AUTODESK UNIVERSITY

IT19817

5 Pillars of Effective CAD Management

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Learning Objectives

- Discover the 5 pillars of effective CAD management
- Learn how to manage these 5 key areas to improve productivity
- Discuss how to prioritize planned improvements
  Learn how to plan a phased improvement over time

Description

In my 10 years with CAD, I've only met a handful of people lucky enough to have a full-time job as a CAD manager.

Most of us got to be a CAD manager because we had a powerful feeling that we could get our jobs done more easily if we could just get our CAD tools sorted out (and because no one else wanted to do it!).

This class is for people who want to be CAD managers, people who have become CAD managers by accident, and people who do the CAD manager's job and don't get any credit for it!

In this class, we will discuss 5 key areas that you must attend to as a CAD manager to support your team and effect your team's productivity.

Finally, we will discuss tools for putting these 5 key areas onto a productivity road map to help you plan a phased improvement.

Whether you're managing CAD at your company officially or unofficially, please come and join us for this lively and informative class.

Your AU Expert

Paul Munford had 8 years of experience 'on the tools' before joining the CAD department in 2005. Paul worked his way up to become a CAD/Cam manager specializing in manufacturing for construction before joining Graitec UK as an Application Engineer in 2015.

Paul handles licensing, deployment, customization and training for AutoCAD and Inventor software. Paul still uses AutoCAD and Inventor to create manufacturing drawings for Graitec's customers.

In his spare time Paul writes the blog entitled CAD Setter Out, and authored 'Mastering Autodesk Inventor 2016'.

This will be Paul's 9th trip to Autodesk University, and his 5th as a speaker.
@Cadsetterout

Introducing the Five pillars…

My first job after leaving college was as a labourer. I spent my days loading and unloading trucks for other more skilled than myself.

After some time, I managed to get my first gig as a carpenter and I began working my way up.

After working my way all the way up to project manager, I took a sideways shift and re-trained in AutoCAD to get a job as a drafter.

Finally (After 20 years!) I wound up as CAD/Manager for a company that specialised in bespoke fine furniture making.

But through all of this, there was one common theme in everything I approached…

I was LAZY!

That's right, I don't think anything should be any harder work than it really should be ☺

So, I worked hard, but I also tried to take notice of common themes in the design and manufacture workplace that took up our time and made our job hard work.

At Graitec, my job is to help other CAD managers implement CAD software. But just installing CAD software doesn't help us to become more productive. It takes the right environment, and the right behaviour to get the most out of our investment.

Back in April of 2016 I sat down to write out my thoughts on this subject as a blog post on LinkedIn.

You can read the original post here:
https://www.linkedin.com/pulse/five-pillars-successful-cad-management-paul-munford

What follows is a reproduction of that original post, slightly updated for Autodesk University 2016.

Five Pillars of effective ***CAD*** *Management.*

Five pillars of successful CAD management (Blog Post)

In the last 10 years of working in CAD, I've only met a handful of people lucky enough to have a full time job in CAD management.

For most of us, we got to be the CAD manager because we had a deep and powerful feeling that we could get our job done easier and quicker if we could just get our CAD system sorted out... (and because no-one else wanted to do it!)

This guide is aimed at those of you who want to be a CAD manager. Those of you who have become the CAD manager by accident, and those of you who do the CAD manager's job and don't get any credit for it...

I salute you!

Hardware

Hardware is the easiest investment you can make in your CAD office, with the quickest return.

Does your machine hang whenever you open a big CAD file? Do you suffer from regular crashes? Does your machine get clogged up with rendering or simulation work, preventing you from getting on with something else?

It's easy to calculate the amount of downtime you are suffering from. You can measure downtime over a 4-6 week period and extrapolate an average downtime for a year.

Multiply downtime by your labour rate and you can easily see how investing in new hardware can win back time that you could be spending on billable project work.

Wasted time x Labour rate = Potential gains

1 hr per week = 48 hrs per year x £40 = £1,920 - You can easily save enough money to buy a new work station!

Bear in mind that most companies will depreciate hardware against tax over a three to five year period, and you can easily see how the money spent on new equipment can be earned back.

***Top Tip:** A simple way to measure downtime is to give each of your CAD operators a bunch of counters. Ask them to put a counter in a jar every time they have more than 5 minutes downtime. Count of the counters and extrapolate the result.*

Specifying a CAD station

When it comes to specifying a CAD station, there are five main things to consider:

Operating system

At the time of writing, many new PC's will be shipping with Windows 10 as standard. The early indications are the Windows 10 is a good operating system.

