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Business and ROI Skills for CAD Managers

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CAD managers are typically ill-prepared for the budgeting, forecasting, purchasing, ROI computation, and cost-justification tasks that await them in the business world. This session covers these aspects of CAD management by examining ROI calculation scenarios for hardware, software, process improvements, training, and CAD management functions from a CAD manager's point of view. ROI concepts will then be used to explore a business-focused method for forecasting future needs, preparing departmental budgets, and prioritizing CAD management tasks that will get you noticed by your management team! If you are a CAD manager who needs to navigate through planning, budgeting, and cost-justification with confidence, you can't afford to miss this session -- regardless of your industry discipline.

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 *Cadalist* 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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Topic 1: Change Your Mode of Thought!

This session will challenge you to take off your technical hat and put on your management hat. Like it or not management is a part of the job and there are several ways you can change the way you think, act and communicate that will make you a more effective manager.

Management is process not money

CAD managers are sometimes viewed in a negative light because they're always asking for money rather than contributing it. Think about this statement for a moment and realize how true it is. When CAD managers ask for new hardware or software systems they are perceived as merely asking for more money for more things that most people don't understand. Most people simply think the CAD department should complete their drawings and documents and couldn't care less about your computer hardware.

In blunt terms, CAD departments don't make million dollar sales deals and they don't create wealth, they exist to provide a function. The best job a CAD department can do is quickly and efficiently complete the job they are tasked to do. The only selling point the CAD manager has is to show how more work is being done in less time with fewer employees.

Fortunately, good management can often be a matter of setting the right policies in place to gain better efficiency at zero cost. The old adage of "work smarter not harder" plays right into this efficiency based approach. If you can demonstrate that you are getting the best performance from your staff given what you have to work with, then you'll be seen as a great manager. Understand that as you build your managerial reputation for efficiency, your requests for funds will be trusted more and questioned less. You'll be viewed as an established manager who is credible, competent, and who squeezes every bit of productivity possible from his staff.

Eliminate snags and bottlenecks

CAD managers enjoy an interesting view of the engineering landscape – the view from end of the process. By this I mean that CAD departments tend to see the end of the work process because development, engineering and design have already been largely completed. Chances are that as CAD manager you already know where the snags and bottlenecks in your company's work methods are so why not take an active role in solving the problems?

If you can suggest a way that CAD work can be done in parallel with engineering, for example, you may provide a way to get your work product out the door faster. If you could find faster methods of checking or routing documents to cut rework you'll lower costs. Use your view of the work process to make your CAD department an example of what can be done when training, technology and good management theory converge. If you show forward thought that improves your company's profits you're going to be a hero with a bright future.

Collect Cost Savings Ideas

Now write down some of your ideas to improve your operating environment. We'll use these later.

1 _____	7 _____
2 _____	8 _____
3 _____	9 _____
4 _____	10 _____
5 _____	11 _____
6 _____	12 _____

CAD as a proving ground

Frequently, CAD departments are held at arm's length by the general computer support establishment. CAD people tend to push computer hardware to the limit, they bring in new equipment first and they always want the most expensive equipment. This can sometimes brand us as being "difficult" or "demanding" but it does place us in the position of being the proving ground.

Another problem we face is user resistance. We sometimes analyze and discuss issues for months or years and never make any concrete progress due to the resistance.

To break through these barriers simply MAKE CHANGES AS YOU CAN. Simply put: Show everyone how you will make things work by demonstrating, demystifying and proving your concepts. If you can prove your concepts people will eventually start to trust you and will follow your lead. It does take work to lead by example but the end results happen faster and with less frustration than continuing to have the same discussions with no tangible progress. Three words: Just do it!



Topic 2: 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:

What does "no standards" lead to?

Plotting fiascos: Bring up an example of how plotting various sets of drawings took hours rather than minutes because layering and/or plotting standards weren't in place during the creation of drawing sets. Project managers are especially sensitive to this argument because they've been burned by it before. Placing a dollar value on plotting problems is easy. Just take a conservative estimate of wasted man-hours and multiply by your average hourly labor cost to get a valid cost number. Reducing this cost can be a key driver in the move to CAD standards so be sure to utilize it.

