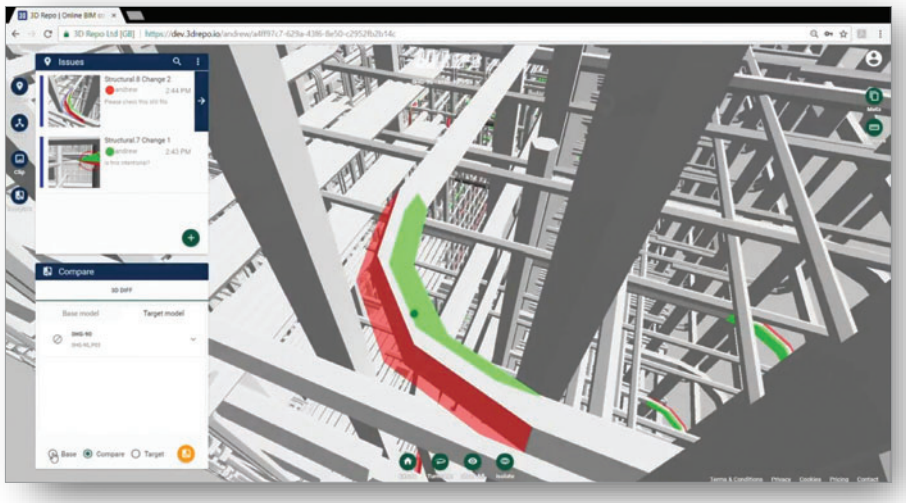
What's the Diff?

3D Repo is helping to transform the way we handle information with its web based, real-time change detection solution, 3D Diff



I would hereby like to demolish a couple of contemporary construction myths. The first one is that the management of change within the construction industry is a complicated and time-consuming pain in the backside, and the second is that 3D Repo is 'just a virtual reality company'.

Let's put that in context. In any sizeable project which entails design input from a number of different disciplines, it is inevitable that there are going to be many instances where clashes occur, with MEP conduits going through steel girders, or where the positioning of doors prevents occupants in lavatories opening them without straddling the toilet bowl (hands up the Design Centre), each instance being recorded as an engineering change during the design stages, or at any time up to, and sometimes beyond installation.

Each of these changes to the building model is emailed to all of those affected within the project, and the relevant managers with responsibility for ensuring that the changes are implemented have to upload every change request, locate it within the building, confirm the changes and issue alternative instructions to the contractors involved.

Keeping track of each change request and ensuring they are being acted upon is a major task in itself, and everyone involved in the process will question my assertions. But wait, let's examine the second myth.

3D Repo has been a regular exhibitor at a number of exhibitions and seminars in recent years, where they have been wowing attendees with their ability to present architectural buildings within a virtual reality environment. They also presented at the CAD User seminar on COBie last year, showcasing an alternative method of viewing BIM to the prescribed COBie format. Instead of displaying building information in a tabular format (as with Excel, for example) 3D Repo is able to present it as a federated 3D model, giving users the ability to interrogate any aspect of the model and its associated data using standard navigation tools.

It is able to do this because the information is held as individual objects that comprise the whole information held by a component. They can be linked to other components which can be used to assemble complete 3D models using the latest versions of each component, or used as the basis for calculations, categorised by date and other parameters, and assembled according to any criteria that can be formally defined. Once defined, the information can be presented in any format, the 3D virtual model just being another display format, in spite of its dramatic effect.

As the model evolves, 3D Repo keeps track of all changes as they occur, and can compare any set of information against earlier versions, to compare changes to model geometry, or even to check problems that occur when models are updated to accommodate software version changes (Revit 14 - 16 for example). Open standards such as IFC and BCF formats allow 3D Repo to access data from any application and upload it to its secure server. That, however, creates rather large files for viewing, and to reduce their size the data is preprocessed before being served to the client.

3D Repo is not 'merely' a virtual reality company then, but rather the developer of cloud-based total information management solutions. This was explained to me by Jozef Dobos, the founder and CEO of 3D Repo. The concept of total information management was developed by Jozef whilst at UCL and sponsored by Arup, where his role was to devise a system for the sharing of large-scale 3D models from disparate architectural and engineering systems within a single web-based application. Furthermore, the totality of information created and assembled for a construction project is stored within the 3D Repo cloud server, available to be accessed and utilised in whatever format required - including, and in particular, the dates when the data was uploaded to the model file.

THE DEVELOPMENT OF 3D REPO

After graduating from UCL, Jozef took a fresh look at the way building information could be managed more efficiently, and set up 3D Repo, which currently employs a small team of software engineers and AEC professionals. The basic premise is that data can be anything, with the construction industry being both particularly suited to the 3D Repo approach, and relevant to Jozef's past experience. It can be similarly applied to any industry, process, or information workflow where data is constantly being added, analysed and presented in different formats.

The company is currently working with the likes of TRL at Greenwich, creating APIs to align building models with maps, using construction survey points, and adding building heights to urban structures - which can be used to create relevant contextual models on the fly. They are providing TRL with a usable database for its experiments with autonomous vehicles within the borough, which requires access to comprehensive infrastructure information together with real-time changes - traffic flow, temporary roadworks and other data points.

3D Repo is looking to double in size over the next year thanks to the commercial success the company enjoyed in the last 12 months. Further expansion is necessary to cater for the inevitable impact that the company's latest development will have on the construction market. Backed by its information management capabilities, 3D Repo will transform the way contractors handle the engineering change process.

HANDLING DESIGN CHANGES

3D Repo has now released a design change management module, 3D Diff. A patent pending application, 3D Diff utilises the information management capabilities of 3D Repo, enabling users to open a current 3D model in its entirety, and overlay it with an earlier model constructed from information available at that time. It is then able to compare the current version in real time with the earlier model and highlight any changes between them, including models created using different modelling tools and pipelines. For instance, a user may pass 3D models from PDMS to Navisworks as well as to Tekla due to project specific requirements. Without 3D Diff, there is no way of verifying what data has been lost in translation from one package to the next.

Similarly, when parties to a contract first review the whole document but then during negotiations only need to review redline changes in a Word Document, 3D Diff enables the same approach, whereby the design coordination meeting only needs to concentrate on the respective changes rather than the whole federation over and over again.

This eliminates the need to receive, open and locate individual changes in a complex model, as a viewer can inspect the whole model on the screen and see, at a glance, the entirety of design changes between any previous revision and the current model. They can then hone in on individual instances which, when selected, provide access to the information associated with each component.

The accuracy of the model reflects the scale of the original design, and is capable of visually displaying small details, for example a requirement for a door to be shifted a couple of inches sideways. Being able to view all changes within the model would facilitate the display of multiple instances of the same design change throughout the model. You don't need to download any software to run 3D Diff either - the data you upload is fully encrypted and user privileges are fully maintained.

So, Instead of the project manager having to select and view every engineering change request that crosses his desk, all they need to do is upload the appropriate models to 3D Diff and view each request, which will be colour coded to indicate its status, and annotated with relevant management information. Instead of being a chore, it has become a simple exercise that familiarises the project manager with the totality of changes required in a highly visual and expressive manner.

EXPLOSION IN INFORMATION

The information required to handle such solutions is expanding exponentially. Fortunately, the technology required is expanding at a similar rate. The question is, which is the chicken and which the egg? Software like 3D Repo looks to be capable of addressing the issues that arise from inefficient use of the information available, and to discriminate between usable data, and that which is irrelevant for current purposes and can safely be ignored - although still available in the cloud should anyone need it.

www.3drepo.org