



Features and Benefits

CAiCE™ Visual Construction® 10 software brings a new approach to construction automation. The contractor now has tools to make volume decisions and estimates without using planimeters. You can receive data electronically, use 3D visualizations to preview it, and create mass haul estimates to better monitor construction and save money. The software provides a comprehensive set of utilities to accurately model a proposed project during the construction process, recalculate design models to match field conditions, and model as-built construction at different phases of the project. Periodic resurveys of as-built conditions are used to calculate quantities for progress payments. For added productivity, CAiCE Visual Construction integrates Microsoft® Visual Basic® for Applications (VBA) so you can customize the product to your workflow.

CAiCE Visual Construction comes with the CAiCE Project Manager, drawing import/export capability (supporting DWG and DGN formats, and others), basic drafting tools, and a powerful graphics engine. Primary features include the following:

- **Visualization**

With CAiCE Visual Construction you can see the proposed and as-built pay items in section, plan, and perspective view simultaneously as the project develops. This capability makes it easy to spot and resolve areas of discrepancy between plan and final pay quantities.

- **Feature Codes**

In CAiCE Visual Construction a unique feature code is associated with all project pay items. Unlike other systems, CAiCE Visual Construction uses a feature code table to represent all pay items according to specific, user-defined CAD standards. To calculate quantities, it is not necessary for all cross section links to be of the same color, style, and weight. Instead, all cross section links and pay items have an associated feature code that is used when calculating quantities for pay. This ability to associate items with a feature code instead of CAD symbology minimizes errors caused by inaccurate drafting.

- **Digital Terrain Modeling**

Underlying the software's advanced cross section editing tools is a fast and accurate digital terrain model (DTM). CAiCE Visual Construction software's DTM represents many different types of surface models for computational purposes, including proposed and existing terrain, unsuitable material, subgrade material, bridge decks, and day-to-day surfaces of borrow pits or stockpiles. In addition to the volume calculations available when using the average end area method, CAiCE Visual Construction software's DTM allows for prismatic (surface-to-surface) volume calculations of pay item quantities.

- **Cross Section Editing**

CAiCE Visual Construction provides extensive cross section editing tools that help you accurately represent the true state of the cross section surface before construction. You can make revisions on the fly, without having to update cross section files using common drafting commands. The software also provides easy-to-use tools that check closed areas for accurate volume generation and insert, delete, or update cross section links.

- **Computing Earthwork and Volumes**

Powerful yet easy-to-use earthwork computation capabilities enable you to classify and compute volumes for different material types.

- **Scalability and VBA Customization**

To meet the needs of both small businesses and large organizations, CAiCE Visual Construction can be customized to meet coding, plans production, operations, and CAD standards.

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| Feature | Function | Benefit |
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| Digitizing from design drawings | Construction estimating from design drawings is interactive and easy with CAiCE Visual Construction. You can load 2D and 3D design data into CAiCE Visual Construction by digitizing from plan and cross section drawings or by importing from digital design data. | Increases productivity by providing an easy and accurate way to create estimates from design drawings. |
| Earthwork analysis | The software generates detailed volume reports using either the surface-to-surface or average end area method for excavation, embankment, paving and surfacing materials, concrete and other structural materials, milling and resurfacing quantities, topsoil stripping, surcharge, borrow pits, special backfill, and unsuitable material excavation. <ul style="list-style-type: none"> • Volume calculations for all project phases • Gaps for structure openings • Run-in and run-out of materials to actual starting and ending stations • Changes in expansion and compaction factors • Borrow and waste | The ability to quickly and accurately define earthwork exceptions for beginning and ending materials, gaps, borrow and waste, and changes in cut and fill factors helps to increase your productivity. |
| Quantity estimating | You can use the software’s feature code–driven database to define a detailed table of pay items. From this table you can produce quantity estimates for paving materials, structural components, striping, barriers, guardrails, signals, signs, drainage structures, and all other types of pay items. For each item, you can | Feature codes provide a quick and accurate way to generate quantity estimates for a variety of pay items. |

