2D to 3D: What Not to Do!
Robert Green – Robert Green Consulting Group

CM3200

Transitioning your company from 2D Autodesk® AutoCAD® software to 3D BIM, civil, or mechanical modeling is tough, but you already knew that. In this class, we learn the key factors of 3D work process success by examining common causes of transitional failure. Key topics include user transition, software transition, ideal hardware configurations, IT issues, training, standards, and management support. We use a chronological approach, taking you from required planning and budgeting to testing through implementation and training. Along the way, real-world tips on how to manage resistance to change and management hesitancy are presented in the framework of saving time and money. No matter where you are in your company's 2D to 3D transition, you're sure to pick up a few good ideas on what not to do in this informative class.

Learning Objectives
At the end of this class, you will be able to:
- Minimize user hesitancy and resistance
- Avoid standards and process errors
- Minimize implementation costs via training
- Avoid IT and hardware errors

About the Speaker
Robert is head of the Robert Green Consulting Group, and an 18 year veteran speaker at Autodesk University. You have likely read his work in Cadalyst magazine, where he authors the CAD Manager; column, or in his bi-monthly CAD Manager's Newsletter. He holds a degree in mechanical engineering from the Georgia Institute of Technology, and gained his CAD skills from 28 years of AutoCAD®, MicroStation®, and various MCAD software systems. Since starting his own company in 1991, Robert has performed consulting and teaching duties for private clients throughout the United States, Canada and Europe.

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Note on Handouts

I view my course handouts as a resource you can skim before the presentation and read in more detail after the presentation. I also sometimes post revised handouts after AU is completed so be sure to check back for any updates.

Do Not – Skip the Sanity Check

If you read all the marketing literature one sees for 3D software systems you’d think the software would run itself. Everything is described as “easy” or “simple” or, my personal favorite, “intuitive.” I’ve been working with 3D CAD software implementations since 1986 using SDRC Ideas, CALMA, Pro-E, Solidworks, Mechanical Desktop, Inventor and Revit and I can confidently say it has never been as easy as the marketing guys would have you believe.

Note: I don’t find BIM implementation any different than any other 3D software no matter what the architects think!

Over the years I’ve developed some truisms that have helped steer me through 3D implementations that I’ll share with you here:

- The best CAD manager in the world can never implement 3D if their management doesn’t back them up, fund them and give them the time to succeed.
- If senior management has an unrealistic expectation of how easy, fast and cheap it’ll be to implement 3D software even the best CAD manager can never live up to these expectations.
- The best implemented software in the world will never be accepted if the hardware and/or network systems of the company aren’t up to the task of running it.
- The greatest software in the world can never be implemented if users aren’t ready to make the changes needed to use it.
- No matter what you do, renegade users can always torpedo your 3D implementation. If you’ve ever dealt with these types you know what I mean.

Do Not: Forget the Funding

“No bucks, no Buck Rogers!” – Gus Grissom

Without funding for 3D system implementations what’s the point?
Do Not: Forget to Manage Expectations

What all my truisms have in common is a component of expectation. By this I mean that everyone comes into the 3D implementation process with an idea, right or wrong, of how things will go. Some users will have expectations of a negative experience that will require a lot of change on their part. Many times management teams will expect implementation to be easier, faster and cheaper than it really will be. And in some cases IT departments will underestimate how much more taxing 3D applications can be on hardware and network infrastructures.

If you combine all these improper expectations you can see that nobody is going to be happy when the reality of 3D implementation sets in. And if nobody’s expectations are met then you, the CAD manager, are in for some rough sledding and unhappy people.

Adjusting Expectations

As I’ve made my way through various 3D implementations I’ve come to believe that adjusting everyone’s expectations before 3D implementation happens is critical for my success. Only when things go as expected are people happy and the only way for that to happen is to inform, educate and articulate how things will go as early as possible.

Of course, as CAD manager, you’ll be the one to figure out how things will actually go in your company and you’ll have to be the person who manages all the user, management and IT expectations.

So how do you manage expectations? Let’s look at a checklist I use that always helps me achieve control:

- **Talk to management first:** Even though 3D implementation affects users more than management, management will be the ones to back you up, fund your budget, and provide the authority for you to proceed with implementation. Therefore having management buy into your plan for 3D is critical and must happen first. If you can’t get management on board why even bother?

- **Understand IT needs:** If the expectation is that you’ll go from AutoCAD 2004 to Revit, Inventor or Solidworks on a 3 year old single processor machines with 1 Gig of RAM you’re going to have some unhappy users. Now is the time to get a plan in place for new hardware (dual processor with 4 Gig RAM minimum) because you know it’ll take longer than you think to get the new hardware approved.