Be aware that many Autodesk products will only run on Windows 10 if you are using the latest version - and you may have to install updates or service packs.

Right now, I would recommend asking for PC's with 64bit Windows 7 operating systems if you can get them, until Windows 10 has become established.

My main recommendation would be to make sure that everyone in your office is on the Same operating system! (That will save you a few unnecessary headaches).

Hard drive

Go for an SSD drive. They are becoming more affordable and reliable every day, and they give a massive boost to your whole system.

Because your operating system can write data to your SSD drive faster than an old fashioned optical drive, your whole system will feel faster and more responsive.

You will also find that your system boots faster, meaning that you can get down and get productive right away first thing in the morning when you are at your best!

Memory(RAM)

Lots! The more memory you have, the large the amount of data you can work with at any one time.

If the CAD file you are working with is larger than the amount of memory you have, your CAD software will need to write some of the file out to your hard drive and then swap bits of it in and out of memory - slowing your whole experience down.

You will also need to take note of the Speed of your memory. The speed that your memory will work at is limited by the speed that your mother board can push the data round. This is called the 'Bus Speed' of your mother board.

***Top Tip:** if you are upgrading a machine, http://uk.crucial.com/gbr/en have an excellent service to help you find compatible memory.*

Processor

Your CPU (Central Processing Unit) is at the heart of your computers productivity - but what are you looking for?

Many CAD systems currently on the market are too old to make significant use of multithreading in their day to day tasks.

However - multithreading is used for compute intensive tasks such as rendering and Simulation. The greater the number of cores your processor has, the more tasks your CAD station can do at once.

For this reason, I recommend that you look for Speed in your processor chip over the number of cores it has - unless you need to do hardcore rendering and simulation!

Graphics card

I find it quite surprising just how well 2D AutoCAD will run on a PC which doesn't even have a dedicated graphic card.

But If you want to work in 3D you will need a graphics card - full stop.

CAD Graphics card Vs Gaming card?

This is a question that comes up frequently. The truth is that a good gaming card will run CAD perfectly adequately and will be cheaper than a dedicated CAD graphics card.

If you are a student looking for an inexpensive machine to learn CAD on - go for a gaming card by all means.

So is a dedicated CAD graphics card worth it? By all means - yes! CAD graphics cards are configured to work with CAD software without glitches or hiccups. If you need a reliable machine for a professional CAD user, you will want a professional Graphics card.

Graphics cards have their own memory and processor (the processor is referred to as a GPU, graphic processor Unit). Look for a fast Graphics processor and lots of dedicated memory.

You can read more on this debate here:

http://www.graitec.co.uk/hardware/cad-workstation-guide/workstation-vs-gaming-graphics

Top Tip: *Not sure if your Graphics card is compatible with your software? Check out the Autodesk recommended hardware guide before you buy.*

http://usa.autodesk.com/adsk/servlet/syscert?id=18844534&siteID=123112

Network

Don't forget to give your network a little love when thinking about your investment in hardware.

Most of us prefer to keep our CAD files store on a secure, backed-up network location. Your CAD station can only work on files as fast as it can write data to and from your server.

I recommend fiber optic cabling around your office, don't forget to consider the speed of your hubs and network connectors as well.

One simple way to speed up working over a local area network, is by using data management software such as Autodesk Vault. Vault copies your CAD data to your local drive for you, which allows you to take advantage of all your fancy new PC's awesome speed!

Further reading

For a complete guide to specifying CAD hardware, check out the CADalyst CAD speed blog:

http://blog.cadalyst.com/cadspeed/2011/04/12/hardware-for-the-cad-professional-part-1

Is there an easy way to specify CAD hardware?

The easiest way to specify CAD hardware is to have someone else do it for you!

If you are a real hardware nut - then I don't want to spoil your fun! However, if (Like me) you would prefer to spend your free time on other pursuits, phone your local Autodesk reseller and ask them to specify your CAD stations for you.

Looking into the future of CAD hardware

The future of CAD hardware harks back to the past. It won't be long before we can use thin client terminal PC's running our CAD software on our server or in the cloud.

I personally don't believe that cloud based CAD solutions such as Fusion 360 or Onshape will displace desktop CAD in companies that have already invested money and time building a design backbone based on their desktop CAD system.

But if you are starting a brand new design or engineering company right now then you are in a great place to check out these emerging technologies and try them out.

Content Libraries

I want to write about content next, because I honestly believe that it is the second easiest way to improve productivity in your office (after hardware).

