Autodesk University 2007

CAD Manager's Handbook 2008, Part 2

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Continued from CAD Manager's Notebook 2007: Part I. This session -- distilled from the presenter's popular "CADalyst" column called "CAD Manager" and 16 years of CAD-management experience -- is designed to give the working CAD manager a more advanced skill set for tackling tougher problems. We'll discuss matching management style with the needs of your company, strategy-based CAD management, managing CAD as an enabling tool, deemphasizing complexity, reemphasizing results, hiring the right people, budgeting for success, and making cost savings your number-one priority. Using cost savings as a guide, we'll conclude the session with specific ideas for boosting user output, enacting a results-based CAD-management plan, and selling your ideas to senior management. If you manage CAD, you can't afford to miss the career-enhancing concepts we'll cover in this class.

About the Speaker:

Robert is head of the Robert Green Consulting Group and a 13-year veteran speaker at Autodesk University. You've 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 21 years of AutoCAD, MicroStation, and MCAD software usage. Since starting his own company in 1991, Robert has performed consulting and teaching duties for private clients and throughout the U.S. and Canada.

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Section 11: Understand management's persepctive

I've come to believe that everything you do as a CAD manager is easier if management is on your side. So, from a strictly selfish standpoint, you should want to manage the relationship you have with your management.

Here are some universal truths about senior management that are frequently overlooked:

- Management controls the money, and money makes things happen
- Management sets priorities and pushes to get things done
- Management delegates authority, thus enabling you to do your job
- Management loves having their CAD manager work with them

Therefore, it should be obvious that if you don't have a positive working relationship with your management, it's going to be much more difficult to do your job.

Debunking the Myths

I have spoken with a lot of senior managers over the years, and I've become aware that many of them believe certain myths about CAD managers. Let me address those myths and give you some strategies for debunking them.

Myth #1: CAD managers are technical people who don't understand anything about management

Myth #2: CAD managers are expensive. They're always asking for high-end software and hardware

Myth #3: CAD managers can't see the big picture

Make the Effort

If you address these myths, management can't help seeing that you can focus on the big picture. It is difficult. I personally had troubles starting to delegate and looking at how other people worked. And yes, it was hard at first to get away from the technical details and see the bigger picture. But I was able to make the change relatively quickly once I made a conscious effort. If you take the time to really focus on the bigger picture and look at work processes and how things are getting done, your management will notice it.

No, you won't debunk Myth #3 overnight. But it will happen over time if you continue to make these types of changes and look at the bigger picture. I've found that when they start paying attention to their companies' bigger picture issues, most CAD managers can make a radical change in management's perception within six months to a year.

No matter what you attempt to achieve as CAD manager you have to break through the common management myths. Using the above guidelines take inventory of the myths your management has and take the time to break through them. You'll find that once you've shattered management's improper perceptions that you'll get a lot more done and have an entirely different level of respect from your management.

Why Management is Out of the Technology Loop

I frequently speak to groups of CAD managers, and I ask them this question: "How many of you feel that your management has no idea what you do for a living?" This question will usually be greeted with mild laughter and a show of hands that typically represents 70–80% of the room. What this tells me is that CAD managers are generally frustrated that their senior management doesn't understand the technology challenges they face day-in and day-out. Or, simply put, your management doesn't understand how hard your job is. And many times CAD managers feel that this means they're under-appreciated and not understood.

Meeting Company Needs — Not User Wants

One basic thing you need to understand about your management staff is that they have their eye on what's useful for the entire company. They are not predisposed to think about what the average CAD user in their company wants. They're not thinking about the latest technology tool that might make your job easier or about the latest server that might make the network run faster. They're thinking about global business objectives like how to sell more work, how to get more productivity per person, and other issues. They're thinking on a higher business plane than we typically are as CAD managers.

What is important is not whether we agree or disagree with that concept but rather that we accept it, deal with it, and manage our relationship with our management accordingly. We need to determine what our management's expectations are for us.

