

# Raising the Standard

## How CAD Standards can be Implemented to Improve Design and Project Management

By Rob Lion - Head of Professional Services, Excitech Computers Ltd.



"HEY - YOU FINISHED WITH THE IN-HOUSE STANDARDS MANUAL FOR EFFICIENT CAD USE?"

### Introduction

"Une des meilleures façons pour assurer que la productivité de votre service de CAD sera obligé à créer et sera obligé à travailler à une série de normes de CAD. Pour ainsi faire apportera de nouveaux employés en haut pour expédier plus rapide, les projets de vitesse à l'achèvement avec la plus grande précision, et faciliter données plus des efficaces échangent avec les clients et collaborer les firmes."

OK, have I gone mad? No (well, no more than usual!). So how many of our 20,000 readers will understand the above sentence? When we communicate with each other, we need to do so in a common way, so that we all understand what is said, and how it is meant. The same is true within the world of CAD.

One of the best ways to ensure the productivity of your CAD department or project is to create and work to a set of CAD standards. Doing so will bring new

employees up to speed faster, speed projects to completion with greater accuracy and facilitate more effective data exchange with clients and collaborating firms.

### What makes a CAD standard?

As little or as much information as necessary to make CAD work more productive! At the very least, the CAD standard should guide a user through opening existing drawings and plotting them out. This would be enough information to get a new CAD operator up and running on day 1 at the job. A document outlining these steps would be less than one page!

Beyond this, users should know how to effectively edit drawings. This means knowing where the symbol library is located, how to access it and what "layers" or "levels" drawing information should be placed on. It would also help if the user knew what customisations have been carried out on to the system as not all companies set up

software the same way. Documenting this may take several pages.

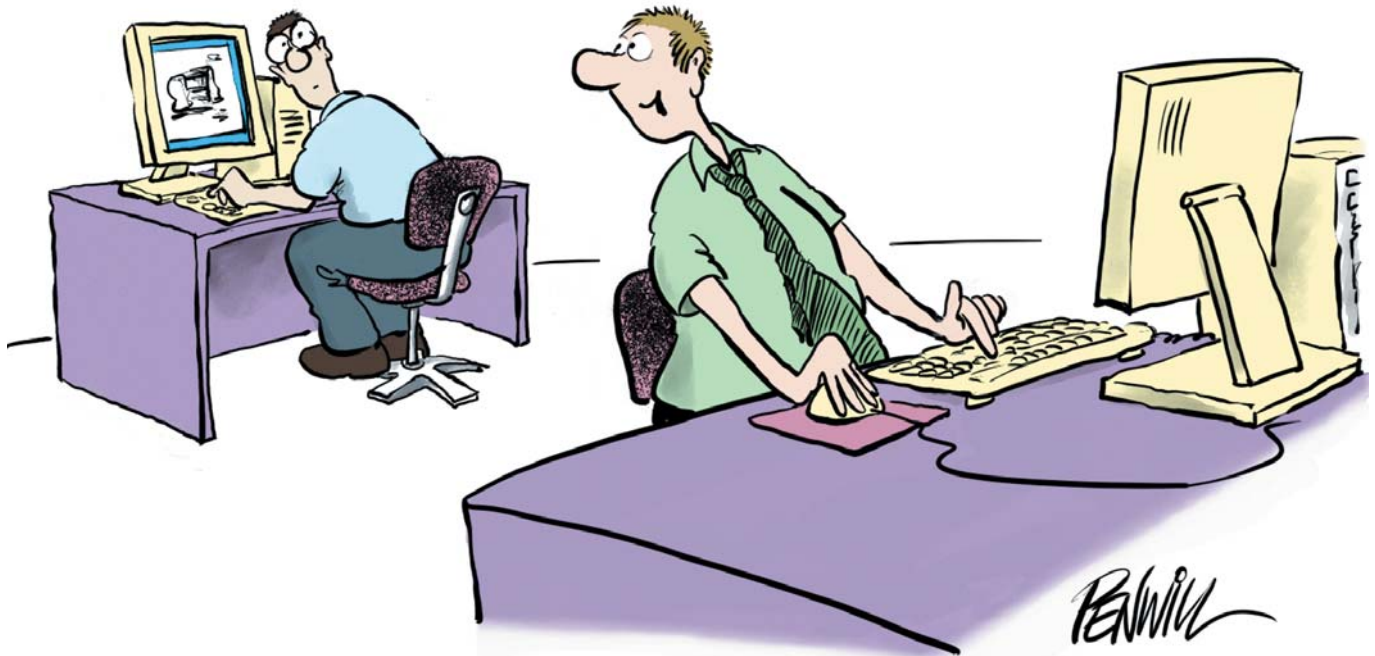
A well thought out CAD standard would also include information on how to set up new projects and drawings, as well as steps for exchanging CAD data with clients and other companies. There may also be a FAQ (Frequently Asked Questions) section to help users with troubleshooting their CAD systems. Appendices may also be included to impart additional information to the CAD users in a way that does not detract from the overall focus.