I am lucky enough to have been trained in drafting on the drawing board. I began my career drawing by hand before CAD was widely used in industry.

I can tell you that we don't use CAD because it's BETTER than hand drafting.

We also don't use CAD because it's QUICKER than hand drafting (some of those old boys could really knock those drawings out!)

We use CAD for one reason, and one reason only...

COPY and PASTE

Why Copy and Paste? Because before CAD - changing drawings was laborious and annoying

Who remembers scratching out Inked lines on tracing paper with a scalpel blade, and then having to sand the tracing paper back to smoothness with an ink rubber?

It was sometimes quicker to pull a new sheet of tracing paper over the original drawing and trace the whole thing again :/

Before CAD *changing* a drawing cost almost as much as *creating the drawing* did in the first place.

Copy and paste allowed us to copy, erase, edit and change drawings without diminishing quality, but more importantly it saved us from the tyranny of a blank sheet of paper.

Copy and paste meant that we could start our designs based on existing designs that we could keep in a library. You can't get draw faster than copying and pasting from a library!

2D to 3D Content libraries

It's often implied that 3D CAD is quicker than 2D CAD. I would contend that it isn't (but we can have that debate in the comments!).

3D CAD in Architecture and Engineering is often used to create a database of information about the project. A drawing is one view of this database, a bill of materials (BOM) is another. This means that your CAD models need to have imbedded data as well as shape geometry.

However, 3D CAD is wayyy quicker than 2D if you don't have to start from scratch.

Whether you work in 2D or 3D, there is no more productive way to invest your time than to create content libraries for your colleagues to use, and re-use, rather than starting from scratch.

For me, this is the second most important investment you can make after Hardware.

Software

There are two key topics to consider when talking about managing software.

- managing your licenses
- managing your costs

The move from Perpetual to Rental

I hope that you've heard about the recent changes in the way Autodesk sell their software?

Until recently, Autodesk sold their software under a perpetual license scheme. This meant that you purchased the right to use the software in perpetuity (forever).

Practically speaking, this meant that you bought the software on physical media, and that you could install the software on your PC at any point in the future, or at least, as long as you could find a PC that will run the software!

The licensee of your software used the unique ID of your PC's motherboard to register itself and prevent you installing your software again on another machine.

But what did you do when a new version of your CAD software was released? Well - you had to pay for an upgrade!

So next came Maintenance subscription. This was a cost that you paid on top of the initial cost of the software in order to get the next release of your CAD software at a guaranteed price.

The advantage of perpetual licenses is that they become an asset. You can keep the software for as long as it is still useful.

The disadvantage of perpetual licenses is the cost of entry. You pay up front for the software and the maintenance (often £5000 or more per seat) making it a big lump of cash you need to spend out up front.

This way of purchasing your software has now gone, and has been replaced by Rental licenses.

Rental Licensing

Rental licenses don't install a licensee file on your computer. Instead, they 'ping' Autodesk's cloud license server every couple of weeks to check that you have been paying your fees.

If you stop paying your fees, your Autodesk software will stop working!

The advantages of rental licensing are that your license is now tied to your user, not your PC and the cost of entry is a LOT less.

Because your license is no longer tied to a PC, you can install your CAD software on as many machines as you like. Your users will be promoted to log in when they start up CAD, so they can work on any PC (or any compatible device) they want to.

Rental can be paid for monthly, or you can pay in advance in order to secure a better deal. This brings the cost of entry down to £50-£200 pounds to use Autodesk software for a month!

This makes it cheap to try out software for a few months before committing, or you can just pay for a month of software for a product that you use infrequently. You can also scale licenses effectively by buying new licenses when you need them and by stopping paying for licenses when you don't.

Rental licensing - buyer beware

The low cost of entry up front means that your bill for CAD software will be a lot less when you go out to the market to buy.

One downside of this is that your leverage to get a good deal from your CAD reseller goes down.

Be prepared to package your needs for other services such as hardware or training with your software licensing in order to secure a better deal from your reseller.

I should also mention that, while rental licenses are a lot cheaper up front, you keep paying for them *forever*...

Over a period of four years plus, you will end up spending more on rental licenses than you used to spend on perpetual licenses with maintenance subscription.

Make sure that you take advantage of the rental license system to 'turn off' licenses you don't need to help keep costs down.

The Autodesk Management portal

Now you no longer have licenses on your server - the Autodesk management portal will become your new best friend!

manage.autodesk.com

This is the tool you will use to manage the licenses you own. You will use this online web portal to allocate your licenses to users, and allocate cloud points to users which can be spent on other Rental Benefits such as Cloud Rendering and Cloud Simulation.