Therefore, as CAD manager, you need to place an emphasis on understanding what management's needs are and putting those company needs above everything else. I would argue that a truly effective CAD manager does the following things:

- Looks at the big picture of overall company needs
- Helps meet company objectives like sales targets and productivity quotas
- Considers CAD user's wants and needs into the mix
- Focuses on technology solutions for the common good
- Realizes that if the company isn't profitable and functional nothing else much matters

If you can find a common denominator by which facilitating CAD users' wants and needs meet a management need or objective, then you've won on both counts. Communicate this with your management. Make this an ongoing dialog and discuss it as frequently as you can. The key component here is that through your reporting and conversations with your management staff, you demonstrate to them every day that you understand your job, which is to facilitate the overall productivity and proper functionality of your company, and that is the foremost goal in your mind. If you communicate that on a regular basis, you'll enjoy a much better relationship with your senior management and you'll be taken much more seriously.

Section 12: Use Standards to Get Started

Is there any CAD manager out there who can honestly say they really control CAD standards to perfection? At some user group meetings I spoke at recently I asked this question and didn't get a single positive response. The fact seems to be that every time we try to implement CAD standards there is always some psychological or political glitch that keeps us from finding nirvana. A frequent comment is that CAD standards are easy enough to come up with but hard to enforce. Sometimes we have to deal with users who won't follow the plan and are frustrated with our upper management for not enforcing the rules or helping set a tone of compliance.

It is my experience that upper management really doesn't understand what CAD standards entail so we shouldn't be surprised that they don't grasp the inherent value of them. You'll be amazed that when you present CAD standards as a key financial contributor to your company's bottom line that upper management ears will perk up.

What can you standardize?

Before we talk about how and why we hope to standardize our environments we need to talk about what we should standardize. Some of this may seem obvious to CAD managers but to upper management this subject matter can be confusing. So as part of our mission to communicate our CAD needs to upper management I'll give you some ways you can communicate CAD standards to your management using standard English.

- Layering/plotting
- Text
- Dimension styles
- Dimension scaling standards
- Title blocks
- Template files
- Design procedures (this is where the power is)

Why do all this?

Now that you've defined what you wish to standardize your upper management may ask questions like "What's the payoff?" or "Why should we invest time?" with respect to CAD standards. Remember that your upper management is looking for a monetary reward before they undertake any effort that redefines work practices. If you can't demonstrate why CAD standards will pay back you can bet you'll have no real support from upper management, project management or engineering management.

Here's the real logical flow:

Standards = consistency

Consistency = automation

Automation = cheaper/faster

Cheaper/faster = more profit for the company

More profit = you look like a genius

The reason I go out of my way to outline how you gain upper management's support is to be sure you'll have the political support required when some user(s) decides not to follow the standards. If you do experience renegade non-conformance to standards you'll need an enforcement mechanism to make the renegades behave later. There is nothing as powerful as upper management supporting your CAD standards because they see a clear financial benefit in doing so. Be sure to line up your support with upper management by highlighting the advantages associated with CAD standards. The key will be to show how CAD standards can reduce errors and rework. Try a few of these examples to flesh out your argument:

Section 13: Budgeting for Success

Though budgeting isn't an everyday exercise in management, it is one of the most important things you'll do *this* year to determine how successful you'll be *next* year.

Before you think *"Gosh more financial stuff"* let's think about the fact that budgeting is really nothing more that looking into the future and trying to estimate what we'll need to do a better job next year. In this regard, CAD managers are best suited when they put on their technologist persona and note which trends are coming and how those trends might affect their departments. Therefore, budgeting isn't a tedious exercise in accounting, it is a chance to show forward thinking and futurism. Sounds like a lot more fun in those terms doesn't it?

What to Account For

In a word – everything. Few other documents you'll ever write will have the staying power of your budget. Your budget document will be with you all year and it will come back to haunt you if you don't pay proper attention to it. Remember that as CAD manager you should have an idea of what to expect in the next year and should therefore be able to tell your company what they should expect in terms of expenses. You're not only being asked to forecast what you'll need to merely survive for the next year but what you'll need to thrive and grow your department's efficiency.