### CAD manuals

Regardless of the length and format of the CAD standard, it must be easier to use than it is to ignore; otherwise there will always be the need to micromanage the CAD staff. The overall focus of the CAD manual should be on the day-to-day tasks of the CAD user. Knowing this, the CAD standard must be easy for the CAD users to access and easy for the CAD Manager to update. The best way to do this is to put the CAD standard in the form of a "CAD Manual."

A one-inch ring binder holds a lot of information but does not intimidate the CAD user into conveniently ignoring it on the bookshelf. It also allows ample space for project notes and other information a CAD user might like to keep handy. Then, because it is not "bound" by staples or other cumbersome office supplies, it is easy to update.

For companies that have "web browsers" on their desktops, an electronic CAD manual is not only possible but also practical. Updates are easier and less costly because there is no printed version to re-circulate to the CAD staff. Furthermore, the manual is more effective because it is in colour and can easily include more graphics. This helps the CAD users better understand the material and therefore more willing to use it. Remember, make it easier to use than it is to ignore!



"I'M A STRONG BELIEVER IN CAD STANDARDS - THAT'S WHY I USE THIS EXCELLENT SET OF MY OWN"

### Why have a CAD standard?

For over 20 years I have served as a CAD consultant. During that time, I witnessed both ends of the spectrum when it came to CAD standards. Some firms (much to my amusement and their future dismay) had no CAD standards whatsoever. This is bad news! Even if collaborating firms have differing philosophies when it comes to CAD standards, it still aids communication. Better to have one than not at all.

With standards in place, automated conversion routines can be developed that will reformat drawings much faster than even the fastest CAD user could do individually.

Having a CAD standard also makes it easier for a new employee to get up to speed within the company. Without one, someone will have to spend time (perhaps several hours) showing the new CAD user how to get around on the system. Much of this could be accomplished by simply giving the new employee a copy of the CAD standard.

### What are the benefits of a CAD standard?

Time lost deciphering the "intuitive system" of another person will be regained. Project designers and project managers will be able to access design data more easily without having to learn arcane, complex and unique organisational systems.

The result is better project management, higher quality construction documents, reduced errors and omissions; and ultimately a better building project. Most importantly, design firms can provide a higher quality of service to their clients by delivering data in an industry-standard format ready to re-use for downstream O&M/FM. Savvy design firms will seize the marketing opportunity. "We deliver projects in a CAD Standard format" will let the client know exactly what the project data will look like before the project even begins.

### Who creates the CAD standard?

Generally, it is the job of the CAD Manager. Some firms may have a CAD

Co-ordinator, or Administrator but the duties are essentially the same - make the CAD systems run at optimal speeds and make the CAD users as productive as possible.

For companies that do not have a dedicated CAD manager, a senior Architect, Engineer or Designer may take on the task of creating the CAD standard. In some firms, a CAD-literate Project Manager may lead the effort.

Regardless of who is involved, there must be one person that is the primary "owner" of the CAD standard. This person will lead the effort to create the standard in the first place and is likely to lead any future updates. It will also be their responsibility to maintain any associated documentation - like CAD standards from clients and collaborating firms.

### When should the CAD standard be created?

As soon as possible! Don't wait until everything is perfect or it will never get done. Remember that CAD standards are

dynamic. In order to be effective, they must evolve over time and the sooner the standard is created, the sooner mistakes are avoided.

