



Terramodel Software for Construction

INTEGRATED SOFTWARE FOR IMPROVED CONSTRUCTION PROCESSES

Today's construction industry demands high accuracy and maximum efficiency throughout the construction process. In this tough, competitive industry, where mistakes can be time-consuming and costly, Trimble's Terramodel[®] software provides you with a complete and comprehensive system to meet all of your construction needs.

Terramodel automates construction calculating and reporting tasks—saving you time and money—while also producing reliable stakeout data, 3D machine control data and quality control information. Reliable data minimizes rework on site.

Push construction tolerances to their limits and reward your organization with added profits from material and rework savings. At the same time you have the confidence that your work will stand the test of time.

TERRAMODEL DELIVERS SIGNIFICANT TIME SAVINGS by providing solutions for all construction projects. It provides tools for the essential tasks of bid estimating, volume analysis, and data preparation for stakeout and machine control. Data flows seamlessly from the original survey to the design and then to construction stakeout or machine control—without the need for data exchange or the reformatting of information. This streamlined process eliminates errors and improves the quality of your work. The software’s modular approach allows you to utilize only the components you require at a given time, while giving you the flexibility to expand to meet new needs as they arise. Terramodel is the ideal package for all survey, design, and construction work. These Technical Notes focus on how Terramodel can be used for construction applications.



CONSTRUCTION

Terramodel uses a single-file project-model database that supports construction activities. It provides you with one tool that can be used for surveying and engineering tasks, as well as construction tasks such as calculating cut/fill volumes, creating stakeout data and reports, calculating mass haul and construction phasing, preparing data for machine controlled construction, and producing as-built survey records during the construction phase. Projects created in Terramodel are straightforward to construct on site because they come from a model and not just a drawing.

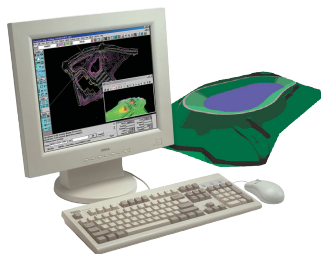
Terramodel provides the following features for construction:

- Data import and export, verification, and troubleshooting
- Mass haul and phasing computations
- Volumes from DTM surfaces and cross-sections
- Residential, commercial, and industrial site design
- Estimating and material takeoff for contract bidding
- Design adjustment during construction
- Plan set and as-built survey records
- Stakeout data preparation—points, alignments, surfaces, grids, design models
- Heavy highway and road engineering
- Groundworks and earthworks designs and analysis
- Landfill design and waste cell construction
- Machine control data preparation and grade checking
- Design and build
- Project visualization and data verification
- Construction GIS



SURVEY

The Terramodel software is ideal for a range of survey work, including the processing of (conventional or GPS) topographic surveys and control networks, as well as CAD editing and digital terrain modeling. The benefits of Terramodel’s unique real-time database for the surveyor are enormous. Creating a project is simple and straightforward—raw survey data is automatically reduced to points and lines contained in a single project file. The final drafting is a reflection of your actual survey data. For more information about how Terramodel can be used for survey applications, see the Terramodel Software for Surveying Technical Notes.



DESIGN

Terramodel also gives civil engineers a complete tool set for design that enhances capabilities and productivity from the initial survey to final construction. Terramodel supports the design of roads, bridges, railways, sewers, surfaces, commercial or residential sites, and new infrastructure with advanced design concepts. Projects are modeled using plan, profile, and cross-section views. Terramodel manages large jobs easily as the software handles hundreds of thousands of points and seamlessly integrates survey and construction data in a single project file.

INTRODUCTION

The Terramodel software belongs to Trimble’s range of products that help you to save time and money on all types of construction projects. The many features in the Terramodel software are built on years of experience in the construction industry.