- **Do user acceptance testing:** To make sure you’ll have a critical base of users that will actually want to learn the new 3D tools you’ll need to expose them to the new software and collect their feedback. Take your trusted power users to a vendor seminar or load up new software on some laptops and go into a conference room for a mini training session. The point is to get users enthused about learning and get their honest feedback before the implementation occurs.

- **Prepare for unhappy users:** As you perform user acceptance testing you’ll no doubt encounter those who don’t like the new software. Note their reasons for not liking the software and note
who has the most negative attitudes so you can modify your implementation plan to avoid problems (more on this in the next newsletter)

- **Talk to management again:** You should now have user and IT expectations adjusted to reality so it is time to go back to management and make sure that the management team knows what you’ve done and what you’ve learned. You’ll now be able to report on realistic time frames for training, IT purchases, and user acceptance. Management will have a clear idea of how hard you’ve worked at assessing the situation and they’ll be impressed with your preparation.

This multi-step process has really helped me to build trust with users, IT departments and senior management staffs alike. And as you work through the process you force all parties to confront reality and adjust their expectations accordingly. Try it, it really does work!

**Tip**

If you’re facing a 3D implementation of some sort it is time to do some homework. Go through the checklist I’ve provided for setting expectations and see how much work you need to do in your organization. I promise that an hour spent on planning will reward you later with happier users, faster hardware and management teams that like what they see.

**Do Not: Underestimate the Timeline**

One of the key topics I talked about in the last installment was that of setting realistic expectations with your users and management. My logic was that if users think they’ll learn a brand new 3D system in two days that they’ll never achieve that expectation and be disappointed in the results. Using the same logic of expectation management, I find it very worthwhile to manage your management’s expectation of how much time the process will take and how much it will cost.

I’ve found the most effective way I can manage the expectations everyone has with respect to 3D implementation is to focus on a reasonable timeline. After a timeline is established you can start to build a realistic picture of costs that is actually in line with your company’s goals.

Here are a few more “3D truisms” I’ve developed over the years that have to do with implementation timelines that you may find useful to keep in mind:

- Users generally think that 3D implementation will be faster because they assume the software will be easy to learn and that they’ll have all the time in the world to learn it.

- 3D systems are very different than 2D and thus the learning curve isn’t nearly as easy as users thought it would be, so users wind up spending more time on the “learning curve.”

- Management sees the extended learning curve time spent with 3D software as something that slows down projects – and this is frequently a true statement.
Do Not: Hesitate to Pause

The truly proactive CAD manager will take my 3D truisms to heart and attack these problems of expectations to heart and manage the problems before they even start. Or, if you've already become entangled in some of these problems you can work your way out of them via clever management. In all cases the problems can be most effectively managed by introducing a timeline component to the problem that addresses the company's needs and allays management's concerns.

Here are my strategies for dealing with the 3D truisms I presented above:

**Truism 1:** State plainly that learning new 3D software will be harder than users think and that they will not have weeks of uninterrupted time because projects will suffer if this happens. Go to the project managers and decision makers within the company and explain this pending problem and ask for guidance on how much time there is in the project for 3D learning to occur. If no time is budgeted for learning then you'll know it and the project manager will be on alert to manage the learning timeline in their projects. No matter how much time is available, this strategy allows you to manage the expectation problem with managers, look like a proactive CAD management genius to senior management and set realistic expectations your users can live up to. Win – win – win.

**Truism 2 and 3:** When learning curves start to get out of control (mainly due to lack of adherence to the strategy above) then you'll have to intervene. The best way to recover from longer than expected learning curves is to call a timeout and get all parties together to confront the problem. Do not, repeat DO NOT, allow the problem to continue and fester as tempers get short and management grows increasingly concerned. Do, repeat DO, get management team members and users to talk thru where the learning problems are and negotiate a solution that allows project work to continue and timelines to recover.

It is better to press the pause button on a 3D implementation for several weeks and allow project work to recover than it is to miss a key deadline because users are having trouble learning. You'll score points from everyone because you diffused the situation and management will love you because you helped get project work back on track.

**Truism 4:** After you've started working through the 3D implementation process and experience a few hiccups management teams start to understand how profound a change 3D is and how it affects business processes in ways they'd never thought of. Now is the perfect time for the proactive CAD manager to call for a "3D debriefing" session where these realities are discussed.

