Proposal for standardization of Building symbols

Background
Present standards for building symbols have been created to support uniform appearance on paper drawings produced by different authors. The need for libraries of agreed symbols has not diminished over the years, but new issues related to the use of symbols have surfaced as practice has shifted from manual drafting to the use of computers for producing drawings and CAD models. Also, the role of national and international standards has changed over the past few years. Altogether, there is a need for a new approach to symbol standards. Following are a few areas where problems are present, and need to be solved.

Coverage of symbol libraries
ISO has published symbol standards for limited areas. These standards have also been accepted by CEN. As a consequence, national standards organizations were obliged to withdraw national standards of wider scope, containing more extensive collections of symbols. This is true for example for British Standards. Thus, the remaining standards have become more fragmented and less useful. Users are left to choose or design their own symbols, and vendors of CAD systems and other tools lack a common language for their products. A non-standardized situation emerges, and the documents produced will not be compatible. As a consequence, there will be cases when symbols will be misinterpreted. It will also be difficult and cumbersome to combine information from different sources, e.g. stacking CAD layers from several actors for a drawing, or use cut-and-paste to reuse solutions.

Objects and properties
Increasingly in computing, symbols are not just combinations of lines and text elements, but the graphical representations of objects, whether a physical object or some other information objects. In addition to the graphical representation, there are a number of numerical and descriptive properties connected to an object. Within the standardization of object-oriented modelling the graphical output has hitherto not been of high priority. Parallel work is needed in order to take care of the presentation needs. However, great attention should be given to the limits between the domains of computing objects and of traditional graphic presentation, in order to avoid confusion and unnecessary overlapping of standards.

Complexities associated with symbolic representation
Even without considering computing requirements, the use of symbology on drawings is a complex area. It includes indications of materials or surface treatments, representation of the physical objects in different projections (top, front, section etc.) at different scales and levels of detailing (e.g. sinks, windows), views for different applications (e.g. a lamp as viewed by the architect vs. the electrical engineer), indications of operations to be performed (e.g. demolition), etc., etc. Commonly, symbols are additive, e.g. weld symbols are often composed of sub-symbols, and there are rules about the manner in which they should be interpreted when used together. When computers are used to create drawings this inherent complexity is compounded by the manner the developers of different applications choose to generate accepted graphic symbology.
Access to standard symbols

Standards on paper, or as digital copies of paper documents, are not appropriate or practical for use with computers. Rather, they should be available in suitable CAD and graphical data formats. There are also apparent possibilities to facilitate the search and to improve the accessibility to symbols if they are contained in a database with a web-based online search interface. Such databases have for example been implemented for components by IEC, and are about to be introduced in ISO.

Coordination with other activities

Many of the problems associated with the use of symbols are not specific to construction, and there is a need to investigate related work in other TC:s. Coordination with product modelling efforts such as STEP and IAI are naturally of the essence, and should contribute to the presentation facilities of product models. Seeking the advice and assistance of major software developers and vendors has a potential to vastly improve the impact of the standardisation work. There are obvious benefits to users as well as vendors in integrating access to standard symbols with software applications.

Suggested approach

Altogether, there are multiple possible and useful levels for standardization relating to symbols, ranging from definitions of traditional 2D-representations to databases of object-oriented components. The initial problem is to confirm what work is required and how it is best carried out. The scope of the suggested project is to devise a plan for the development of symbol libraries and related standards, in coordination with other standardisation efforts that are relevant to the subject. The plan should include, but not be limited to, the aspects mentioned above. Publication is suggested in the form of a Technical Report.