Great managers demonstrate an ability to think on many levels and in differing time frames. Being able to consider operational expenses for today, next year and the next several years given the variables of business can be daunting. Let's at least be sure we understand what types of variables and expenses we need to account for before we create our budget:

Rate of Growth: How much will your company and/or department need to grow during the next year to meet your work commitments? Since the CAD manager may not have any idea of forecasted growth (or shrinkage) you may need to ask your superiors what they foresee as a reasonable growth profile during the next year. You'll need solid information to plan for new computers and software so strive to get a good number.

Capital Items: These are big ticket items like plotters, new workstations, expensive software, etc. What makes these items "capital items" is the way they are treated for tax purposes. Capital items will have to be depreciated over a five year period or leased in order to get favorable tax write-offs.

Companies tend to evaluate these types of expenditures carefully so you may even want to perform a basic ROI calculation to justify the item.

Recurring Items: These are the day to day items like plotting supplies, disks, backup tapes, Internet access fees, maintenance contracts, support contracts, etc. These items should be easy to forecast based on prior year's actual expenditures. These items can go up or down due to growth or lack thereof, but won't vary much given stability in your department.

Training Budget: Too often overlooked and frequently the first thing to be cut. Often times training is seen as something that only happens in concert with major software revisions or major workplace procedural changes. You may not know what training you'll need during your next year but you can probably forecast that you will need training. Why not budget for it so you don't have to sheepishly admit later that you should have?

Let's Get Started

We're now ready to start making an educated guess at our budget. Let's get our notepads out and start trying to identify the various budget costs we talked about above. I suggest making a different worksheet for Capital, Recurring and Training budgets to keep things logically organized. As with all budgets you'll want to work with a pencil and get a big eraser – you'll be changing things later. *Note: I know CAD managers try to avoid spreadsheets but your budget will be more professional looking if you use one!*

The typical mistake in budgeting is to underestimate and try to impress your superiors with how cheap you can be. Being cheap when you budget will only make you beg later for the funds you should have budgeted today. You'll be respected more for thinking of everything and planning accordingly than you ever will for being cheap. Conversely, you'll be punished for missing something that will cause rebudgeting later in the year. A key point to remember in all of this is that just because you've budgeted for something doesn't mean you'll get it. Think of the budget document as the way you'll relay information about the various technology paths you may take next year. If you account for as many scenarios as possible you've got the greatest chance for success.

Step vs Linear Costs

While budgeting try to keep in mind that some costs are linear with respect to growth while other costs are stepwise. That is, as a new worker is added a new computer must be added – this is a logical linear cost which is known and easy to quantify. Step costs are nasty little pills that tend to be required during periods of rapid growth. Think about what type of growth you'll be experiencing in your budget and try to account for the surprise step type costs that could arise.

There is also a relationship between linear/step costs and support/training budgets which you should consider. Linear costs like adding new workers tend to have a known training burden where step costs like server upgrades could require substantial support resources from you or your computer support department. Be sure you account for these support costs in your budget or you may not have enough resources to grow your department properly.

Growth Scenarios

Budgeting for differing growth scenarios is one area where you can apply some trends to help write your budget. Low growth and high growth environments have very different cost profiles. In the case of no growth there are typically known costs and very few budget surprises. When budgeting for no growth you're trying to account for your costs and be thrifty since your company isn't experiencing boom times.

In the case of high growth you'll experience more increasing step and linear costs. The high growth environment is hardest to manage and forecast so the budget will need also need to include contingencies for increasing levels of recurring and capital costs. In the high growth area pay particular attention to step costs like new servers, printers and plotters. You don't want to be stuck in the position of too many people competing for too little system!

A Disciplined Approach

Rather than trying to write a budget all at one time, why not try a more disciplined approach instead? Chances are you're always reading about and investigating new technologies so it won't be much harder to ask about pricing at the same time. If you consistently ask about pricing and implementation costs you'll form better relationships with your vendors and you'll get them to do your budgeting work for you. This approach works for everything from hardware, to training to software. Remember the old adage of "don't guess – ask."

Create a budgeting folder to store articles, web site notes, and quotes from vendors. In essence you'll be creating a budgeting data warehouse every time you ask for literature. By always keeping budgeting and future trends in mind you'll be much better prepared to write your budget when the time comes. I've also found that by constantly having the future in mind you tend to make decisions today that fit your future plan thus making all your budget money work harder for your company. If you can build the skills to constantly think in the future while in the here and now, you'll be recognized as a great manager.