BID ESTIMATING

Terramodel provides the ideal tools for estimating during the bid phases of a project. You can do material takeoffs from plans and cross-sections, and enter design data to engineering precision, so that when you win the contract, you are ready to start work right away. Terramodel also allows you to calculate volumes for different phases of a project, so that you can accurately plan and measure the materials you move at each stage.

ESTIMATE FOR JOB #RP24767

Bid Item	Quantity	Unit Price	Total Cost	Adjusted Total
				Trimble 3D Machine Control
Mobilization	LS	31,570.00	31,570.00	31,570.00
Silt Fence	5,700.00	1.60	9,120.00	9,120.00
Survey Staking		126.58	13,999.75	10,000.00
Clearing and Grubbing	110.60	1.25	408,750.00	-19,620.00
Mass Excavation	327,000.00	15.50	223,975.00	-3,612.50
Install Aggregate Roadbase Material	14,450.00	17.25	230,011.50	-3,333.50
Fine Grading	13,334.00			
Project Totals			967,426.25	-66,566.00
				900,860.25

With Terramodel you can get all the data you need for stakeout, machine control, and estimating from one software package, so you’re saving money all the way.

STAKEOUT DATA PREPARATION

Terramodel provides you with tools for preparing data for stakeout and for resolving problems with imported data (especially CAD graphics data). These tools save you time and reduce the errors before you leave the office. When you import CAD data, Terramodel automatically creates points at polyline nodes (for example, house corners and pile cap locations), to help you create stakeout data. You can also create a 3D surface from a 2D CAD drawing with elevation text or contours.

You can add standard shapes (for example, building pads) to your drawing and rotate them to the correct positions. Points are then created at the node points.



Terramodel makes it easy to export points and alignments to a data collector by allowing you to graphically select the data you want to export.

3D MACHINE CONTROL DATA PREPARATION

For stakeless machine control applications Terramodel allows you to import or key in data, and it provides tools for obtaining design data from plans and digitized drawings. For machine control you can export TIN DTMs, grid DTMs, or 3D design model files.



The Road Engineering module gives you advanced tools for automating the creation of 3D models, including the computation of daylight lines in cut and fill.

TERRAIN MODELS AND SECTIONS

Create cross and long sections through multiple surfaces— Terramodel automatically creates cross-section views and a sheeted layout of multiple cross-section drawings, complete with full annotation. (Cross-sections are created against a horizontal alignment and cross-section locations placed at critical points and regular intervals along the alignments.)

- stakeout control
- cut sheet reports
- volume reports—reports can be pasted on to drawings where required

TEMPORARY WORKS

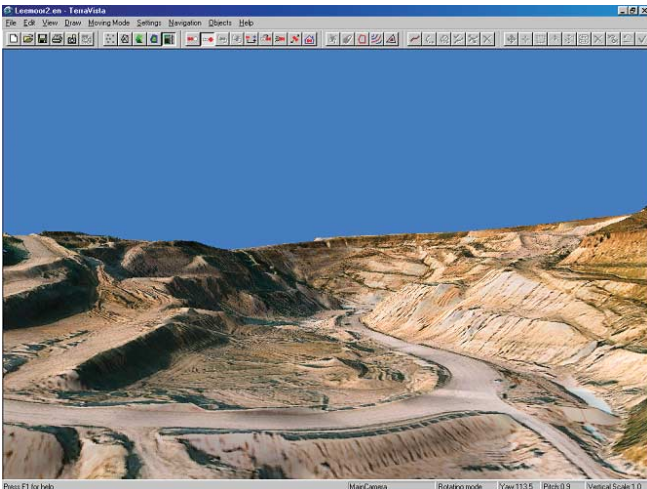
Terramodel’s surface-design features for borrow pits, lagoons, embankments, berms, bunds, benches, haul, and access roads make it the product of choice for facilitating construction infrastructure and temporary works.

DESIGN ADJUSTMENTS

When you receive design changes from the engineer, Terramodel makes it easy for you to adjust the design so you can get back to work with minimal delay. Terramodel also allows you to view and calculate the volume changes that result from design changes.