As you conduct this debriefing session strive for people to open up and voice their frustrations, what they see as benefits, and how business processes might be made better. The reality is that thinking will change as people start to understand the 3D implementation process and now is the perfect time to harness their thinking. I've found the biggest strides my customers make with 3D isn't the initial implementation, but how they innovate and change after the initial implementation is completed. As CAD manager you can be in charge of these great strides so go for it!
Do Not: Forget to Schedule Milestones

You may have noticed that most of my observations of 3D implementations indicate things happen slower rather than faster right? You may also have noticed that unplanned problems slow things down even more. What’s the answer: Planning for slower implementation rather than overly optimistic fast implementation.

So before any substantial 3D implementation begins, you should take the 3D truisms and strategies I’ve outlined and do some serious thinking about how you’ll approach 3D implementation. Use these items as a guide to build a realistic timeline:

- **Forecast learning time:** You know your users so only you can make a decent forecast of how quickly you think they can learn the tools involved. My experience says to take the time you forecast and double it.

- **Forecast project time available for learning:** Take the time estimates for your user’s learning curves and fit that time into the projects they’ll work on by talking with project managers. You may find you won’t have the time to train everyone during a project – perhaps you’ll only be able to train a few.

- **Get management’s buy in:** Show senior management your user and project timeline estimates and ask if they approve. If they approve then you’re good to go. If they want faster implementation then they can help you negotiate that time with project managers. Either way, you’ll have management team members in on the decision making which will keep everyone calm.

- **Put it all on a chart:** Write down the rough timelines, project deadlines and other key implementation variables and publish the results. It is a lot harder for people to complain later when the deadlines they agreed to were published before!

**Tip**

If you don’t manage the timeline up front you’ll be pushed into a faster timeline you can’t meet and you’ll be held responsible for the failure. Embarking on a 3D implementation without a solid timeline is just inviting disaster.
Do Not: Skip the Test Project

Your first test project should pass the Goldilocks test: Not too hard, not too easy, but just right in terms of complexity. Remember that the goal of your test project is to determine how the 3D design process will work in your environment so go with a design task that is manageable and focus on the 3D learning curve and best practices/standards formulation.

Do: Take a typical design task that your team members understand and see how it works using 3D methods.

Don’t: Try to design the next Taj Mahal on your first 3D project.

Test Project Staff

Now that you’ve identified your test project you can pick staff members who have the correct expertise to work on it. The tough part is you now have to pick people who will be able to learn the new 3D software tools as they work through the project. My experience dictates that the following guidelines for selecting test project staff will give you the best shot at a good outcome:

- Pick those who volunteer – they’re already motivated.
- Pick those who view 3D as a career upgrade – they’ll work harder
- Pick those who value standards and process – they’ll help you establish the best 3D procedures.
- Pick those who are flexible – they won’t have as much problem with changing CAD tools.

While the above may not seem like rocket science it is amazing how many company’s I’ve seen go into a 3D test project with a skeptical staff that may or may not want 3D to actually succeed. Your 3D test project will be hard enough to work through so make sure the staff you use are eager, motivated 3D believers – you’ll need their enthusiasm to carry you through the tough times!

Do Not: Skip IT Planning

Some of the unforeseen problems you may have to deal with as you move into 3D implementation have to do with IT infrastructure. Consider the following:

- 3D projects tend to build huge file sets that dwarf 2D CAD by comparison.
- 3D building design and visualization requires beefier workstations than 2D CAD.
- 3D projects run over wide area networks (WANs) eating up LAN bandwidth.

Do: View your test project as an IT readiness test for 3D.

Don’t: Move forward with more 3D implementation if your testing shows substantial IT problems.
Do Not: Forget Key Resources

As you move forward with your 3D test project you’re likely to need training and technical support right? So who will provide these services? Will you have the time and know how to manage the test project or will you need help?

I ask you to ponder these questions and honestly evaluate whether you’ll need outside assistance to get through the test project. If you feel that you will need help then the time to identify these resources is before your test project experiences problems.

Do: Line up reseller or consultant assistance before you need it.

Don’t: Allow your 3D test project to flounder because you’re too proud to ask for help.

Do Not: Skip Training Logistics

The key to getting users on board with 3D software, in my experience anyway, has always focused on the training. For your user can have a great training experience it will require you to plan that training experience out well before the training occurs.

Do’s and Don’ts

To assist you in your training planning let me offer a few do’s and don’ts that should help you focus on the right things while avoiding problems. First the Do’s:

- Do take the time to start at the beginning so that users don’t have gaps in their knowledge. Sometimes we CAD managers think things are easy but our users don’t find it so!

- Do use real world examples in training. If your company manufactures airplanes then use airplane part examples in training as opposed to modeling a chair for example.

- Do teach users the features they need and skip the features they don’t need.