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| | <p>calculate quantities from object values such as number found, length, area, or volume.</p> <ul style="list-style-type: none"> • Feature code–driven quantity tabulation • Customizable pay item tables • Quantity calculations to printed reports or to spreadsheets • Detailed reports | |
| Mass haul | <p>The mass haul features of CAiCE Visual Construction enable you to</p> <ul style="list-style-type: none"> • Tabulate mass haul reports • Draw mass haul diagrams • Calculate free haul, dead haul, and overhaul distances | <p>The enhanced plotting of mass haul diagrams provides more detailed comparatives, with split-screen capabilities for viewing both the plan and diagrams. This feature also creates accurate mass haul estimates, making it easier to monitor construction and cut costs.</p> |
| Stakeout reports | <p>Using Microsoft’s VBA macro language, CAiCE Visual Construction generates a complete set of stakeout reports for construction layout. These reports include radial stakeout of points, curves, and spirals; stakeout of curves and spirals by tangent offsets; radial stakeout of chains; stakeout of chains by even stations; stakeout from one chain to another; and slopestake reports for design sections.</p> | <p>Using VBA, you can quickly and easily generate fully customized stakeout reports to fit your organizational requirements.</p> |
| Customizable reports and plans | <p>You can create customized alignment and profile descriptions, cross section surface reports, quantity estimates, milling and overlay reports, stakeout reports, and cross section drawings. Reports can be created directly as text files, Microsoft® Word documents, Microsoft® Excel spreadsheets, and Microsoft® Access databases.</p> <ul style="list-style-type: none"> • Radial and station offset stakeout reports • Detailed slopestake reports created from roadway design models • Library of customized slopestake reports • Customizable reports for milling, leveling, and resurfacing • Earthwork volume reports | <p>CAiCE Visual Construction’s integration with VBA gives you the tools to create a variety of reports and drawings in any format you choose. You can produce the reports and drawings that best suit your requirements.</p> |

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| Geometric layout | <p>With CAiCE Visual Construction, you have</p> <ul style="list-style-type: none"> • Interactive tools for defining geometry elements and chains • Multiple methods to store points, curves, and chains • Ability to define points by known coordinates, latitude or longitude, locating by direction and distance or angle and distance, alignment stations and offsets, intersections, projections onto other objects, and tangencies on curves • Advanced tools to define edges of pavements, intersection geometry, compound curves, and all types of spirals | <p>The software's coordinate geometry tools are simple, powerful, and interactive. CAiCE Visual Construction provides double-precision accuracy in all calculations, ensuring the highest order of accuracy for all coordinates.</p> |
| Data import and export | <p>CAiCE Visual Construction software</p> <ul style="list-style-type: none"> • Supports all major data collectors for import and stakeout • Imports and exports reduced survey data • Exports CAiCE database to a format that you define • Imports data from all major civil software packages | <p>Increases productivity and ease of use by supporting the most popular data collector formats on the market. Other data collector formats are easy to add through VBA.</p> |
| DTM modeling and viewing | <p>Powerful and fast DTM algorithms mean your systems perform well even with large DTMs. DTM features include the following:</p> <ul style="list-style-type: none"> • Ability to easily handle large data sets such as USGS DEM (digital elevation models) • Ability to drape single or multiple USGS 7.5-minute quad maps onto a DTM surface model • Simplified point and breakline editing • Cross section construction • Tagging of obscured areas • Easy loading and construction • Curved breaklines • Viewing, rendering, and editing • Freehand cross sections and profiles • Terrain and DTM visualization • Color by elevation • Breakline crossing resolution • Ability to easily combine existing and proposed surface models • Accurate earthwork computation using | <p>Fast DTM creation, viewing, and editing increase your productivity. By combining spreadsheet-type interfaces with real-time graphical updates, you can make fast edits without having to regenerate complex graphics. The Auto Track feature built into the DTM creation and editing tools enables you to automatically pan to a specific area of interest, without having to spend extra time panning and zooming around the project area.</p> |

