



# Virtual Work

July 2006

a newsletter for IES customers and friends

Volume 12.7

## Which to Choose? AG vs. VA

*Did you ever have to make up your mind?*

President Bush is required to make some difficult decisions every day. If he waffles, his political opponents will thrash him. If he makes the right choice, the comics will make fun of him. If he makes the wrong choice, people might die, governments might collapse, or worse, republicans might lose a few more seats, somewhere.

### Two Capable Tools

Structural engineers also have choices to make when it comes to doing our jobs well. When deciding which tool to use for a job, for example, those decisions can still be difficult and critically important. IES does not employ any Rhode's Scholars, or anybody with security clearances (that I know of), yet perhaps we can still offer our counsel on the matter of [AnalysisGroup](#) versus [VisualAnalysis](#).



Sometimes you may not be clear on which to use for a particular job. Here is some information that may help you make the most intelligent choice between these overlapping finite element tools. First we show you the general answers, and then we will discuss the reasons, and some specifics...

Project Characteristics	AnalysisGroup	VisualAnalysis
Shear Wall Systems		
Circular Tank		
Rectangular Plate or Mat Footing		
Irregular Plate or Mat Footing (Unusual shapes, varying soil conditions, changes in plate thickness...)		
Grade Beam Analysis		
Simple Beam Analysis		
Large, Complicated Model		

### Contents

- Which to Choose? AG vs. VA
- Irregular Mat Footings
- New Vistas Chronicles
- Install & License Tips
- Latest Updates

## New Vistas Chronicle

*Oh Say Can You See...?*

Microsoft [Windows Vista](#) is the forthcoming replacement for Windows XP (or older systems). At present the new Vista system is still in beta testing, with Beta 2 just released and an expected delivery in early 2007. IES is investigating this new system to see how our applications perform, in anticipation that at least some of our customers may move quickly to the new platform.



### Installation Pains

Last night, while watching Stage 17 of the [Tour de France](#) (where American Floyd Landis surged back into the top 3 overall, from 11th place with a stunning stage victory), I spent a good 6 hours watching Windows Vista 'upgrade' my 2 year old Toshiba laptop.

After getting 15 minutes into the install, I had to abort and go uninstall a Microsoft program that was incompatible! This forced me to restart the install, and re-enter the product key again.

It was rather painful to watch the screen showing each task as it was performed:

## AG vs VA (continued)

Project Characteristics	AnalysisGroup	VisualAnalysis
Dynamic Analysis		
Need for Design Checks		
Unusual Boundary Conditions		
Frames, Trusses, Columns		

## Preliminary Conclusions

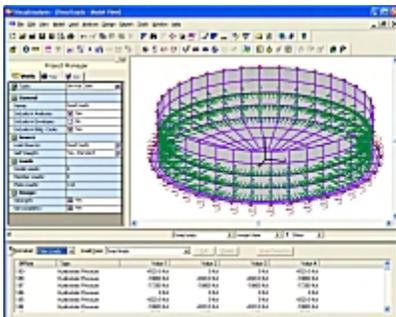
It is fairly obvious from the table that we think VisualAnalysis is a good tool for most kinds of jobs and that there are certain types of jobs that **do not** fly in AnalysisGroup. Let's take a quick look at the strengths and weaknesses of each product.

### AnalysisGroup Strengths

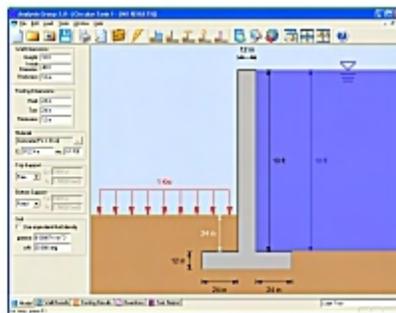
- No 'raw' finite element modeling required, fast project setup
- Fast, concise, and beautiful reports
- Easy handling of shear wall systems, circular tanks, and mat footings
- Focused user-interface showing only those features you need for the job

### AnalysisGroup Weaknesses

- Limited flexibility for special situations: No tapered beams, cannot change soil parameters under a mat footing, no irregularly shaped plates, etc.
- Limited ability to filter and sort in reports
- Piece-meal component analysis rather than comprehensive building analysis



Vs.