For companies that are preparing to switch from one CAD system to another, having a CAD standard in place will ease the tension associated with going to a new system. There will still be a learning curve, but it will be lessened by the CAD standards being in place prior to rolling out the new system to the users. Starting to establish and/or convert the CAD standard three to six months prior to the new system rollout is not unreasonable.

### What's the process for creating CAD standards?

The process can be long, but the sooner it is started, the sooner it is finished and the sooner the company or project reaps the rewards. The process of creating a CAD standard is illustrated in figure 1.

### What should the CAD standards cover?

As a minimum, the standards should cover:

- Who to contact with any questions
- Data formats and versions
- File naming conventions
- Layers/levels convention
- Line types/styles
- Text types/styles
- Colours
- Dimensioning
- Title frames
- Blocks / Cells
- Plotting

Careful consideration should also be given to:

- Data directory structures
- Xref / reference file management
- Symbol libraries
- Attributes and tags (to record asset data)
- 3D Data
- Copyright issues (i.e. Ordnance Survey)
- CAD Software and versions!

Don't forget, the CAD Standards manual will evolve in time.

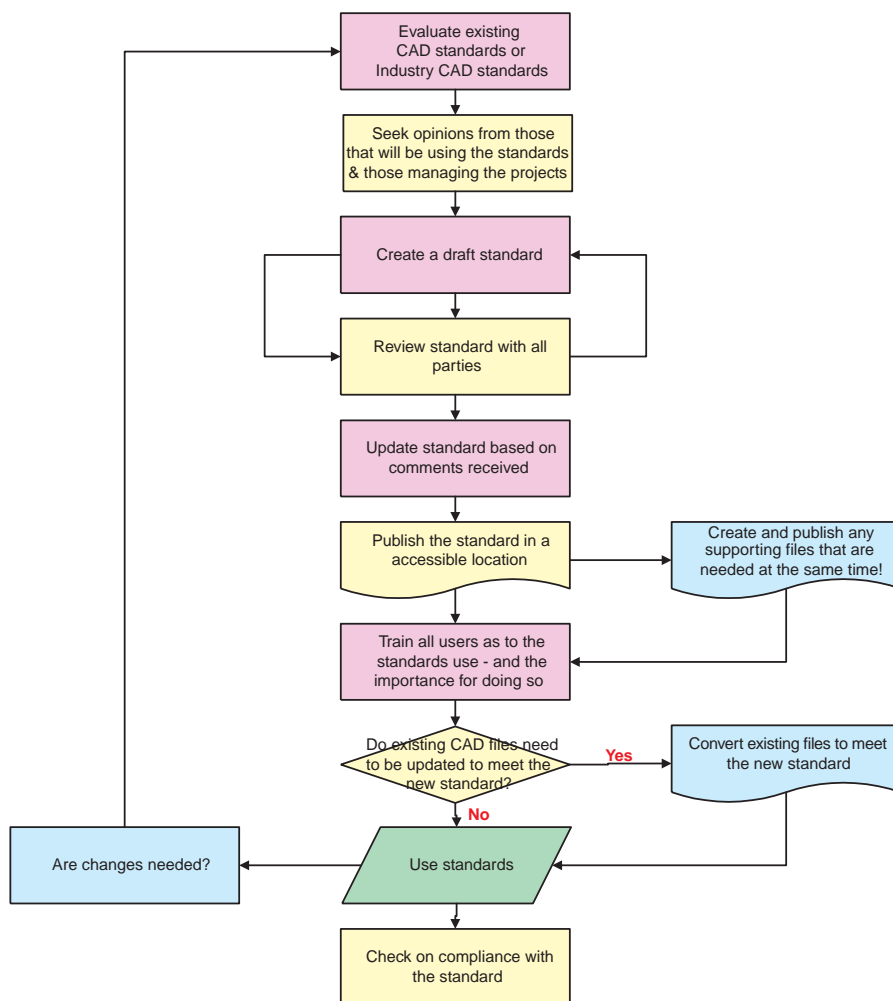


Figure 1: The process of creating a CAD standards

### How will I get the CAD standards adopted?

#### Ensure acceptance of proposed CAD Standards and protocols

Involve the key departments and supply chain in the production of the standards.

