Virtual Modeling for Traffic and Construction Visualization

The LBJ Express Project in Dallas, Texas

**Timeline of the 3-D drive-through videos created for cross-street bridge work**

- Joe Ratliff Walkway - Demolition over I-635 eastbound main lanes
- Montfort Drive - West half demolition over eastbound main lanes
- Montfort Drive - West half demolition over westbound main lanes
- Resser Road - Complete demolition
- Montfort Drive - Beam hanging over west half
- Joe Ratliff Walkway & Resser Road - Beam hanging
- Welch Road - Complete demolition
- Joe Ratliff Walkway - Bridge span placement Resser Rd - bridge deck pour

**Project Facts**
- **Total Project Cost:** $3.1 billion
- **Term:** 52 years
- **Comprehensive Development Agreement (CDA) executed:** September 4, 2009
- **Construction:** $2.6 billion ($490 million TxDOT/public funds); $664 million equity from LBJIG; private activity bonds (PABs), $615 million; federal Transportation Infrastructure Finance and Innovation Act (TIFIA) loan, $850 million
- **Operations and Maintenance Costs:** $550 million (2008 dollars)
- **Length:**
  - I-635 from east of Luna Road to Greenville Avenue: Approximately 10.7 miles
  - I-35E from south of Loop 12 to south of Valsesia Parkway: Approximately 5.8 miles

**4-D Construction Animation**

In order to assist the TxDOT public information officers, CFB accurately creating a 4-D model that virtually show the construction of the project using the latest CPM schedule. Also incorporated will be the demolition of the current facilities as well as any temporary conditions. The model can potentially be shared with anyone, but is specifically geared towards project stakeholders, elected public officials, and local policy makers without experience in reading construction plans and understanding CPM schedules. A small segment of the entire project around Preston Freeway is presented here as an example. The images show the construction of the new cross street bridge in segments along with the rest areas needed. Furthermore, the sequence of construction of the frontage roads, general purpose lanes, and finally the managed lanes are depicted as well. The actual videos of the construction process will have the durations of the activities incorporated from the CPM schedule.

**3-D Drive-Through Communication**

**Informing the Public** The Dallas District of TxDOT has employed the use of 3-D virtual drive-through modeling to communicate short term (15 hour max), multilane closures (1 lane open) on LBJ Expressway (I-635). Through this, first-of-a-kind, virtual drive perspective modeling, TxDOT has been able to educate and inform the public about various detours and lane closures to mitigate potential congestion, travel time, and navigational issues for the users of I-635 corridor through Dallas, TX. The videos proved very useful in depicting the temporary lane-configurations, the time frame, and how the configuration would affect the exit and entrance ramps to both the traveling public and other project stakeholders.

A series of videos has been created using the latest available CAD software to minimize the costs and maintain the benefits for each individual closure to eliminate any noise over the 1354 mainlanes necessitated due to the reconstruction of various cross-street bridges. They were shared with the public through the video sharing website YouTube. The links to the videos were sent out to the media advisory and alerts for the Public Relations Office of the I-635 Infrastructure Group. The I-635 Infrastructure Group also included links to the videos on their website, Twitter feed, and Facebook feed. From there, different media outlets shared them as needed. This is the **underlying output** where the videos were at the time the video was created.

**Project Location Map**

- Pictometry® Oblique Imagery

**Future Research for Virtual Modeling**

Pictometry® Oblique Imagery

CBT will be exploring the use of oblique imagery for use in 3-D and 4-D models. Pictometry will incorporate serial images of existing buildings, which will provide geographical context and room for the targeted audience.

**Public Education for Newly Completed Construction**

The new facilities on LBJ Expressway will be radically different from the current. For example, the new managed lanes do not have all of the same entries and exits that are available for the general purpose lanes. Only 5 entrances and exits are available. In order to help educate the public about the new lane configurations, CFB could potentially create 3-D drive-through videos (similar to previous) from the 4-D models in its completed phase.

**Educating the Media**

Heather Newsom, Public Relations Manager for Preston Freeway Infrastructure said that: “The videos not only educated the public, but also helped educate the media about the closures and lane configurations they could inform the public accurately and quickly.” This was a benefit we did not anticipate.