

Business Advantages of Using Electronic Engineering Data

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AGC/DOT Technical Conference

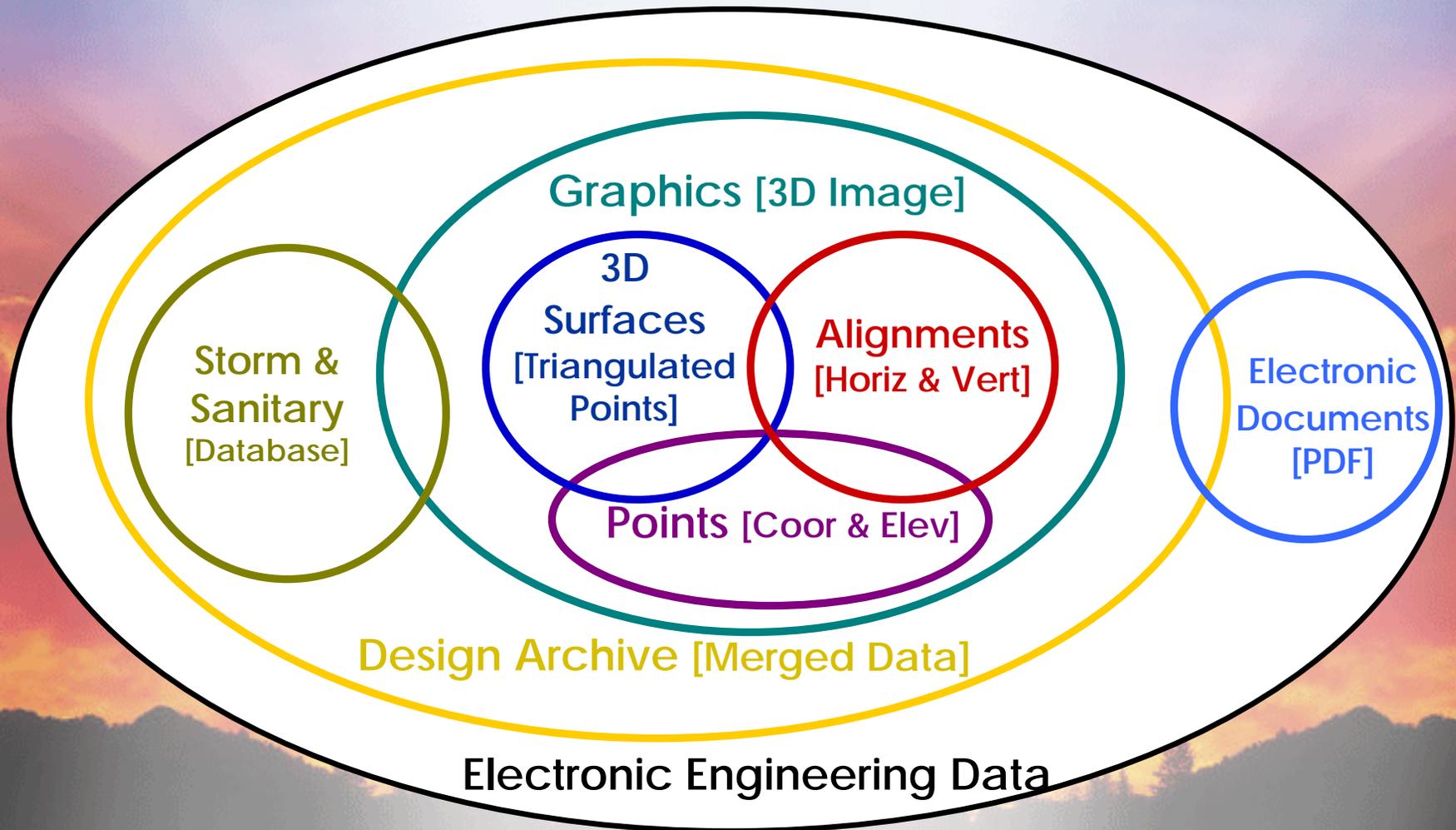
Types of Electronic Engineering Data Created During Project Design