Temporary labor problems: How long does it take you to get a new temporary CAD technician up to speed on your drawing practices? How much is that costing in lost productivity for your company? Wouldn't a firm set of CAD standards cut through all this uncertainty? By the way, you'll hire better temporary labor if you let them perform a drawing test working to your standard because you'll verify their knowledge of layers, text and dimensioning, right? You can demonstrate costs in this area by taking the number of training hours it takes to orient a new employee times the labor rate times the number of new employees in a given year. If you make use of temporary labor you may be able to justify CAD standardization on this cost savings alone.



Lack of automation possibilities: Which manual processes in your company (like plotting) could you automate if your CAD standards made all your drawings perfectly consistent? This is a powerful argument with upper management because automating mundane processes would allow their employees to do higher quality work (and more of it.) If you frame CAD standards as the doorway to productivity gains you'll get upper management's undivided attention.

Inconsistent look and feel: Most CAD managers can produce several different sets of drawings done by different vendors, engineers and drafters that don't look anything at all alike. If you throw three drawings on a conference table in front of project/engineering management and confront them with this reality they'll see that standardization would produce a more uniform look for the company's drawing product. Placing a dollar value on the look and feel issue is tough, but the psychology of it is a powerful motivator.

Vendor/outsourcing management

If your company out sources any design tasks to vendors you probably receive electronic drawings from those vendors at some time. The problem is, typically, that different vendor drawings look very different and nothing at all like your drawings. CAD standards can be a great work saver if you make your vendors subject to providing drawings using your standards. After all, why rework vendor drawings to conform to your standards after the fact?

If you provide your vendors with a copy of your CAD standards and template files is there any reason they shouldn't be able to provide you with proper drawings? Since vendors are paid to provide a service you can simply insist that the service they provide include conforming to your CAD standards. After all, your company writes the check to the vendor!

Vendor/outsourcing management is an area rife with error and thus creates an opportunity for you to save the company some money via savvy management!

Topic 3: Use ROI to Keep Score

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 met with management resistance to spend money on adjunct programs or add-ons.

The 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. The savings generated by removing bottlenecks allow you to purchase add-on software. A quick example might be that of a \$45/hour architect making door and window schedules for large building projects. If the architect spends 2 hours creating these schedules by hand but an add-on package could do it in 5 minutes then a cost savings of \$86.25 can be achieved (just multiply time by the hourly rate). If we go on to say that a design firm produces 100 of these schedules a year then a total cost savings of \$8625 can be recognized. This example is a perfect real world bottleneck analysis: It finds a process that is time consuming then produces a payback based on time savings. Further, by looking at the firm's needs you can determine the total annual payback for eliminating the bottleneck.

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. To quantify another example lets 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 (use same calculation method as above). As you find and analyze your company's CAD bottlenecks keep a journal so you can return to the results later.

Create a benchmark: Now that you've established the bottleneck points that cost you productivity you can concoct a test, or benchmark, that you can use to compare add-on software programs. In the case of the architect making window and door schedules you could write a benchmark that would include creating a drawing with a variety of doors and windows and then producing a finished drawing with the generated schedules. Note that in this benchmark case we took care to create a drawing first then generate the schedules. This way we'll be observing the actual time consumed to create the drawing using the add-on software we're analyzing to capture the entire experience of using the software.

For the case of inserting blocks you might write a benchmark that specifies how the user interacts with the software and how easily they can find the specified detail block with a minimum of keystrokes. You'll also want your benchmark to evaluate how long it takes to load your block definitions into the software by analyzing whether slide files or programming is necessary.



In either case, your benchmark specifications should include real world, tough design problems that you face everyday. By making the benchmark a tough test you will force the add-on software to confront your toughest problems so you can really see how much time savings you'll be able to achieve. Don't be afraid to include some real stumpers in your benchmark. You do want to get a real impression of the software's functionality, right?

Now show management: At this point you should have a list of bottlenecks and benchmark tests that allow you to keep score as you test various software products. By the time you start shopping you should've laid the groundwork for support from your CAD users and built a solid case for why you're examining add-on software. As you collect demo programs or visit vendors run through your benchmark tests and be sure to keep track of how long each step took – you'll need this to calculate your cost savings later. You'll also want to note anything in your benchmark tests that couldn't be solved along with interesting features that may provide time savings you hadn't considered.

What you're doing at this point is creating a tally sheet that describes how well the software you're looking at addresses the problems you have in your current work processes. This tally sheet is an essential tool for documenting your testing effort and cost savings in a manner that keeps the real data in front of you at all times. The better your documentation is the better it'll be received by your upper management later when you ask for money, so do a nice job.