## New Vistas Chronicle (continued)

- Copying Windows Files (1.5 hrs)
- Gathering Files (1 hr)
- Expanding Files (30 min)
- Installing Features (just 5 min!)
- Completing Upgrade (???)

After an hour into the final step, I went to bed, deciding that I didn't care exactly how long it took. What's up with 'Gathering Files', did they wander off? I'm thinking the 'Installing Features' speed is a bad sign, though.

## Getting Started

This morning, the machine was running Windows Vista. It seemed to be running OK, except there was some problem with the wireless network card, and I could not see the Internet. I poked around a bit trying to get it to work, but without success. I brought the machine to work and connected it via cable to the network there and was able to run Windows Update. No Surprises here, just 13 updates were available, 56 MB worth of fixes, for this system that I received on DVD just yesterday...It did fix the wireless card problem so I guess it was worth it.

Of course, after I had installed Vista as an upgrade, I read some material online that said upgrading a Windows XP installation was a "bad" idea, that it was much better to reformat the disk and install it new.

## First Impressions: Foggy Views!

Aside from doing the usual annoying thing that all software developers do (moving and renaming our favorite features), Vista appears to have really "snazzy" new icons and backgrounds.

## AG vs VA (continued)

### VisualAnalysis Strengths

- Power, flexibility, generality: solve just about any structural model
- Large model control features: wizards, options, etc.
- Full 3D building modeling capabilities
- Advanced nonlinear features
- Design support: steel, wood, concrete, cold-formed steel, and more
- Graphical and text reports with filtering and sorting capabilities
- Wide array of preference settings to tailor the software for your needs

### VisualAnalysis Weaknesses

- You must "muck about" in raw finite elements: setup and result interpretation is more difficult for some project types (especially 3D plate-element models)
- General-purpose application so you have to know more about how to use the tool and how to set up your projects

### And the Winner Is....

You must still decide the winner based on the type of projects you do regularly. Many IES customers have both tools in their toolbox and can then make the decision on a per-project basis. Hopefully you will be better equipped to choose the right product; the one with minimal loss of productivity and maximum quality for your clients. It's still not too late for you to become president, either.

## Irregular Mat Footings

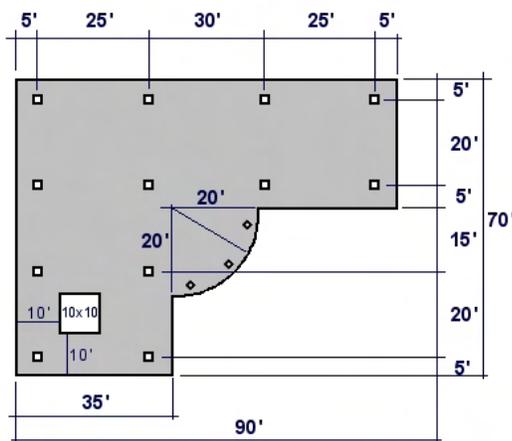
### *How to Analyze an L-Shaped Mat Footing in VisualAnalysis*

At Last! After years of answering the questions, it dawned on us that you might benefit from a tutorial for the finite element way to solve mat footing problems in VisualAnalysis. We have put together a little tutorial that is now available on our web site in the "Movies & More" resources area for VisualAnalysis. You may download this tutorial (#24) along with some project files at various stages of the project:

[www.iesweb.com/products/visualanalysis/resources/](http://www.iesweb.com/products/visualanalysis/resources/)

The remainder of the article is the **executive summary** in case you just want the "big" picture and you can put off the details until you really them...

### The Sample Project



## New Vistas Chronicle (continued)



My old laptop does not have enough video card memory (32MB vs 128MB required) to support Vista's new glassy, transparent windows features, however. Vista has also slowed down my machine by 100%.

Every time I try to make an 'admin' change on the machine, Vista insists on asking me to confirm that I actually initiated this change, so security is tighter, and much more annoying. The new [IE7](#) web browser has prevented me from accessing my bank statements at Wells Fargo, so I'm forced to use the free [Firefox](#) browser!

### IES Applications on Vista

The Good news is, that IES VisualAnalysis 5.5 opened OK and seemed to be running. There is a problem using the File | Open command, it will not allow you to read window layouts, analysis results, or design information. You can bypass this problem by opening the .VAP file directly from Windows Explorer though. Other IES applications appear to be functioning normally as well.

The [IES web site](#) also appeared to be working correctly under Vista with IE7.

