reinforcement bound together in a resin matrix, precured prior to application.”
 - Action: SC6 agreed to make the above changes.
- j) Comment on 5.2.2 from USA: Procured plates are covered by ISO 1406-1; Change title to FRP bars, grids, and plates.
 - Action: SC6 agreed to make the above change.
- k) Comment on 5.2 from USA: In addition to properties of resins and FRP, the document should also address the properties of structural adhesives used for NSM ; Add a Section 5.4 Similar to 5.3 specifically for Structural Adhesives for use with NSM.