Summing Up

Now that you've beefed up your budgeting knowledge start thinking about your future budget every time you attend a meeting or talk to a vendor. Build your budgeting folder up a little bit each month as you focus more thought on how your future will be impacted. Every once in a while, take your folder home and leaf through all the information as you update your budget plans. You'll be surprised at how budget planning will start to just "happen" as you think about the future. You never know you may even start to enjoy the process.

Section 14: Faster/Cheaper Software Approach

The only reason we're using anything today we didn't use yesterday is because it makes existing tasks faster or cheaper, hopefully both. Believe me when I say that if we could do engineering with slide rules and paper faster than computers and plotters we would still be doing so.

So the question that all businesses need to look at is how new CAD technologies, especially 3D technologies, can best be integrated into the everyday engineering environment in a way that delivers faster, cheaper results. To illustrate faster/cheaper let's look at the evolving technology of business communication and draw a few conclusions as we go.

Some example of the faster paradigm might be the following:

- Letters faster than couriers
- Standard mail cheaper than express
- Air mail faster than standard mail
- FedEx faster than air mail
- Fax much faster than FedEx
- Email as fast as faxing but with higher quality

Faxing got the information there in minutes for the cost of a phone call. The motivating factors here were CHEAPER and FASTER.

Email had all the speed of faxing but didn't require the printing and scanning of paper documents. Information is emailed in its native data format. The motivating factor here is CHEAPER since less labor is used to handle the information.

When does change happen fast?

So where was the real paradigm change? It was actually with the FAX machine (not the computer) because the FAX machine was where technological changes facilitated faster AND cheaper at the same time. And please notice that the evolution of mail handling took a century while the FAX machine went from nothing to full business implementation in 5 years.

The moral of the story? If you can find technology that is both FASTER and CHEAPER that technology will be absorbed rapidly and the change can't be turned around.

Thinking Like Management

Let's try an alternate way of looking at the cheaper/faster paradigm from a management standpoint. I'll use the example of moving to 3D design software as a background for the discussion simply because I see this discussion so much in industry. If you can visualize the transition to 3D from management's perspective and use cheaper/faster metrics you'll be surprised at how much better you understand the process.

I've often made the assertion that management teams are increasingly ambivalent towards implementing 3D software because they think it will be expensive (that is NOT cheaper) and that it will take time to do (not FASTER). Taken in that perspective and you can see why they're hesitant. Let me run through a list of typical management thoughts regarding implementing new software:

The "old software" runs just fine

Translation: They don't see the CHEAPER in new software.

New software is buggy

Translation: They're afraid technical glitches will slow things down and raise costs.

Training takes a long time

Translation: While users sit in training they're not working, thus raising overhead

What is fascinating about these trends is that they are all business and productivity driven rather than technologically driven. It seems like you can have the greatest software release since time began and it won't matter if it isn't easy to install, integrate and run quickly with low learning curve times from everyone involved.

Finding the Faster/Cheaper

Since we're talking about dealing with new software releases let's examine some ways that new software can be introduced into your company's culture with minimal cost and maximum impact and thus garnering maximum management support. If you combine some of these suggestions with a healthy dose of faster/cheaper you should be able to allay your management's fears. Try some of the following approaches to start the conversation:

Generate a list of great time saving features

By listing out the new software features that allow you to save time you're showing your management where the CHEAPER is. Often management thinks that we always want new software and that we don't give thought to what the benefits will be. Head this skepticism off at the past by illustrating your thought process and show your management that you've found the CHEAPER in the new software.

Generate a planning document

You've found the CHEAPER in your new software so now plan things out so you can get the CHEAPER done FASTER. Sometimes management just wants to know you have a plan, so show them yours and make sure they know that you've got your eye on the cheaper/faster paradigm while you do so.