Real world costs and savings

Lets say that you've now benchmarked an architectural add-on package that contains tools for automated door and window schedules and dimensioning tools which you hadn't even anticipated using but were impressed with. We were able to determine that this particular piece of software costs \$1500 and requires a two day training class (which costs \$500) and a two week period of time for the user to setup and become adept with using the program. We anticipate needing two copies of the software and will have to send two architects through training.

First, my own experience says to count the CAD user as being 50% efficient during the period of familiarization for costing purposes. So let's calculate the cost per seat for purchasing and implementing the software:

- We take a cost of \$1500, add the \$500 training cost, plus the two days lost at \$45 per hour and subtract a full week at \$45 per hour to account for two weeks of 50% productivity. The total cost of acquiring the software then becomes \$4520 dollars.
- Since we need two seats of software we obtain a total cost of \$9040 while the total savings we could generate was \$8625 (from the bottleneck analysis).
- What looked like an easy "buy" decision before now starts to look a lot more expensive when the details are factored in!
- This investment will produce a first year, pre-tax return on investment (ROI) of 96% so the software pays for itself in about 12 months and then starts generating savings.

The fact of the matter in our example case (and most real world cases) is that the implementation and training costs for add-on software add up quickly. Your superiors will ask questions like: Will your CAD operators be able to recapture the productivity they lost during the training phase? What if all that time and money is spent and success still isn't forthcoming? These questions will be answered very effectively with your bottleneck, cost analysis and ROI numbers supporting your purchasing request.

General conclusions

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 where 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 so long as you frame the debate correctly.

The tried and true concepts of return on investment (ROI) and automating redundant tasks 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 a high enough ROI to make it worthwhile you're golden!

Lastly, it seems that all companies, no matter their circumstances, don't want to add employees unless they absolutely have to. This aversion to hiring plays into investing in technology that enables outside contractors to collaborate and places a high premium on eliminating information handling. Unless your company is in a death spiral they will always be receptive to any ideas that allow more work to get done with the same amount of people.

Think like management and succeed

I know it runs counter to the technologist instincts that CAD managers usually harbor but it is imperative to bias your thinking towards management during periods of economic uncertainty. Try to remember that management's focus is keeping the business going and emerging from the slow down in good shape to win new business and drive profits back up. Therefore management will tend to have a knee jerk reaction against spending for anything. 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.

Welcome to CAD management with an emphasis on management principles applied to technology topics!



Topic 4: Cost Justify Your Job!

Now that you've become adept at justifying new technology investments, program modifications and know how to make ROI business decisions why not use the same logic to prove your worth?

Consider these questions:

- *How much productivity did you create by implementing smart new technology solutions?*
- *How many processes did you streamline?*
- *How much waste were you able to cut?*
- *How key was your CAD knowledge to achieving the above objectives?*

If you have smart answers to the above questions you're well on your way to proving what you're worth. And when you're worth what they're paying you, you know you'll keep your job!

Compute Your Own ROI

So what are you costing your company? Here are a few hints:

If you're on overhead then you are "dead cost" because there's no way to recover overhead. So if you're a full time CAD manager on overhead your cost is your salary (plus benefits, etc). If you're a part time CAD manager then prorate your salary to match your percentage of CAD management.

What do you return (or save) the company:

Whatever cost saving ideas you've been able to implement is your savings. Simply take credit for what you've saved.

What's your ROI:

Your ROI is your savings number divided by your cost.

Driving ROI higher:

Reduce your cost to drive up your ROI. Do this by finding ways to do your CAD management duties using job accounting, thus burying your CAD management cost inside of paying jobs. If you target what you do to project managers so you make their jobs more profitable you can do it. You may have to work at this a bit but it'll happen if you push.

Closing Thoughts

Over the years I've found that understanding how to present technical information to senior management teams using business logic has allowed me to get my budgets approved faster and get my ideas considered more seriously. If I had it all to do over again I would have started using the business logic we've discussed in this course a lot earlier and had fewer headaches as a result.

I know that business skills are something new to learn and I am aware that it'll take some effort to get acclimated to the shift in thinking but I firmly believe that it is worth your while. Try it and keep me posted on your progress.

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 **CP215 - 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

