CRC Construction Innovation

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Report
Integration of Life Prediction System with LCADesign

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A valuable addition to the LCADesign software package would be the automatic estimation of building component service life. The CRC CI Learning Systems project has produced a software package that estimates the service life of ten different components. This package could be integrated in future versions of the commercialised version of LCADesign.

The Learning Systems software would be integrated on three different levels. The first level would involve mapping LCADesign Object Reasoning Rules to component types. The second would involve getting the geographic location of the components from the Building Information Model (BIM), and the third level would involve integrating the user interface.

Mapping LCADesign Object Reasoning Rules to the building components used in the Learning System would be relatively straight forward. Firstly, all Object Reasoning Rules that have an equivalent building component in the Learning System would need to be identified. Many Reasoning Rules would not have an equivalent, and many would map to the same building component. Having identified all relevant Reasoning Rules, a mapping file would be created that would be used by LCADesign to select appropriate building components for each applicable element in the BIM to use for service life estimation. Additional parameters would be derived from the Reasoning Rules where feasible, and default, changeable values used where not.

Once all applicable components are identified within the BIM, it is necessary to provide the geographic location of the building to the Learning System. This information may be taken directly from the BIM where available. In situations where location information is missing from the BIM, or is inaccurate, the user will have to manually enter the information. This may be implemented in two ways. Firstly, the user may click on a point on a map to get the latitude and longitude, as is the case with the current implementation. Secondly, the user may simply indicate the environment type rather than a specific location; i.e. marine, benign, etc. This approach may be preferable, as the current implementation of the Learning System is based on the state of Queensland, and it is unknown how much effort would be involved in including the entire Commonwealth, or even the globe, into the system.

With the component types and geographic location identified, estimates may be made of the service life of each component. The current results section of the Learning System user interface can be fairly easily integrated into a future version of LCADesign. This part of the user interface could also be adapted to allow the user to provide additional parameters where necessary. The current implementation of the Learning System does not have a reporting facility. In order to include the results of the service life estimate into the LCADesign report, a reporting module would need to be developed specifically for it.

In all, integrating the Learning Systems software with a future version of LCADesign would not pose many technical challenges. The main issue would be identifying which Reasoning Rules map to which building component. This highlights the need for an integrated inventory/product database for use in all BIM related CRC CI software products. A common, integrated inventory/product database would negate the need for

individual software components to map between different formats of product information. A future version of DesignSpec, using a commercial product/inventory database would be an ideal starting point for this process.

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