This will involve setting up a CAD User Group, with a single representative from each of the Stake Holders and the client using regular meetings to resolve and discuss issues with meeting minutes and sign-off at the end from all parties to the agreed standards.

The support and enforcement by the Client is a requirement.

#### Training and change management of personnel on use of standards.

Allow the use of the standards to be seen by everyone to enable the download of:

- Latest releases of standards
- FAQs
- Drawing templates
- Supporting files (i.e. linetype file etc)
- Symbols
- Enabling technology/software
- Feedback on problems and questions relating to standards

A web based training tool can also be added to the site to test users' understanding of the standards and would take the form of questions and multiple-choice answers with immediate feedback on results.

**Training and change management of personnel to understand the need for standards.**

Present the companies/clients requirements and processes for the supply of documents / drawings on the project based on agreed standards. This would include demonstrating any supporting technology that can be used.

**Facilitate the use and acceptance of the standards by CAD Users.**

Deliver supporting technology to help ease the acceptance and use of standards.

**Facilitate the use and compliance of standards by CAD Managers.**

Deliver supporting technology and help to ease the policing of data to ensure it meets the agreed CAD Standards.

**How can I easily check to see if the CAD Standards are being used?**

Enable the client to efficiently check the supply chain compliance to the CAD Standards.

Deliver supporting technology and help to police the data and ensure it meets the agreed CAD Standards. Excitech has three unique products to help you here.

**1. CAD Checker** - a tool that checks the drawing complies with the agreed standards and reports on any non-compliance.

**2. ProLM** - an easy to use tool that allows users to create and manipulate layers within AutoCAD to the agreed standards.

**3. Standards Converter** - a tool that allows drawings in one CAD standard to be converted into another CAD standard.

**Provide the ability to accurately plot and view drawings from any location.**

Deliver supporting technology and help to enable the accurate viewing and plotting of drawings to different scales/paper sizes with correct line widths.

**Manage and maintain the CAD Standards**

Following the implementation of CAD Standards it will be essential to ensure they are maintained, policed and updated.

Issues will need to be resolved and a focal point needed for ownership of problems.

The adoption of a CAD Manager is a must on any project. Typical activities of a CAD Manager are:

- Running an on-going CAD User Group to uncover issues and resolve them
- Own the CAD Standards and keep them updated
- Be a central focal point of CAD knowledge for issues which need addressing
- Support and train CAD users
- Police data created by CAD Users for compliance with CAD Standards
- Liase with IT on hardware/software issues and requirements
- Implementation of design policies and procedures.
- Co-ordination of design data
- Process development and improvement in alignment with delivery teams

**Summary**

There seems to be an unending battle as to whether or not CAD work should be done well or done fast. The enlightened believe it should be both, while the cynical think that at best only one is attainable. Regardless of your current state of mind, rest assured that CAD standards will help your CAD staff work both better and faster. All it takes is some commitment, a little planning and some good old-fashioned effort.

**Where to next?**

Excitech Computers Ltd has created and maintained CAD Standards for many customers, both large and small, using both AutoCAD and MicroStation based products. Examples of customers that Excitech Computers Ltd. has assisted are listed in the table below.

**If you need help in any of the following:**

- Producing a comprehensive set of 2D/ 3D CAD, document or asset standards for your company or project
- Updating your existing standards
- Policing your CAD data for CAD standards compliance
- Getting your standards adopted by your suppliers and/or projects
- Training users and supply chain into the use of your standards
- General CAD Management assistance

Excitech Computers Ltd. has experienced professional consultants that can help you now, no matter how large or small your CAD standards requirements are.

For more information, please contact Excitech on 020 8804 9942 or email [dpj@excitech.co.uk](mailto:dpj@excitech.co.uk).

**▶ MORE INFO 3206 see inside back cover**

	2D and 3D CAD standards Object standards Asset standards Software standards Policing standards Supporting files
	2D CAD Standards Document Standards Asset Management Standards Policing standards Supporting files
	2D CAD Standards CAD start-up pack CD For MicroStation