# BuildingSmart International InfraRoom Development Proposal

Hugh Woods     BuildingSmart UKI        October 2014

hugh.woods@atkinsglobal.com

Linear infrastructure projects such as roads as railways include a large number and variety of linear features, for example fences, kerbs, ducts, retaining walls, safety barriers, utility services. These may be designed, constructed, maintained and owned by different teams, companies, organisations and clients – but they interact spatially with each other.

During design the detailed route of such features may iterate many times. And during construction there may again be constraints that mean that they must be moved.

Take a length of safety barrier as an example:

1. During preliminary design it is a generic barrier type where conditions show that it is required.
2. During detailed design is becomes a sequence of lengths of specific performance specifications (and may iterate many times before being finalised).
3. At construction it becomes a set of specific proprietary types of fence that match the performance requirements, dependent on the contractor's preference.
4. It might also be surveyed in its as-built location. (For underground assets this step is essential.)

There is no geometry currently available in IFC4 or in CAD systems that can respond to this amount of change. There is insufficient documentation on IfcSweptAreaSolid to know if it has the essential requirement of maintaining vertical on a generalised 3D spine.

I proposed development of IfcLinearFeature – a general purpose geometry type for representing features common in infrastructure projects. This would be defined by a 3D spine line plus 2D cross-section and/or repeated 3D objects such as posts. The 3D spine line would be IfcAlignment, which now includes 3D LineString as its most basic option.

Again using the safety barrier example:

1. Definition is a generic barrier cross section and representative post type and spacing, offset from the edge of road.
2. Definition is appropriate barrier cross section and post type and spacing for required performance, on final designed alignment.
3. Definition is specific barrier cross sections, posts and spacings for chosen products, on final designed alignment
4. Definition is as 3. but on as-built alignment. A large amount of geometry gets updated quickly, by changing the spine alignment.

I have a working prototype in Autocad that demonstrates the concept in action. Atkins is using it on an increasing number of BIM projects. The development risk is small, and the potential benefit great.