- 3D Surfaces – Triangulated Display of Surface Points – Represent the Existing or Proposed Ground Terrain
- Point Data – Coordinate Position of Engineering Points in Real Space
- Alignment Data – A Series of Related Geometric Points or Lines
- Graphics – Image Created Using Draped 3D Surfaces, Engineering Features or Alignments, and Shapes
- Storm & Sanitary – Database of Drainage and Sanitary Structure and Pipe Line Information
- Design Archive – Merged CADD Graphics, Alignments, 3D Surfaces, Drainage Database and Pay Item Database
- Electronic Documents – Digital Copies of Specifications, Standards and Other Policies

Uses for Electronic Engineering Data During Contract Construction

- Automated Quantities – Automates the Calculation of Quantities [InRoads Quantity Manager]
- Automated Stakeout – Coordinate & Elevation Positions Used With GPS or Total Station to Stakeout Points [Contractor Stakeout]
- Graphical Stakeout – Items to be Staked Out are Selected Graphically, With Survey GPS to Stakeout Features [CEI Toolset]
- Machine Navigation – Utilizes 3D Surfaces & Alignments to Guide Operation of Equipment
- Graphical Inspection – Items to be Inspected are Selected Graphically, With Survey GPS to Verify Items [CEI Toolset]
- On-Demand Information – Instant Access to Routine Documents, Available on Tablet or Handheld PC

Electronic Engineering Data



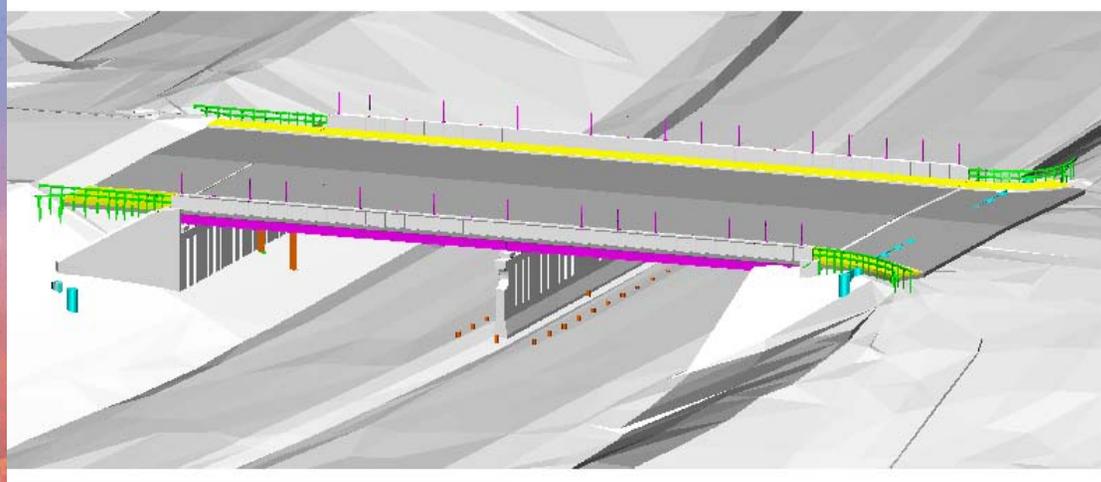
Data Uses In Construction

Applications Data Type	Automated Quantities (Quantity Manager)	Automated Stakeout (Contractor Stakeout)	Graphical Stakeout (CEI Toolset - Stakeout)	Machine Navigation	Graphical Inspection (CEI Toolset - Inspection)	On-Demand Information (Instant Field Access)	Data Description
3D Surfaces (DTM)							Existing or Proposed Terrain Surface w/Points and Breaklines
Point Data (Coor & Elev)							Just Points With Coordinates & Elevations
Alignment Data (Features)							Points or Lines Assoc Together w/a Horiz and/or Vert Alignment
Graphics (3D Images)							Points, Lines, Shapes & Solids Presented as a 3D Model
Storm & Sanitary (Database)							Database on all Storm & Sanitary Engineering Information
Design Archive (Merged Data)							Merged Archive of All Above Engineering Information
Electronic Documents (Digital Paper)							PDF Copies of Pertinent Paper Policy Documents

What is Wrong With 2D Paper?

