Erik Kjems
25. March 2015

Assessment of the proposed next step for IFCRoads

The IFC standards should support exchange of road and road related data between systems throughout the whole product lifecycle. From planning through design, construction, maintenance and back to planning. My main concern argued orally in the InfraRoom meeting at BRE March 2015 is as follows:

Roads are designed with a variety of very advanced CAE tools based on quite different design approaches, which all together end up with a geometry description of a road, which include well-defined geometry referenced geographically. The road design can be visualised in all common CAE tools, and thereby we actually see what we want to exchange on the monitor. So we should focus on creating IFC objects from that result, or instead of sending data to the monitor creating IFC objects.

The approach until now has been focusing on reproducing the way roads are designed with advanced tools. But road geometry is mostly very complicated especially around and in larger cities, and it will be close to impossible to make an IFC standard supporting this kind of procedural approach. It would imply to develop a standard, which can reproduce all steps taken during a design process using advanced design tools. A road with a more or less fixed cross section along an alignment is fine in trivial cases but will very soon show its shortcomings, and will hamper the process creating an IFC standard, and also the adaption by vendors.

I suggest to focus on the "pure" geometry, which has been derived already by the design system, and from that create IFC objects with vital attribute data included. Since the road geometry is "given" by the design systems we should split up the road into arbitrary 3-dimensional pieces as part of a larger jigsaw or as Lego bricks. That way a main road complex will be put together by road objects defined with road volumes including the pavement structure. This will give a lot of strange looking spatial objects, which IFC supports, but since all objects are geographically referenced, and probably some topological parameters can be included, this should be fine. This probably also would help to assure the quality of the model since geometry and geographic coordinates are exchanged rather than methods.

This approach should be used for the main road complex and partly for terrain modifications for instance ditches, while it should be fine regarding the other road related elements to use the same approach as described in other IFC objects, since the geometry mostly can be well-defined. I guess the work from KICT probably can be adopted widely, although in my experience every country or even region has its own way to design roads, why a full adaption perhaps is not possible.

A lot more can be written for instance about how one intends to use the IFC models. For what actual purpose by whom and why. But I guess the expert group has been discussing this already.

I hope this short note of my thoughts can be used for an upcoming discussion in the expert group and lead to a different approach regarding the road body. It is essential to do this sooner than later since the approach in the IFC vers. 1.1 already may be obsolete, since we do not need to offset anything, this has been done already in the design software :-)

Best regards
Prof. Erik Kjems, Ph.D.
Aalborg University (bips)
Denmark