Demonstrate a smooth implementation timeframe

By planning for new software to transition in smoothly you'll minimize disruptions and keep mistakes down to a minimum. While smoothness doesn't really get things done cheaper or faster, it keeps the costs of mistakes down thus maximizing whatever faster/cheaper you've already planned for.

Plan for successful training

Like a smooth implementation, planning for training keeps mistakes down. But training offers a powerful FASTER benefit by making people productive that much faster. Sell your skeptical management team on training by using the faster motif and watch how their opinion on training changes.

Section 15: Bottleneck analysis (ROI Lite)

We've all encountered limitations within our CAD systems. Sometimes we just don't have the functions we need to perform certain tasks efficiently. Chances are you've wanted to use your CAD management position to do something about the shortcomings but have been met with management resistance to spend money on adjunct programs or add-ons.

They key to getting what you want AND building a case for CAD management is to use an ROI-based approach to justify your arguments. Let's look at a case of how we can use ROI, and as we go we'll examine how persuasive this is from management's perspective.

Bottleneck Analysis

A bottleneck is a limitation in your current software that is costing time and, therefore, money. If you can eliminate bottlenecks you'll save time and, therefore, money. Typical bottlenecks I've encountered are generation of schedules and bills of materials, plot management and collation and custom block/dimension style management, to name a few.

Here's an example: Let's say you could produce a custom icon menu that allows users to place standard detail blocks graphically rather than by navigating directories. Such a routine might save 60 seconds for each detail insertion for a $30/hour drafter. If your firm produces drawing sets using 1000 details per year, then the total savings would be $500. As you find and analyze your company's CAD bottlenecks, keep a journal so you can refer to the results later.

Find the Bottlenecks

Keep a list handy and write down the bottlenecks when you find them. The list will grow!

Suggest Solutions

What's the answer to removing the bottleneck?

Now Show Management

Get permission from your management to address the bottlenecks. Make sure they see the faster/cheaper in your logic and you'll be off and rolling.

General Conclusions on ROI

I can report from my own experience that when companies won't pour money into new technology they will refine and enhance existing technology, so long as it makes financial sense to do so. And in companies in which technology spending is trending up, there is still a strong motivation to refine new technology to fit the company's needs. Therefore, there is every reason to be optimistic about new technology spending if you frame the debate correctly.

The tried-and-true concepts of finding the bottlenecks and fixing them have now joined the mantras of cost reduction and right sizing in the corporate world. If you can increase productivity for the employees in your company and prove the faster/cheaper (high ROI) to make it worthwhile, you're golden!

Last, it seems that all companies, regardless of their circumstances, don't want to add employees unless they absolutely have to. This aversion to hiring plays into fixing bottlenecks. Unless your company is in a death spiral, management will always be receptive to any ideas that allow more work to get done with the same number of people.

Section 16: Staffing

Preventing bad hires is a good deal for your company and for you as well because you won't have to support the bad hire. I highly recommend that you become involved in the hiring process, if for no other reason than to protect yourself. Here are some ways you can facilitate the process.

Do Your Own Interviewing

Only someone who truly understands CAD can identify CAD knowledge. To make the point another way, ask yourself the question: How many times has a department manager in your company hired a CAD operator who was substandard or, worse, totally misrepresented himself or herself in an interview? Because you are responsible for supporting CAD operators, it seems only fair that you hire your own staff.

Test Your Candidates

Despite what the human resources experts may say, you won't really know how well candidates can use AutoCAD until you test them. When interviewing prospective candidates, it is imperative that you test for competency. Of course the time-honored technique of interviews peppered with tough questions works, but it becomes too time consuming to be effective. So why not employ a multifaceted testing program that can be administered easily with a minimal investment of your time?

Although multiple choice tests aren't perfect, they can efficiently eliminate unsuitable candidates. You can administer these tests to applicants sitting in a lobby chair or break room, then attach the test to the applicant's resume. This way, unqualified candidates will have wasted their own time rather than yours. (The best electronic CAD testing software I've seen is AutoTEST Pro by a company called ACADemix. Their web site, www.academix.com, offers some examples and a downloadable trial version.)