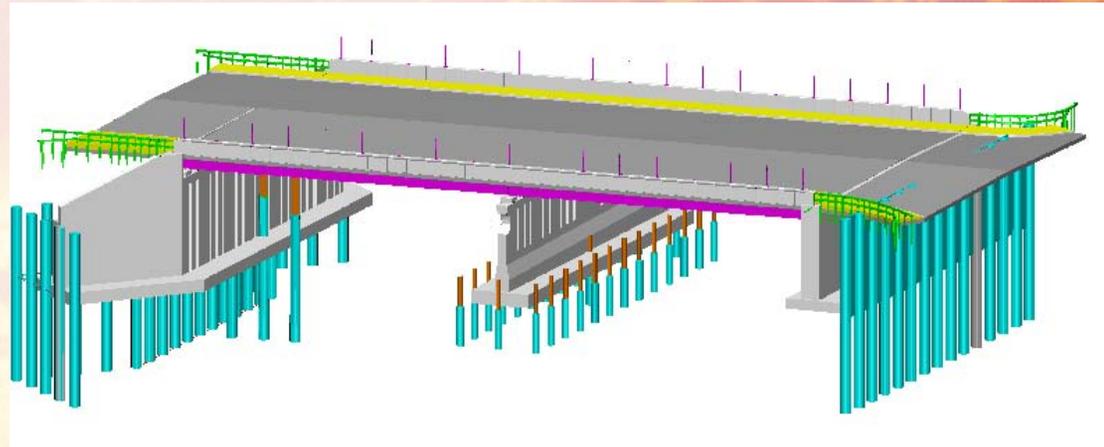
*Misinterpretation
of 2D Can Lead to
Costly Mistakes,
Re-Work & Delays*

3D Data Use for Construction



- Visualize How Components Fit Together
- Identify Construction or Vehicle Conflicts
- Rotate or Move to View Different Perspectives

- Early Detection of Potential Underground Utility or Drainage Conflicts
- Bridge Foundation Considerations



Machine Navigation Systems

Utilizes 3D Surfaces & Alignments

*Electronic Data
Can Automate
Construction
Operations*

Rough Grading w/GPS

Fine Grading w/RTS

Trenching w/GPS

Benefits for Inspection & Stakeout

This stuff is amazing

CEI TOOLSET

Hands-On

Workshop

Thursday @ 8:30AM

- Identify Feature Graphically
- Verify Feature Information
- Verify Position Instantly
- Track Who & When Approved

- Select Features Graphically
- Stakeout as Needed by Offset
- On-Demand Proposed Location and Elevation

Return on Investment (ROI)

- ✓ Eliminate Reverse Engineering – Provide Electronic Data Directly to Contractors for Field Construction
- ✓ Graphical Stakeout & Inspection – Features Can Be Positioned by Offset, Verified, Quantified and Approved by Inspectors Instantly in the Field
- ✓ Machine Guidance Systems – Estimated Dirt Savings:
 - 50% Savings on Equipment – Less Use & Field Adjustments
 - 80% Savings on Survey – Little or No Roadway Stakeout
 - 75% Savings on Labor – Less Hand Work & Field Adjustments
 - 4% to 6% Savings on Material Overruns
 - Potential 5-10% Savings on Dirt Items
 - Big Safety Benefits – Less People on the Ground

Electronic Data = Lower Risk = Lower Costs

- ✓ Increases Confidence in Constructability of a Project
- ✓ Reduces Chance of Encountering Unexpected Problems
- ✓ Decreases Manual Calculations – Increases Operational Efficiency
- ✓ Reduces Misinterpretation of 2D Designs
- ✓ Eliminates Need for Paper Cross Sections and Planimeters
- ✓ Faster and More Accurate Earthwork Balance Calculations Prior to Bids



- Discussion -
- Questions -
- Comments -