Virtual Design + Construction [VDC] is standard process on today’s jobsites, but in our high-tech world the next evolution is always underway. Enter: Augmented Reality!

A collection of Augmented Reality apps are already on the market, and two GLY Project Engineers recently seized the opportunity to take the Block 52 East jobsite for an augmented reality test drive. Here’s their report from the field.
WHAT IS AUGMENTED REALITY?
According to DigitalTrends’ website, Augmented Reality [AR] is the interaction of superimposed graphics, audio and other sense enhancements over a real-world environment displayed in real time. In simpler terms, it means looking at the real world through a lens or screen that allows you to add visual elements or data notes to enhance the view.

Advancement in mobile phone and tablet technology means that any of us can easily augment our reality through one of the many AR apps on the market.

WHAT IS THE POTENTIAL ON THE JOBSITE?
Although the current suite of available apps has limitations, GLY’s AR team is optimistic about the potential to generate significant construction cost savings through the prevention of mistakes and rework on site.

After getting the technology up and running—highlighting the need for next generation apps to be ready right out of the box—and importing our SketchUp models, we could overlay the as-built or under construction environment with the model in real time.

We found the user interface fairly straightforward and the application valuable, even if just to easily access our models on smart phones and tablets.
A BIT OF A WORKOUT

On the second day, we turned on the forward-facing camera for the first time. As we moved around the jobsite overlaying the real-time streaming environment with the models we hit our first real challenge. The manual location setting required pacing around, arm raising and finger pinching to accurately set the model in place. Finding the right position while peering through the tablet screen is disorienting, and the initial AR mode is somewhat temperamental.

CRASH TEST DUMMY

We also spent time adjusting file sizes in an effort to optimize functionality. Initially we created three versions of the model to compress the file size from 21MB to 3.5MB. When we tried to use the compressed model in the field during a waterproofing/exterior review, the model size was still too large and crashed the system.

GETTING SPECIFIC

After scaling down the model even further, we successfully used the AR app on a specific issue – a pipe in conflict with a 2.5-inch finish system of stone. We identified the conflict using the X-Ray mode, and resolved the issue before installing the stone.

Following this success, we used AR to test and confirm assumptions in a variety of scenarios: constructing an interior stair; placing rebar and art installations; and overlaying a display window with graphic film during a coordination meeting with the Architect. We also overlayed a building curtainwall with schedule information using the Drop Schedule function, to field assess glazing progress.

QR CODES

One of the most obvious and powerful advantages of AR is the ability for field staff and tradespeople to literally carry the model in their pocket, as a supplement to Construction Documents.

We tested this feature during a team demonstration by posting a series of QR codes throughout the jobsite at specific points. The codes are easily scanned with a smart phone or tablet, providing instant access to the model for that portion of the building. The activated model is located at a consistently fixed point, allowing visualization of the more complex and intricate elements of the building work, as well as access to more information than what is available in the Construction Documents.
LESSONS LEARNED
1. Setting up the model accurately in SketchUp, and translating it into AR with enough compression but at the same time without compromising functionality or data integrity, is fundamentally important.

2. QR codes appear to compress the model even further and have easier functionality.

3. The model remains tied to the tablet and scales relative to itself. To be accurate enough to use for clash detection, quality control, and accurate visualization, we need to be able to pin the model to the site with GPS—so we can walk around it—rather than pinning the model to the tablet and the person holding it.

GAME CHANGER
As AR technology matures, becoming more accurate and user friendly, we predict we’ll see more of it on the jobsite. We think AR can do for 3D modeling what 3D modeling did for 2D drawings – transforming the way we work together and communicate, and creating even more opportunities for accuracy, efficiency, and time and cost savings.

We know there are great things coming. In early 2015, Microsoft launched its new AR initiative—Windows Holographic—that looks set to transform the way we interact with the world around us. From what we read, it could solve many of the issues we run into with the current generation of apps.

WHAT’S NEXT
We’re on the edge of another evolution in project delivery. We see a future where we can show the Owner what a building will look like on site before a single brick is laid. We imagine stepping through different entrances, standing under canopies, and exploring the experience with the Design Team; we can walk the site with City and Utility inspectors using X-Ray vision to study the infrastructure beneath.

The potential is tremendous, and GLY is confidently moving forward.