News on Wood Standardisation

News on CEN and ISO standardisation for wood and wood-based products

January 2008

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Service Life Planning in Durability standards

An exciting development is taking place on the European scene for durability standardisation at the moment. New concepts, like service life planning, service life prediction, and service life costing are making their way into a field that has been dominated by rather traditional methods for assessment and classification. Even the word "durability" is to some extent seen in a new light, due to the growing awareness of the demands in the Construction Products Directive (CPD). The development of new standards is in many cases a very arduous and time-consuming process, but in this case the work proceeds at a pace that is quicker than usual, partly due to pre-normative work done outside of CEN.

A slow adaptation to the CPD

The Construction Products Directive (CPD, Council Directive 89/106/EEC) states six essential requirements that must be fulfilled throughout an economically reasonable working life of any construction works. They are:

- Mechanical resistance and stability
- Safety in case of fire
- Hygiene, health and the environment
- Safety in use
- Protection against noise
- Energy economy and heat retention

Obviously, the first, third and fourth items on this list are very much linked to durability aspects. The European Commission has published several Guidance Papers for the interpretation of the CPD. Guidance Paper F deals with durability issues, and it addresses the concept of durability as "the ability of a product to maintain its required performance … during the working life of the product". This differs from the traditional usage of the word durability, which mostly can be seen as synonymous to resistance to degradation, i.e. purely a material property. Here, on the other hand, durability has no meaning for an individual material per se, but it is linked to both its application and the working life (or design life).

Even though the CPD is not new, it appears that the full consequences of its requirements have not yet impregnated the planning and execution of construction works in practice. In a small survey, the TFPC attempted to gauge the state of awareness among professionals (architects, building industry etc.) in Europe. Many answers indicated that they perceived Service Life Prediction as a very important field, but that reliable methods are lacking. However, the concrete industry and other producers of building materials have developed more or less sophisticated tools for service life prediction of their products, while the wood industry has not been very active and is lagging behind.

The emergence of a Task Force and a Task Group

Task Force on excursion.

Preliminary ideas concerning a more fundamental renovation of the current suite of durability standards began to emerge in 2003. Underlying motivations were the observed lack of uniform strategy, the absence of discussion about the actual purpose with many standards, and the perception that it was never asked how the standards were being used and by whom.

From Sweden we proposed to CEN/TC 38 that a "Future Group" should be established, with a rather free mandate to look further into these questions. At its meeting in November 2005, TC 38 then picked up this proposal and established the Task Group Service Life Prediction "with the aim of proposing a road map outlining how service life prediction might be addressed within CEN/TC 38 standards". The group (TGSLP) held its inaugural meeting in October 2006 and chose Finn Englund to be the convener.

By that time a Task Force Performance Classification within the COST Action E 37 "Sustainability through new

technologies for enhanced wood durability" had already been in action since two years. This task force (TFPC) had to a large extent coinciding goals, looking at other ways to classify the durability of wooden materials according to their estimated performance. A clear ambition was also here to provide input to the standardisation. The cooperation between the CEN and the COST task groups has been facilitated by the fact that they are chaired by the same person.

The TFPC will deliver its final report to COST E 37 when the Action ends in June 2008. The results so far points out some possible routes for a performance based assessment and classification of wood products in the construction sector. Much of the output from the TFPC can be found on the COST E 37 website www.bfafh.de/cost37. In a document outlining principles for successful, useful and modernized standards we have identified certain demands that should be fulfilled for test methods and classification methods:
They should be

- useful
- reliable
- reproducible
- repeatable
- predictable
- consistent
- easy to use
- easy to understand
- well correlated to practical product performance
- applicable to the widest possible range of products