Take some time to familiarise yourself with the management portal. Make sure that you know how to allocate a license to a user, remove a license from a user and put a license on hold.

You can learn how the Rental Subscription and Autodesk Software Account Management portal works here:

https://knowledge.autodesk.com/customer-service/account-management/subscription-management/subscription

Standards

There is one reason and one reason only to enforce CAD Standards at your company.

Speed.

Your CAD users will work far more productively if they don't have to think about (relatively) trivial matters such as line weights, font styles and file naming while they work. All this stuff should be decided before they even start a new design.

Your CAD users should be free to focus on where they personally *add value*. This could be by helping sales and marketing to attract new customers, or by reducing the cost of your product by tweaking the design to reduce manufacturing costs.

Many of us start in CAD management because we believe that there is a great value in working to a standard.

For many of us, the biggest headache in CAD management is getting people to use the standard!

Don't turn a people problem into a technology problem - Mark Kiker

The reason that we find this hard is because we need to deal with actual real life people! I encourage you to write your standards down in a standards document, but I know for a fact that your CAD users won't read it!

Instead, you'll need to SELL the idea of CAD standards to both your CAD users AND your Senior management.

You'll need to encourage conversation about standardisation. You'll need to listen to people's views on standardisation. You'll need to bring all this together into a standard and you'll need to be able to enforce this standard when not everybody gets what they want!

The easiest way to encourage people to use your standard is to automate it. Create templates, adapt the standard libraries that come with your CAD software.

Use features such as AutoCAD's tool palettes or Autodesk Inventor's standard's library to make it easier for your users to use your standards than to use their own!

Training

Training has to be the hardest sell on my list, even though it's the groundwork for every other subject we've talked about. We all know we need training, and we all know that we don't get as much training as we should.

I've often heard business owners grumbling about training:

"We trained them in our CAD software when we bought it... Why do we need to train them AGAIN!"

CAD software doesn't stand still. Your subscription fee gets you a new improved version of your CAD software every year. If you don't get training, you won't know how to use it and you won't be getting the most out of your investment.

Buuuuut, hang on a minute. How many of us use ALL the features of our CAD software right now? Really? Come on!

I am a big fan of taking people out of the office for their initial training in a new CAD system.

If you are going to learn something as complex as CAD software, you really don't need the interruptions from colleagues and email.

It takes time to learn a new CAD system and the longer you have to experiment in the safety of the classroom, under the guidance of your instructor, the better.

However - once you've got the basics, it doesn't make sense to take that much time out of the office again.

There is no point learning features and techniques that you won't use straight away. You will forget them before they become useful. Instead, smaller chunks of training on a more frequent basis that can be used straight away can yield better results.

My most important lesson I learned as a CAD manager was not to try and teach everybody EVERYTHING about your CAD software.

Instead - my suggestion is that you work out your process. Work out your system. Write your standard. Create your libraries. Automate your tool set and then just teach your people how YOU do CAD at YOUR Company.

Your thoughts

There you have it.

Hardware, Software, Content, Standards and Training.

Ten years of thoughts an observations on the themes of CAD management distilled into one article. What do you think?

Did I miss anything out?

Is there something you would do differently?

There is one question that I never tire of asking, and I am always fascinated by the answer. So I'm going to ask it of you now - please reply by emailing me at Paul@Cadsetterout.com

What is the biggest CAD problem facing you at your company today?

Resources

AU Online
http://au.autodesk.com/au-online/overview

Autodesk Virtual agent (Activate registrations and download software)
http://autodesk.creativevirtual15.com/autodesk/bot.html?isJSEnabled=1&businessArea=Root.Front%20Desk&startContext=Root.Front%20Desk

Autodesk Knowledge network
https://knowledge.autodesk.com/

Autodesk Screencast (Create workflow videos from inside Autodesk CAD software)
https://knowledge.autodesk.com/community/screencast

CAD Manager Blog (Robert Green)
http://www.cad-manager.com/

Expert CAD Management by Robert Green
http://www.cad-manager.com/expert-cad-management-the-book

CADD Manager Blog (Mark Kiker)
http://www.caddmanager.com/CMB/

BIM Manager Blog (Mark Kiker)
http://www.bimmanager.com/

JTB World Blog
http://jtbworld.com/

CAD Panacea Blog
http://cadpanacea.com/

CAD Notes Blog
http://www.cad-notes.com/

CAD Pro tips Blog
https://cadprotips.com/

Cadsetterout Blog
http://cadsetterout.com/