Those candidates who survive the initial multiple choice test can be tested for actual drawing proficiency. The best strategy for testing is to take a drawing that is typical of the job you're hiring for and ask the candidate to complete some tasks that would represent a challenging assignment. When you create the task list that you'd like the user to complete, you should place the tasks in order of

complexity so the easiest tasks are completed first. Try to get a good mix of commands moving from geometry creation and editing into the tougher concepts of dimensioning, XREFs and scaling.

Grading the Results

While you are grading the multiple choice component of your testing, note the strengths and weaknesses of the responses. You may find someone who knows the basics of AutoCAD very well but doesn't understand higher-end functions, for example. For these users, the hands-on drawing test should correlate closely to the written test.

To evaluate the results of your hands-on testing phase, you'll want to track the amount of time required to complete the work, the accuracy of the work and the efficiency of the work completed. While timing the work is easy, efficiency takes some effort to judge. You'll likely be able to tell really good work and really bad work quickly, but the majority in the middle will require some sleuthing. For example, by examining the command history in AutoCAD's text window, you can tell how many cancels or restarts were executed in the user's drawing session. (Note that you can increase the number of lines stored in the text window via the Preferences Display tab if you set up a really complex test). You can also use the Undo function to move backward through the creation of the drawing to get an idea of the user's methodology.

When tabulating the final results, you should grade for accuracy and efficiency first, and use time as a tie-breaker. The logic behind the testing is to weed out the bad and prioritize the remaining applicants in terms of accuracy and efficiency.

Recommendation. Use the Grapevine

You've probably heard the saying that most jobs are never advertised except on the grapevine. The same thing goes in the CAD world, but the good news is that you already have a grapevine. If you have good CAD operators on staff, then they already know other CAD operators. All you have to do is tap into this network and you'll be able to attract workers to your place of employment. The corollary to this is that if your current CAD operators won't refer any of their friends to you, then you probably have an undesirable workplace.

Of course you'll have to offer something worth making a person leave a current job, and thus money comes into the picture. Only you know what salary range your company has to offer to attract other workers, so calculate what you can afford before you advertise. Other than salary, you can offer a great working environment; and if you already have that, your workers' friends will know it.

Recommendation. Consider Moonlighters

Remember the management principle that you should give your hardest work to the person who's already working the hardest? Don't overlook the pool of good people who want to do some moonlighting CAD work to augment their regular income. If you can delegate some portion of your work to moonlighting workers, you can typically get very good fixed-price work on a timely basis with no requirements to provide computers, office space or benefits. While harder to coordinate, outsourcing does have its benefits and is frequently better than hiring from temporary agencies.

Section 17: Think Like Management

I know it runs counter to the technologist instincts that CAD managers usually harbor, but it is imperative to align your thinking with that of management during periods of economic uncertainty. Try to remember that management's focus is keeping the business going and emerging from slow periods in good shape to win new business and drive profits back up. Therefore, management will tend to have a knee-jerk reaction to any spending. Try to remember that this is not a personal knock on your CAD management skills, but a broad approach to dealing with a problem.

As you request any type of funding, always ask the questions:

- If this were my own money at stake, would I take this action?
- If I were a stockholder in this company, would I vote for this action?
- Will this action make the company stronger?

If you can honestly answer yes to the above questions when you request funding for a purchase, you'll have more confidence in yourself and will demonstrate that you've thought the issue through.

Section 18: Again Don't Quit!

CAD management is an ongoing process that never stops and is never easy.

However, if you attack the job from the angles I've described you'll stay saner and get better results with less effort. So keep at it and never quit becoming a better CAD manager.

Want the PowerPoint?

I'll be happy to send you a copy of the session PowerPoint presentation. Just send an email to me at **rgreen@cad-manager.com** and be sure to put **CP205 - PowerPoint** in the subject line so I'll know which class you attended.

I'll send out PDF captures of the PowerPoint files upon my return to Atlanta.

Reference Materials

You can find a wide range of information on CAD management and business metrics at my web site - **www.CAD-Manager.com**.

For a complete guide to a wide variety of CAD management topics including IT, personnel management, software configuration tips and much more, you may want to check out my new book: *Expert CAD Management – The Complete Guide*

To learn more please visit: **www.cad-manager.com/book**