CIB W080 – Prediction of Service Life of Materials and Components


by

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Introduction
This past May 2000, members of CIB W80/RILEM 175-LSM held their annual meeting and were welcomed guests of the CSTB in Paris. A welcome was offered by Jean François Le Téno and thereafter the secretary general of RILEM, Mr. Michel BRUSIN addressed the group. Mr. Brusin offered a very informative presentation of RILEM interests, in particular, those activities in support of the development and dissemination of test protocols and recent advances made within the RILEM secretariat in support of committee activities. Additional information can be obtained from the RILEM web site (www.rilem.org).

Briefly described below are the main items of interest for members including reports from the four task groups and related information on activities from members.

Report on activities from Task Groups

Environmental characterisation
Dr. Svein Haagenrud (TG-leader) provided a brief report on activities and indicated that efforts in this task are to focus on exploring the use of IT and GIS tools in co-operation with the work going on within CIB TG 20 "Geographic Information Systems". As a basis for this work, Dr. Svein Haagenrud plans to make use of the CIB TG20 report that will soon mark the conclusion to the TG’s work. The scope of the report covers a broad range of aspects on GIS and spatial distribution of data as related to the built environment, and as well, a significant part concerns environmental characterisation. In addition, new results from a UN/ECE study (described below) may also be included since this study is more comprehensive in scope and employs more sophisticated damage functions than described in previous reports.
Mr. Jan Henriksen reported on the UN/ECE study aiming at establishing dose-response functions based on field exposure of 87 different material types (i.e. including metals, stone masonry, paints, glass and electronic materials) at 36 sites in Europe, two in US and one in Canada. The intention within the UN/ECE programme is to look at more complex reactions than those focussing on SO2 and the means to move from dose-response to damage functions. A four-year test period started two years ago and includes "hot spots" having high NOx levels. Mr. Jan Henriksen also reports that a parallel study being conducted in China has, after one year exposure, revealed results almost identical to those of the UN/ECE thus helping to confirm the reliability of data.

**Information technology**
Mr. Stewart Burn (TG-leader) informed members of the most recent activities in this area and suggested that the task group would now concentrate efforts to establish a world-wide index covering databases of service life related information. The index would provide the necessary information for locating the databases, indicate what data is included, and its quality. As an initial output, a review of existing databases is to be made that will serve as an index to relevant information on service life.

Mr. Burn also referred to ongoing standardisation of IT in the building sector and stressed that its’ use today is still focussed on costs rather than service life methodologies. The possibility of establishing a database using previously collected data from specific countries was discussed. It was agreed that to initiate the activity of establishing a database on service life of materials and components should first focus on a single material – aerated autoclaved concrete (AAC).

**Reliability and probabilistic methods**
Dr. Per Hovde (NTNU-Norway) introduced the work of the task group that focuses developing tools for service life prediction using factorial methods, engineering design tools, or probabilistic techniques.

Dr. Hovde gave a brief presentation of the rather comprehensive report on the “Factor Methods for Service Life Prediction”, encompassing the background (i.e. implementation in standards), review of existing knowledge on factor methods, and further development. He noted that recent work at the Housing Authority Property Mutual – UK, has lead to the publication of two books that provide an overview of the main workmanship and design issues that affect the durability of components and materials in domestic housing. It is anticipated that these publications can provide useful information to further development of the factor method.

**Other contributions from members**
Mr. Jérôme Lair of CSTB gave a spirited account of his doctoral work that focused on coping with uncertainties in expected component failure while taking into account the complexities of the building system when undertaking either durability assessments or service life predictions ("Durability assessment of building products – Data fusion & FMEA tool"). This most interesting presentation provided an overview of tools and algorithms to aid assessing service life such as: FMEA (Failure Mode and Effects Analysis), fault and event trees, fuzzy sets and belief functions. Further information of similar work can be found in CIB Report No. 248 "From data to decision: Life cycle assessment and service life prediction – Descriptive sciences in a prescriptive context".

Dr. Geoffrey Frohnsdorff informed on the ongoing US research programme "Partnership for advanced technology in housing" (PATH). Aims of the programme are to establish a durability rating system and provide good practice information for homebuilders. Three guidance
documents on Design, Construction for Durability, and Maintenance, respectively, are to be produced. Data is being gathered from various sources, including homeowners and material and component manufacturers. For example Dr. Frohnsdorff reported on a survey among house owners of which some 4000 submitted replies on the type of maintenance being carried out on their homes out on a routine basis. Efforts are being made to insure that manufacturers offer service life information together with the other information provided about their products.

Peter Mayer (Building Performance Group) gave a brief account on a component driven approach to establish a database to derive the level of risks vs. design, workmanship (particularly as for joints) and material, respectively, as related to new building construction.

**9DBMC Up-coming International Conference in 2002**
An overview of proposed activities of the up-coming 9th International Conference on Durability of Building Materials and Components (9dbmc) was provided the conference chair, Mr. Stewart Burn. The conference is to be held in Brisbane, Australia, from March 17 to 21, 2002. Among other items, Mr. Burn indicated that an industry exhibition would be arranged in conjunction with the conference. He noted as well that this conference is to be the first that will have the proceedings entirely published in electronic form. Mr. Burn went on to inform members that Prof. Carmen Andrade of Spain has agreed to represent RILEM on the conference steering committee. More details about the conference are found at www.dbce.csiro.au/9dbmc.

**Next Meeting**
The next meeting of the CIB W80/RILEM 175-SLM will be held in connection to the CIB World Building Congress, Wellington, New Zealand in April 2001.