### The Bottom Line

The bottom line is that there really is no compelling business reason to switch to the new system, even after it is released next year. If you are purchasing new systems, it may be a better system than XP, but that still needs to be proven. You can get at some of the new features, like [Windows Defender](#), and [Internet Explorer 7](#) without resorting to the full new operating system.

If you really must switch, you can be sure that 'current' IES

## AG vs VA (continued)

### The Outlined Procedure

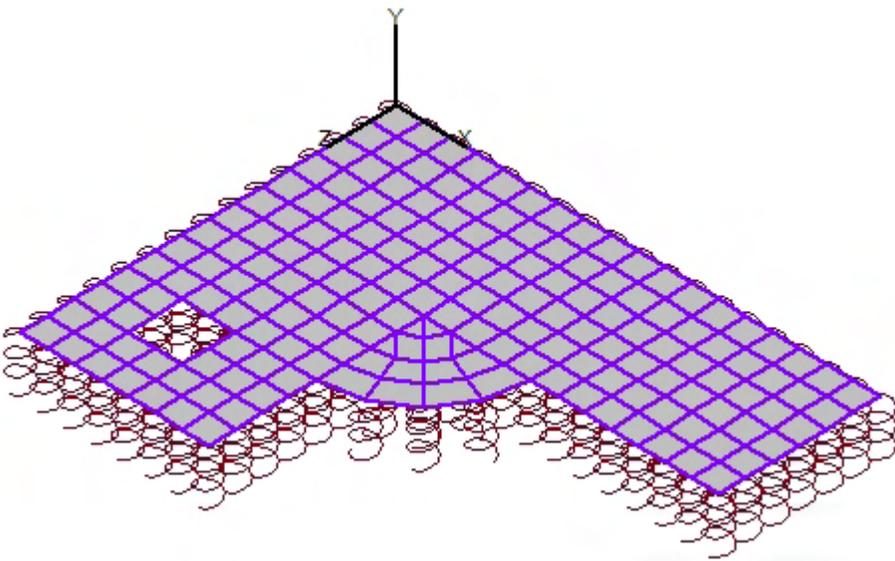
Here is the process we will go through to analyze the mat footing.

- A. Define the Project Geometry, Loads, Materials, and Boundary Conditions
- B. Create the Structural Model
- C. Setup Dead Loads
- D. Check Model & Perform Mesh Refinement
- E. Setup Remaining Load Cases and Combinations
- F. Validate Results and Interpret
- G. Design the Mat

There are a few areas where modeling irregularly shaped mat footings can get tricky, so a few tips are in order. These are explained in more detail in the full tutorial.

### Creating Plate Models

Many VisualAnalysis customers spend lots of times with frame models, and plate models are a bit more intimidating. Plates have to be meshed. They give approximate results. And you have to make choices about your mesh. Some of these topics are covered in other tutorials and in the help file, this tutorial outlines some basic techniques as well.



### Soil Spring Supports

One common question we get is how to determine the spring support stiffnesses for the soil. The simple answer is to use the soil subgrade modulus (also called the subgrade reaction), multiplied by the plate area supported by a spring. The subgrade modulus may be given in a soils report, or pulled from a table using a general classification of the soil.

The soil subgrade modulus can also be estimated as:

$$k = E_s / [ B * (1 - \mu_s^2) ]$$

where  $E_s$  is the soil modulus of elasticity,  $\mu_s$  is Poisson's ratio of the soil, and  $B$  is the width of the footing.

applications will be running OK on the new system. As for IES, we will probably stick with Windows XP, at least for the next 6 months or so.

My old notebook needed some cleaning anyway and is now back up and running (faster than ever) with the tried and true Windows XP.

## Install & License Tips

*No Magic Required!*

Sometimes customer call and ask questions about licensing and activation as if there were some magic incantations required to complete the process. In truth, we have designed a system that is both simple and painless for 99% of IES customers. If you have had or anticipate having problems, you might want to read this brief overview.

### Getting Products Installed

There are two approaches to installing IES software. The most popular is to simply install the software directly from our web site, or to download the installation file and then run it. This is the best way as you will get the latest release. For the direct-install, your web browser must support ActiveX controls (i.e., Internet Explorer!)

New customers may [download the free-trial](#) of a product, existing customers may use the [re-install or update](#) links.

