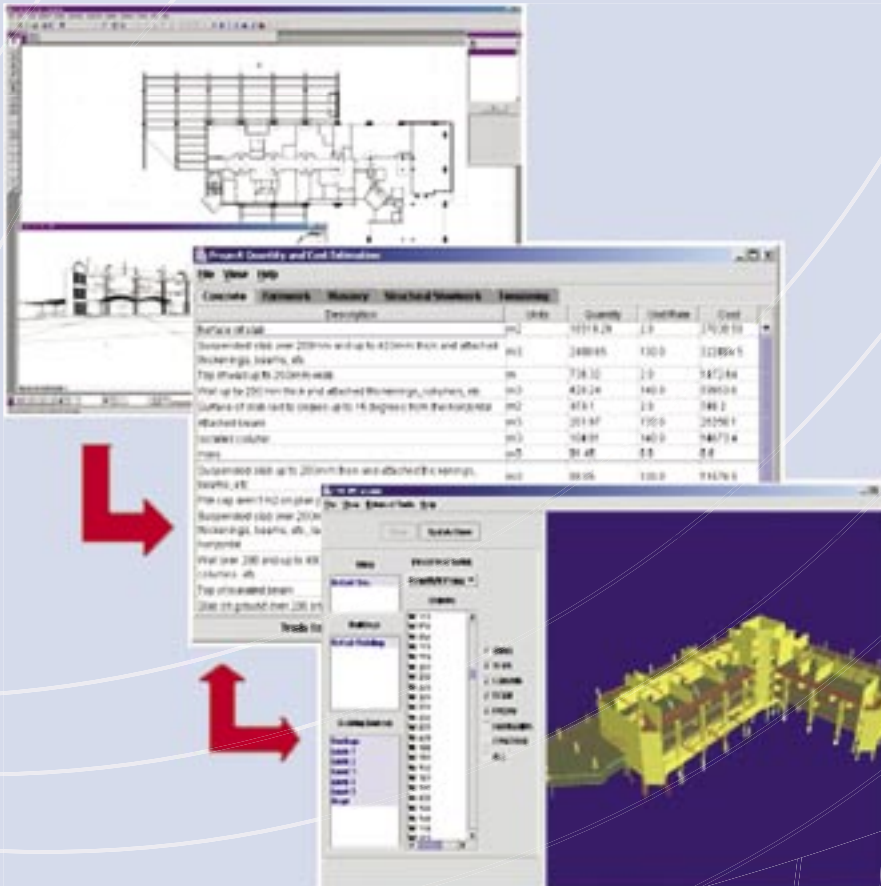# CRC Construction Innovation
BUILDING OUR FUTURE

Automated Estimator

A computer software tool that automatically generates a bill of quantities (BoQ) and cost estimate from a 3D CAD building model. Viewer software, developed to complement the program, shows the two-way correlation between building components and items in the BoQ.

CRC AUSTRALIA

An industry need

The responsibilities of the cost consultant are a critical aspect in construction planning, developing and assessing competitive tenders and in the subsequent building and contract administration stages. The task of taking-off quantities and preparing estimates is time-consuming and can be error-prone. It is often done under considerable time pressure.

Improving technology applications is the obvious answer but the challenge is to do this in a way that requires minimum change in current industry work practices and systems. Users are far more likely to adopt new software and processes that require fewer changes to the way they are used to working. What is of even greater significance is to take account of practices that truly add value or provide a means of checks and balances.

Automating the output – the traditional Bill of Quantities – is just the first challenge. Arguably, the greater challenge is how to build in the valuable human contribution the estimator provides in checking building components against the drawings. During this process the estimator may identify errors and ambiguities in the documentation. Automatically generating a BoQ removes this process – so how do the user and the customer have the confidence that items in the BoQ are measured properly?

Both challenges have been met in the development of *Automated Estimator* and the *Viewer*.

What is Automated Estimator?

Automated Estimator is a computer software tool that automatically generates a BoQ and cost estimate. Information contained within a 3D CAD Building Information Model is exported in the form of Industry Foundation Classes (IFC[1]) data. This data is used to populate a database (which shares data and communicates with other applications). *Automated Estimator* analyses this data to generate a bill of quantities and cost estimate.

In addition, *Automated Estimator* incorporates *Viewer* software that provides a mechanism for displaying the correlation between building components and items in the BoQ and also from items in the BoQ back to the building components. This allows results to be seen in 3D, making them easier to interpret and validate.

Validation is also facilitated by options to display either all of the components measured or not measured under a section or the BOQ as a whole.

A Rule Editor allows users to define estimating rules or modify existing estimating rules to suit the internal processes used by an organisation. The rule format is flexible, allowing information to be extracted at various stages during the design process.

The software currently covers the following trades – reinforced concrete, post tensioning, formwork, masonry and structural steelwork at detailed documentation stage – with more trades under development.

CRC Construction Innovation
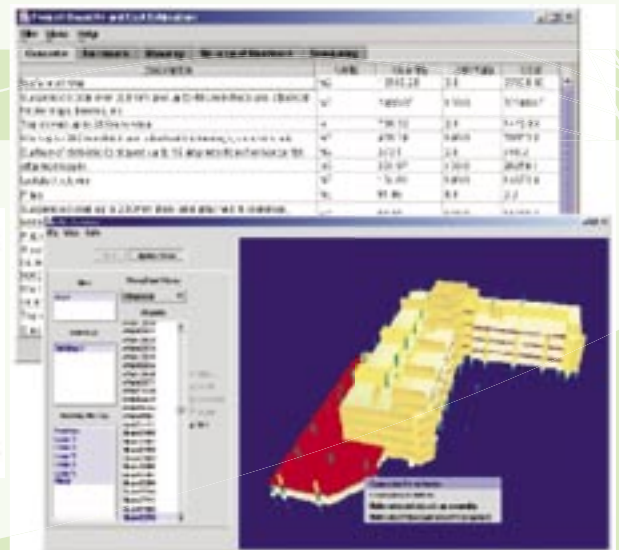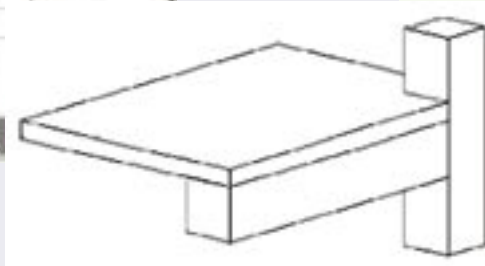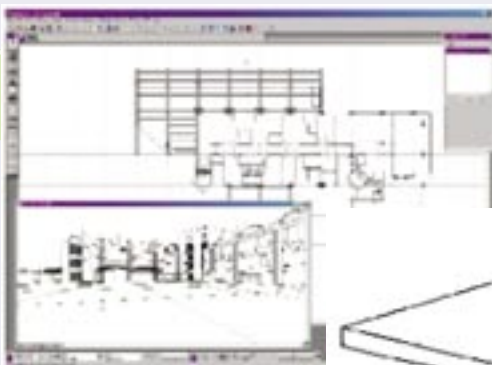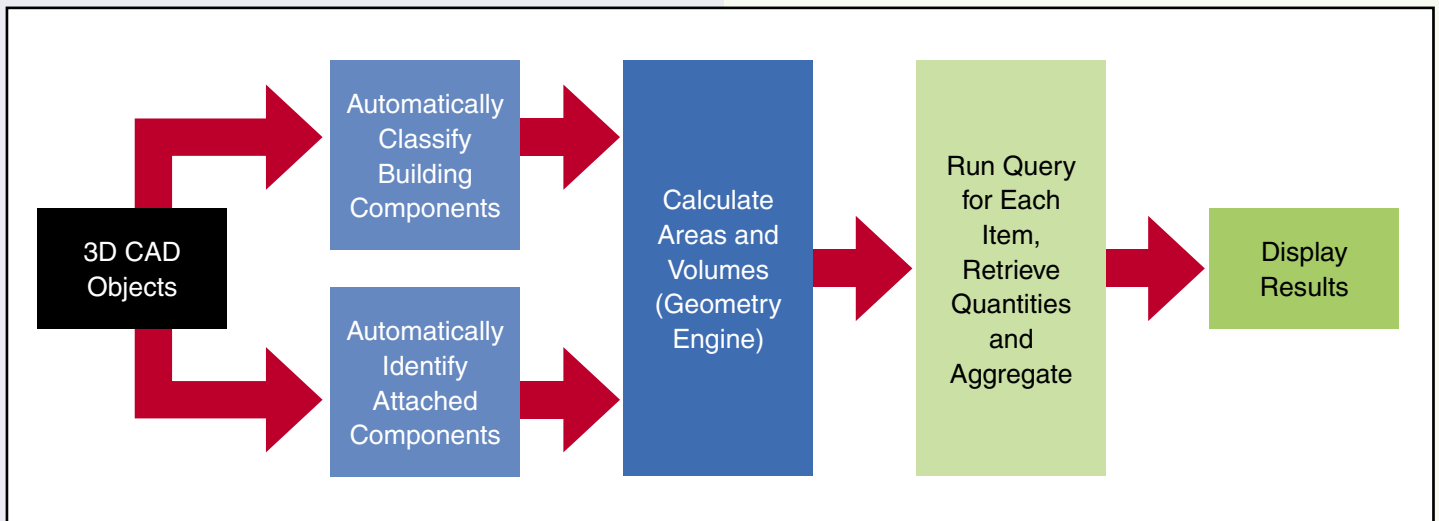**B U I L D I N G   O U R   F U T U R E**