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| | <p>surface-to-surface volumes</p> <ul style="list-style-type: none"> • Ability to view aerial photographs at correct location, scale, and orientation • Ability to drape aerial photographs onto DTM surfaces • Ability to map images to real-world coordinates • Realistic, on-the-fly renditions of survey data • AVI files for drive-throughs, reviews, and client presentations | |
| Cross section editing | <p>CAiCE Visual Construction software provides</p> <ul style="list-style-type: none"> • Complete tools for editing cross section points, links, and surfaces over a range of stations • Multiple tools for creating, editing, and adding field-measured surfaces • Definition and modeling of topsoil stripping and surcharge surfaces • Advanced editing tools for extending, trimming, and closing surfaces • Definition and modeling of rock surfaces | <p>Cross section editing tools enable you to graphically modify cross section links to reflect the true state of the design surface before construction. Various tools to check closed areas for volume generation, and insert, delete, and update cross section links ensure accuracy.</p> |
| Freehand cross cross-sections and profiles | <p>CAiCE Visual Construction software's database structure enables you to view freehand sections and profiles immediately and displays breakline feature codes in the view. Cross sections can be saved or added to existing cross section files.</p> | <p>Increase productivity with tools for fast and simple viewing of freehand sections and profiles. You can view terrain cross sections and profiles simply by dragging a freehand line across the DTM surface.</p> |
| Geotechnical toolbox | <p>With CAiCE Visual Construction software, you get</p> <ul style="list-style-type: none"> • Easy creation of subsurface digital terrain models • Comprehensive borehole editor for data input • Easy plotting of borehole information in 3D, cross section sheets, and profile sheets | <p>Provides greater productivity with tools for easy creation of subsurface DTMs and comprehensive borehole editing.</p> |

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| Roadway design | <p>CAiCE Visual Construction offers advanced roadway design functions, including tools for</p> <ul style="list-style-type: none"> • Traffic rerouting and detours • On-site design changes • Superelevation definition • Creating and editing horizontal alignments and profiles • Interactive cross section design | <p>The ability to easily reflect on-site changes to proposed plans ensures accurate and timely payment of materials.</p> |
| Progress payments | <p>CAiCE Visual Construction provides utilities for progress payments:</p> <ul style="list-style-type: none"> • Make progress payment calculations during any phase of construction • Calculate final estimates • Merge current field conditions with existing terrain models, earlier construction phase models, and proposed design models to generate intermediate surface models and progress payment tabulations | <p>The automated calculation of progress payment estimates ensures accurate and on-time billing.</p> |
| Survey | <p>CAiCE Visual Construction</p> <ul style="list-style-type: none"> • Supports all major data collectors • Surveys and models existing terrain • Collects data for topsoil removal, rock outcrops, and other special materials • Remeasures during construction for progress payments <ul style="list-style-type: none"> • Exports design geometry directly to survey data collectors | <p>The ability to reuse data without having to spend time recollecting work in another format helps increase your productivity.</p> |
| Visualization, graphics, and imaging | <p>CAiCE Visual Construction offers dynamic visualization tools to</p> <ul style="list-style-type: none"> • View contours, wireframe grids, slopes, and drainage information in 3D • View background files • View aerial photographs at their correct location, scale, and orientation • Drape aerial photographs onto DTM surfaces • Use JPEG, TIFF, BMP, CMP, KODAK, and other major formats • Map images to real-world coordinates • Display realistic, on-the-fly renditions • Create and play AVI files for drive-throughs, reviews, and client presentations | <p>Visualization is done in real time directly from the project database and does not require extensive preparation. As a result, modeling becomes a visual process with highly realistic renderings of existing conditions.</p> |

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| Database properties | CAiCE Visual Construction offers double-precision storage for all values. It also provides full geodetic support for state plane zones, Universal Transverse Mercator (UTM) zones, and grid-to-ground conversions. | Full 32-bit precision eliminates dependence on the accuracy of a CAD drafting tool and ensures accuracy and integrity of all digital design data. |
| Translators and CAD compatibility | CAiCE Visual Construction offers <ul style="list-style-type: none"> • Ability to import and export data from other civil software packages • Complete compatibility with AutoCAD® and MicroStation® software applications | Import and export capabilities allow the reuse of existing data in other formats, easing the transition to CAiCE Visual Construction. |
| Drafting and plans production | CAiCE Visual Construction offers utilities for drafting and plans production, including <ul style="list-style-type: none"> • Plotting—plans, profiles, cross sections, and plats • Text manipulation, editing, and labeling • Customizable annotations of alignments and profiles • Creation of as-built plans • Drawing of line segments, line strings, cells, and shapes | Less time spent on drafting cleanup means you can focus on data quality instead of on data presentation. |

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