Company Background

- Products we produce
  - Precast/pre-stressed beams for highway construction
  - Commercial products for parking garages and buildings

- How we got into 3D modeling and B.I.M.
  - PCSC established in April 2001
  - Tekla Xsteel selected from a field of major software vendors (Autodesk, Bentley, Nemetschek, Solidworks)
  - Tekla Structures Precast released for commercial use in September 2005
  - Used for commercial projects since 2004, began use for selected bridge projects in 2009
Why We Chose Tekla

- **Ability to handle large, highly detailed models**
  - Innovative way of modeling and handling rebar in a lightweight manner

- **Commitment to interoperability**
  - Able to handle a large number of 3D/BIM information exchange formats (ifc, dwg, skp)
  - Partnered with major software vendors to create plug-ins for exchanging information (Autodesk Revit, Graphisoft ArchiCAD)

- **Easy to customize**
  - Standard catalogs of products, embeds, inserts, etc.
  - Drawing templates, reports
Example Projects

**Sherman Valley**
S.R. 1020 SEC. 02B over Sherman Valley Run in Bedford County, PA

**Ashcom**
S.R. 1004 SEC. 001 over Cove Creek in Bedford County, PA

**Wampum**
S.R. 0288 SEC. L10 over Wampum Run in Lawrence County, PA
Sherman Valley
Sherman Valley

Precast Footings
Sherman Valley
Sherman Valley
Sherman Valley
Sherman Valley
Sherman Valley
Sherman Valley
Ashcom Cove Creek Bridge

- Precast deck modules with integral parapets
- Precast approach slabs
- Precast abutment and wing walls
- Pre-stressed bulb tee beams
- Precast footings
- Precast approach slabs
Ashcom Cove Creek Bridge

- 1 Wall Panel per Wing Wall
- Corner Transition
- NMB Splice Sleeves for Vert Reinf Continuity
- 2 Wall Panels per Abut Breast Wall 15’ High
- Transverse Post-Tensioning Duct
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge
Ashcom Cove Creek Bridge

Completed Project
54 Calendar Days
Wampum
Wampum

- Precast wing wall with integral curb
- Precast cheek wall
- Precast back wall
- Precast pile cap
- Steel pile
Wampum

Precast deck module w/ integral curb

Steel beam cast into deck module
Wampum
Wampum
Wampum

7 days from closure to reopening of bridge
Current Process

1. Contract drawings
2. Transfer contract drawing info to 3D model
3. Generate 2D drawings from model
4. Submit drawings for approval (PDF)
5. Approval received
6. Initial materials info to purchasing
7. Finalized materials to purchasing
8. Deliverables to production and the field
9. Preliminary details
10. Material lists
11. Drawings
12. Reports
13. Data to ERP
14. Final material lists
15. Approved details
Outputs

Piece Detail
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Outputs

Bar Bending Schedule and Lifter Detail for Steel Shop
Outputs

Miscellaneous Material Details
Advantages

- **Realized**
  - Standard components help ensure design standards are followed (reinforcing, embed placement)
  - Automatic material counts
  - Automatic creation of some drawing details

- **Possible in the future**
  - Direct output to CNC machines (rebar bending, casting bed layout)
  - Take 3D to the field to supplement or eventually replace paper drawings
Traditional 2D Collaboration

Design Development

Project Duration

Transfer of Drawings

Transfer of Drawings

Transfer of Drawings
3D Collaboration

Design Development

Project Duration

Transfer of 3D Data

Transfer of 3D Data
Options for 3D Collaboration

- **3D PDF**
  - Everyone has a PDF reader installed on their computer
  - Only useful for viewing

- **3D DWG files**
  - 3D geometry

- **IFC files**
  - 3D geometry
  - Additional non-geometric information (object name, material information)