The second method is to install from a CD that IES sent you. This is OK if you just recently obtained the CD, but otherwise results in potential frustration.

### About License Keys

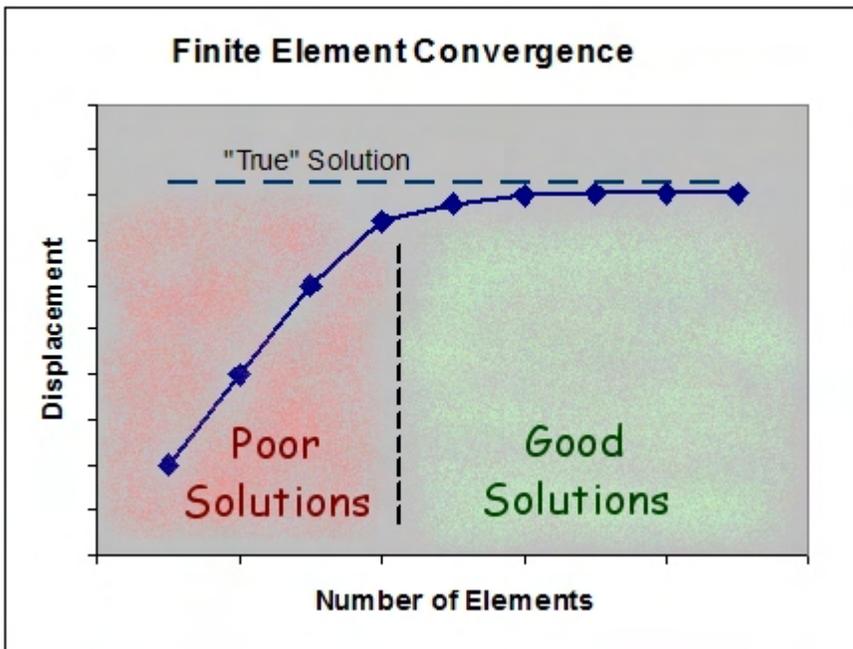
IES license keys haven't really changed in 10 years. The system is simple, allowing a single key to unlock all your IES products, even a prior version as well.

### Mathematical Boundary Conditions

As with all finite element models, you must provide support for all six degrees of freedom in space. With the mat footing you have to use some engineering judgment to determine how and where to place these supports.

### Mesh Refinement

Because plate elements are approximate, and the finite element theory says that with more (smaller) elements you will 'converge' on the true elasticity solution, you should make at least two models to convince yourself that you have minimized the error. The goal is to put your project into the green area of the example chart below, with a minimum of elements:



### Load Case Setup

When you solve a nonlinear problem, you have to think about the individual 'overturning' load cases and what happens if they are analyzed apart from stabilizing factors such as self-weight and dead loads. We show you how to avoid instability issues. We also take a look at the automatic building code load combinations and show you how to speed up analysis and shorten reports by removing redundant load combinations--again requiring judgment that only an engineer can provide.

### Result Interpretation

Finally the tutorial takes a quick look at how you can make sense of the many numbers provided with the plate results. How can you find the design forces you need? How can you determine the bearing pressure under the mat?

For the full blow tutorial and a couple associated VisualAnalysis 5.5 project files, please find Tutorial #24 here:

[www.iesweb.com/products/visualanalysis/resources/](http://www.iesweb.com/products/visualanalysis/resources/)

There are just two 'key' items to remember:

- Only use your most recent software key, destroy all previous obsolete keys.
- Enter the information exactly as provided, with spelling and letter-case.

### Demystifying Activation

Software activation is simply a way for IES to monitor where and how our software and license keys are actually getting used. This system requires the transmission of a unique 'Machine ID' to IES (either automatically or manually) for verification and anti-piracy checks.

This should normally be a one-time, 15 second process after entering a new license key. If the automatic procedure does not work, you may simply transmit the information to us through a [web form](#) or via email. For complete details, there is a nice PDF tutorial available in our [FAQ Answers!](#)

### Rules & Special Situations

If you need to transfer your license, or change the company name, we can create a new key for you (or the new licensee), there is a transfer form at the [Customer Center](#).

IES customers are allowed to use individual licenses on up to three distinct machines, and you may re-install or update the software without damaging the licensing or activation.

### Latest Updates

*No news is good news!*

How about that? IES did not need to release any updates this month. Have a nice summer vacation!