Likely users of Automated Estimator

- Cost consultants
- Quantity Surveyors
- Estimators
- Building contractors
- Architects/Designers
- Academics/teaching institutions

Benefits of Automated Estimator

- Automates quantity take-off and cost estimation
- Reduces the time to take-off quantities from weeks to minutes
- Reduces errors in the estimating process
- Minimises the incidence of disputes arising from errors in estimation
- Allows cost consultants to spend more time on value-adding activities
- Assists in identifying errors or ambiguities in CAD data
- Reduces overheads since the "risk" component allocated to the construction price to cover errors is reduced.

3D CAD Objects → Automatically Classify Building Components / Automatically Identify Attached Components → Calculate Areas and Volumes (Geometry Engine) → Run Query for Each Item, Retrieve Quantities and Aggregate → Display Results

CRC for *Construction Innovation*

Automated Estimator has been developed by the Cooperative Research Centre (CRC) for *Construction Innovation*. *Construction Innovation* is a national research, development and implementation centre focused on the needs of the property, design, construction and facility management sectors. It takes ideas and turns them into collaborative research to produce industry-relevant results for our partners and the whole industry.
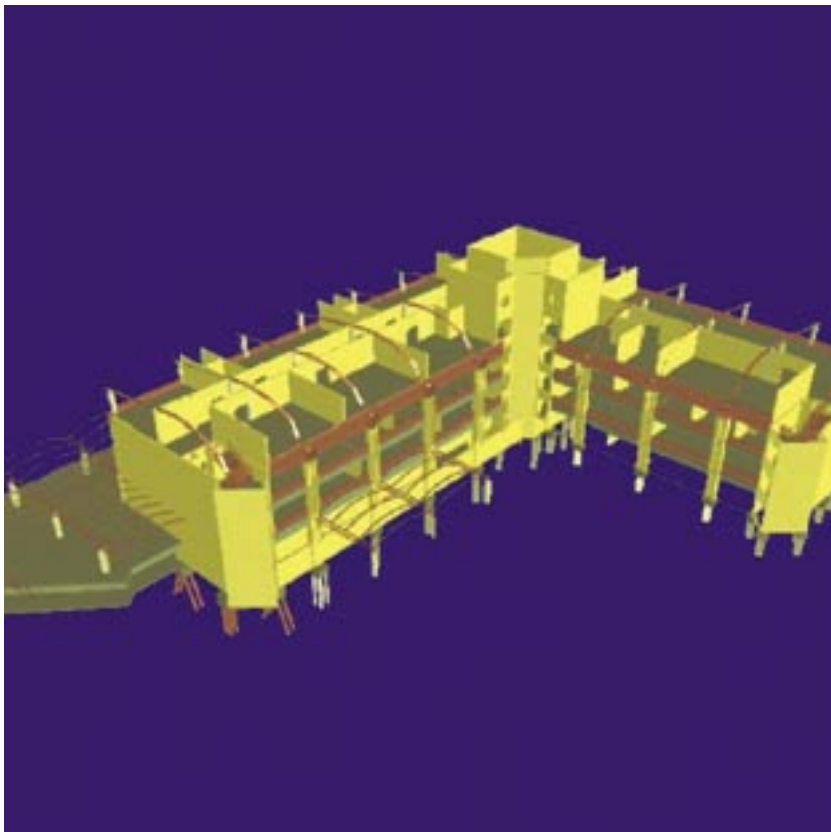
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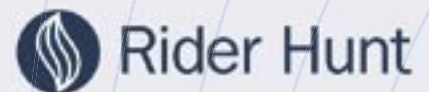Web: www.construction-innovation.info

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Partners in progress

Automated Estimator is a collaborative product developed by the CRC for *Construction Innovation* with project input from Arup, Bovis Lend Lease, John Holland, Rider Hunt, Woods Bagot, Queensland Department of Main Roads, Queensland Department of Public Works, CSIRO, The University of Sydney.