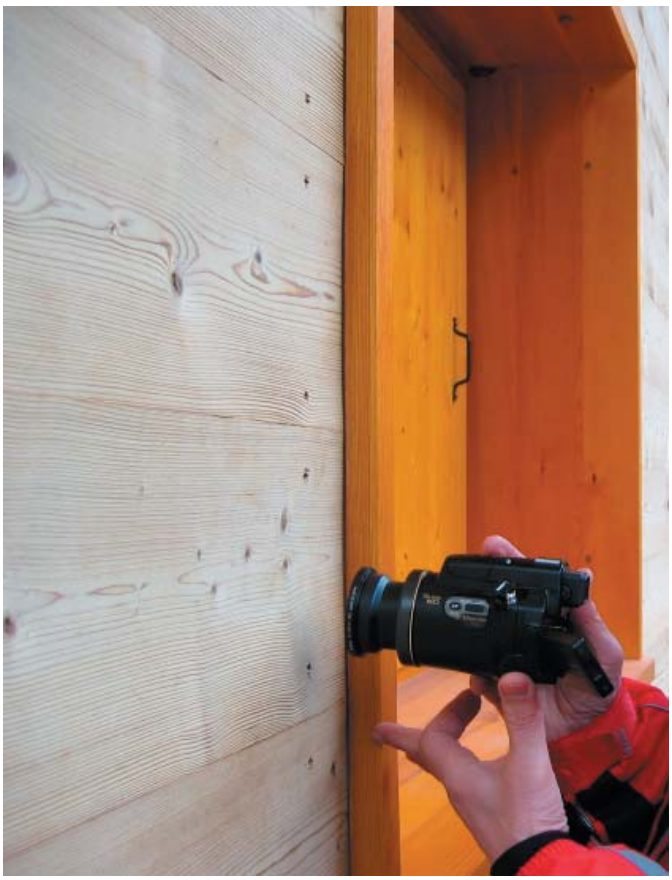
We do not see that the present standards are very well fitted to the needs of specifiers. At best, they give reproducible results concerning differences in resistance towards e.g. decay fungi in ground contact, but the link to predicted service lives of actual construction products is weak. Tests against marine organisms may be an exception where the practical conditions are well simulated by the tests.

Service Life Planning on the ISO level

International standards on Service Life Planning are being developed in ISO/TC 59/SC 14. The series 15686 consists of ten parts, some already ratified and published, some still present only as working drafts. A key element in this series of standards is the Factor method for estimations of service lives. In its more generalized form, the estimated service life of a component (ESLC) is derived as some kind of function of an agreed reference service life (RSLC) and a set of influencing factors A-G. The function can be a simple multiplication with correction factors, but more realistically it should be based on probabilistic values, since several factors may be interdependent.

ESLC = f(RSLC, A, B, C, D, E, F, G)

A = Quality of the component
B = Design level
C = Work execution level
D = Indoor environment
E = Outdoor environment
F = In-use conditions
G = Maintenance level



Close inspection of heat treated spruce cladding.

Who is this for?

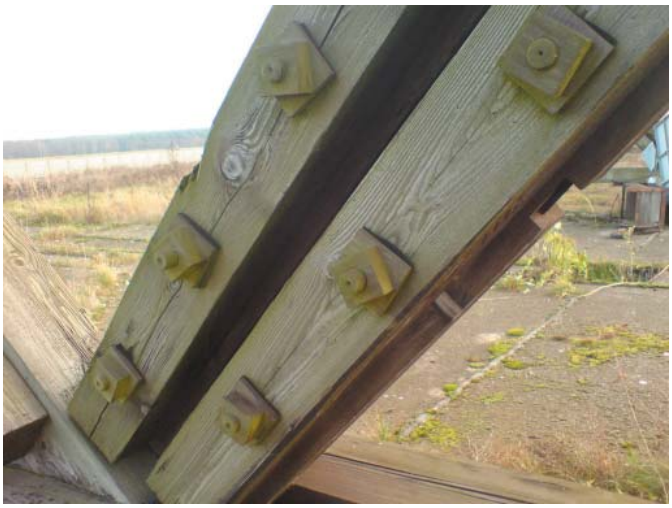
At the core of the philosophy behind the present development is the ambition to adopt a new starting point for all standardisation work by asking first of all the fundamental question: Which needs will this new standard fill? It seems as a natural question, but it is far too seldom asked. It implies that the users of the standards must be identified, as well as the users of the standardized products or works, and that it is their needs that should be satisfied. Important users groups are building proprietors and commissioners, and ultimately the population eventually using the buildings.

Wood durability linkage to general prediction tools

The TGSLP will now strengthen the established links to the broader development taking place in e.g. ISO. As one step in this direction, the plans for the nearer future

includes the development of an implementation document that will try to outline the way in which Service Life Prediction methodology can be applied specifically for wood and wood-based materials and products. In many applications, the degradation of wooden materials is completely dominated by the action of biological agents, which makes the process of determining service life estimates much more complicated and sensitive to an inherent variability. It is probable that the Service Life Prediction in the future will hinge on Use Classes, as defined in EN 335, combined with Durability Classes that give a range of estimated service lives in relation to well-defined refence products under reference use conditions. The delivered data must be expressed in a simplified way, which could be done as a range of Service Factors. Consequences of failure are taken into account at a late stage and are partly left to the decision of architects and others involved in the construction planning, as well as guidelines in national building codes.

It may be too early to speak about a paradigm shift, but there are certainly major steps being taken now towards new ways of thinking. In the end this is believed to lead to a strenghtening of the market positions for wood and wood-based materials in the construction sector.



54 m high towers of wood only at aerial test site, Brück, Germany.

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