- Do include standards in your training. After all it is better to teach users the right way first than having them start out with bad habits.

- Do keep it brief. Most people learn better when taught in several shorter sessions as opposed to one long session.
Now the Don’ts:

- Don’t skip training. Any time I’ve ever been pressured into skipping or skimping on training I’ve always been rewarded with stressed out and unproductive users as a result. Skipping training is simply a false economy.

- Don’t train too many people at once. If you unleash 15 new users on a 3D system you’ll be overwhelmed with questions and support problems. It is better to train fewer people in multiple batches.

- Don’t underestimate startup problems. You’re changing a user’s CAD software and they’re going to be stressed about it. Understand the stress and accommodate it and you and your users will be more relaxed.

None of these suggestions are rocket science but it has always been the times I’ve ignored one of these key pieces of advice when I’ve had problems. In fact, print out the list of do’s and don’ts and keep it on your desk as a constant reminder during the training process and you’ll stay on track much better.

**Do Not: Train in the Wrong Order**

**Who to Train First**

I realize that there are conflicting opinions on the optimal way to train users but I’ve come to believe that picking the first users to train has more to do with implementation success than anything else. Here are the qualifiers that I use to select my first training group:

- **Desire:** Who wants to be in training?
- **Career:** Who views 3D training as being a career asset?
- **Drive:** Who will spend time after class, on their own, to really learn the software?
- **Project need:** Who can actually use the software in a current project when they leave the training?

I use these questions to build a small selection of motivated and driven users who will be able to take their training knowledge to actual project work immediately. The benefits I gain from using this approach is that I tend to move this first training group to 3D proficiency quickly and don’t have to field a lot of support questions since this group tends to be self motivated.

After training this group you can take a little time to collect feedback on what they thought of the training and adjust your training sessions to make them better for the next group.
2D to 3D: What Not to Do!

Who to Train Next

After your first training group has achieved some results with 3D on a real project you can proceed to the next training group. The next group will simply be the next group of people who meet the criteria I referenced for the first group as much as possible.

Now we all know that the second training group may be slightly less motivated and self reliant than the first group but you’ll have the benefit of training the first group to help you do a better job training this group. You’ll also have the benefit of having the first group of 3D users to help mentor the second group along to proficiency.

Who to Train Last

- Renegades
- Cowboys
- Doubters
- Complainers

You know who these users are right? These are the users who’ve been avoiding the move to 3D for a host of reasons, real or perceived.

I train these users last because I can remove the classic complaints these users have by pointing to the successful training of others. Here’s how I handle the common objectives:

- **3D will never work:** Sure it will, everybody else is already using it.
- **This software is too hard to learn:** Well, everybody else has learned it.
- **I can do it faster in 2D:** So could everybody else until they really worked with the software for a while.

I’ve now managed to back those not willing to learn 3D into a corner where they now have to learn the system or admit that they’re simply not able to learn (which nobody will ever admit). I’ve found this methodology a bullet proof way to cut through training avoidance and I’m pretty sure it’ll work for you too!

Do Not: Delay Software Usage

After your training is completed and your test project is selected you have to get people to work right away or the value of the training will be lost. This information is probably obvious to most CAD managers but you’d be surprised how many companies don’t get it.

Conclusion: Resist the urge to train everybody at one time then expect them to jump into 3D months later – instead run several smaller classes so users are trained just in time for their first 3D project. The goal is to leave training and go to actual software usage immediately.
**Do Not: Forget to Adjust/Document/Repeat**

Of course as you train users and put 3D software into use on actual projects you’ll learn as you go. As you learn better ways to use the software keep users up to date on what you learn and adjust your training for new users accordingly. And as you learn more be sure to update your standards to reflect what you’ve learned and keep everyone on the same page.

The dangers of not adjusting what you do and updating your standards are too terrible to ponder. When users are left alone to figure out new ways to work your users will diverge and you won’t have any standards at all! And with the complexity of 3D models and the overall newness of the software you’ll find yourself presiding over a train wreck in short order!

Now it’s time to get going with 3D implementation. By using the planning, communication and implementation techniques I’ve outlined you should be able to manage the process with fewer headaches and false starts.

**PowerPoints and Materials**

You can download updated course handouts (with any additional notes or corrections) for all my presentations at my web site www.CAD-Manager.com on the AU013 page. You can find a wide range of information on customization, programming and CAD management elsewhere on my web site.

I will send you a PDF copy of the session PowerPoint presentation if you request it. Just send an email to me at rgreen@cad-manager.com and be sure to put the course title in the subject line of your message so I’ll know which class you want.

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