3D INTERACTIVE VISUALIZATION

Using the Terramodel Visualizer you can view your DTM interactively from any position and distance. Surface color is controlled by point color—features can be colored differently resulting in realistic visualizations of the survey. Even more realistic 3D views can be created using surface rendering techniques and the placement of 3D objects in the scene. Alternatively, aerial photography can be draped over the model as shown.



Terramodel Visualizer allows you to visualize and analyze the finished site before you put a blade in the ground, streamlining the planning and approval process.

GRADE CHECKING

In addition, the Terramodel Visualizer allows you to compare two DTMs and produce a grade check report as well as a DTM surface to check that you have achieved the design grades.



TERRAMODEL SOLUTION PAKS

Terramodel is a software system comprising multiple modules that can be purchased individually or as Solution Paks combining several modules. Adding modules to an existing system is easy, just use the form in Terramodel to email/fax your order.

Trimble will provide you with the upgrade codes to activate the modules you need—it’s that simple.

The following table shows the modules and recommended Solution Paks for construction.

Modules	Recommended Solution Paks		
	Site Design	Road Construction Engineering	Construction
Field Data Module ¹	•	•	•
CAD Module	•	•	•
Contour Module	•	•	•
COGO Module	•	•	•
Site Design Module	•	•	•
Road Design Module		•	•
ASAP Module (Automated Sheet Assembly and Production)			•
Terramodel Visualizer Module			

¹ The Terramodel Field Data Module is provided as standard with all Trimble conventional total stations.

RELATED TRIMBLE PRODUCTS

The Terramodel software can be used in conjunction with these Trimble products to give you more flexibility and to open up new areas of work:

- The 5700 GPS Total Station® and 5600 Total Station systems both use Terramodel data in the field for fast, accurate, single-person stakeout work. Field data (conventional and RTK GPS) from these systems can be downloaded into Terramodel.
- BladePro® 3D is a 3D machine control solution using GPS or ATS total station technology. The Control Box software reads Terramodel project files and interactively displays data in a format suited to machine operators. The machine position is used in combination with the Terramodel database to control the machine blade in terms of lift and tilt. Updates of up to 10 times per second provide a grade control system capable of millimeter precision.
- Design data from Terramodel can be used by the SiteVision® GPS machine control system and the Trimble Survey Controller™ software for construction applications.

CONCLUSION

Terramodel provides you with a complete solution for all parts of the construction process—from bid estimating to grade checking, and as-built records. Terramodel automates many of the tasks so you can save time and money.

The flexibility of being able to add modules when you need them gives you the ability to carry out all types of construction work without having to learn how to use multiple software packages. The single software system also means that you eliminate the data loss that is typically associated with transferring information between software packages.

There are fewer steps. There are fewer opportunities for mistakes. There is but one company for all your construction needs.

MINIMUM SYSTEM REQUIREMENTS

Terramodel will run on:

- Any Pentium-based computer
- Windows 95, 98, ME, NT 4.0, 2000 or later
- 800 x 600 resolution and 256 colors

Computer-aided design and visualization are extremely demanding on a computer's processor, memory, and graphics adapter. For huge data sets, Trimble recommends the fastest processor, the maximum amount of memory, and fastest graphics adapter available.



NORTH AMERICA
Trimble Engineering and
Construction Division
5475 Kellenburger Road
Dayton, Ohio 45424-1099
U.S.A.
800-538-7800 (Toll free)
+1-937-233-8921 Phone
+1-937-233-9004 Fax
www.trimble.com

EUROPE
Trimble GmbH
Am Prime Parc 11
65479 Raunheim
GERMANY
+49-6142-21000 Phone
+49-6142-21550 Fax

ASIA-PACIFIC
Trimble Navigation
Australia PTY Limited
Level 1/123 Gotha Street
Fortitude Valley, QLD 4006
AUSTRALIA
+61-7-3216-0044 Phone
+61-7-3216-0088 Fax

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE