A SolidWorks Guide to An Efficient Design Team

This guide is designed to help you lay out a road map to create an efficient design team using SolidWorks 3D CAD Software and add-in products.

If you are a CAD Manager, a Designer, or an Engineer looking for advice on implementation or improvements to your SolidWorks system then this guide is for YOU.
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Introduction
This guide is intended to help companies lay out a road map to create an efficient design team. It is not meant to be all inclusive but instead is designed to point you in the right direction throughout an implementation process. It can also help you get back on track if you feel there is room for improvement with how the team is running.

Step 1: Hardware and installation with a plan to maintain
In order to make the best use of SolidWorks and related products, it is important to have the right computer hardware. Since the recommended hardware specifications vary year over year, it is important to refer to the SolidWorks website when purchasing a new computer. SolidWorks has published a comprehensive webpage that will guide you in selecting a certified video card, download the appropriate drivers as well as help you select preconfigured Dell desktops and mobile workstations:

http://www.solidworks.com/sw/support/videocardtesting.html

With appropriate hardware in place, it is also important to have a plan for installation. It is a strong recommendation by our services team to create and maintain an administration image for engineering groups with greater than 10 computers. The best way to install off of one of these administrative images is with a batch file that is setup specific to your network. Javelin services has helped many clients create and maintain these so that all SolidWorks related products are installed with a single click and everyone on the team has the option to remain synched on the same service pack.

Step 2: Options, Toolbars and Add-ins
With a clean installation of SolidWorks it is important to take a moment to customize it to your company preferences and share a recommended setup with the entire team. A little bit of time invested here can be returned very quickly because designers may otherwise never discover settings or toolbars that have the potential to save them a lot of time.

Options
There are numerous options that manipulate how SolidWorks behaves. There are a few that our technical support team recommends on a regular basis if a customer is looking to boost some performance and keep in control of the behavior. Below are a few options that are recommended for every system; however, it is worth the investment in time to have a thorough read through all of the options.
Toolbars

Customizing toolbars effectively can have a large impact on a designer’s productivity. Similar to system options, it is recommended to go through them thoroughly and add tools that will likely be used for your design techniques and remove tools that will rarely be used. A commonly missed toolbar is the “Shortcut” bar. By default this dynamic toolbar can be accessed by hitting “S” on the keyboard. Its purpose is to give a designer their most common tools for sketching, modeling, assembly and drawing right where the mouse is without navigating to a fixed toolbar. It of course can also be customized and even mapped to different keys. If a designer has a space pilot or a fourth button on their mouse, this toolbar should be one of the first things that it controls.

Add-ins

There are numerous add-ins for SolidWorks that will extend on the functionality. If there are add-ins that are commonly used such as SolidWorks Toolbox or SolidWorks eDrawings it would be recommended to allow them to load on startup, but others should only be activated when required.

Sharing customization

With the time invested in customizing these SolidWorks settings as well as following some of the next steps on templates and libraries, it is important to share these settings on all computers. A good way to do this is with the “Copy settings wizard”. Once this tool is used to save the settings, they can be opened from other computers or simply used as a backup in case settings have gone corrupt and are causing problems. The settings file can also be incorporated into an administrative image install of SolidWorks, so that these settings get carried over to all future installs of the product.

Step 3: Choose your custom properties

Custom properties are textual fields associated with files. The purpose of them is to fill in title blocks automatically, populate bill of materials and to find and organize files more easily. Determining which custom properties you should use is relatively simple. Simply decide what is important to show on the title block or in the bill of materials and then consider if there is anything else that will help with finding files. There are some cases as well where extra custom properties are added for special cases like linking effectively with an ERP system.

One of the more challenging issues that companies have is getting designers to fill in the properties in a standardized way. Enterprise PDM, which is SolidWorks’ mainstream document management product, can help
quite a bit in this area because it is excellent at driving information automatically into files without any effort. Another tool that Javelin has developed to help with this situation is PropertyLinks. This tool helps develop drop down lists for designers to select from in a standardized way and can even pull information from an ERP system or other company database. There is a free version of this tool that offers many advantages over the native SolidWorks methods, available here: http://www.javelin-tech.com/propertylinksxpress

Step 4: Standardize templates and title blocks

Template files can give a designer a head start on each file when designing. For parts and assemblies, the document properties are the most important part to review (i.e. Units and standards) and in some cases predefined material can be created. (i.e. If many parts were made out of some stock material). The most important template however is a drawing template because it will include a title block that can be setup to automatically populate with your selected custom properties. Creating a drawing template can be done easily by following these steps:

1. Open a drawing which is close to what you are looking for
2. Add a view of a part with all of your custom properties already added
3. Edit the sheet format layer (right mouse click on paper > “Edit sheet format”)
4. Manipulate the lines using regular sketch tools
5. Add or manipulate custom properties using the “Note” tool (see below)
6. “Edit Title Block” in the right click menu and select which properties should be editable (see above)
7. “Edit Sheet” to exit out of the title block editing
8. Review the document properties to ensure they coincide with company standards (ie. ANSI or ISO)
9. Select “Save As” from the file menu and choose “Drawing Template”
10. If desired, the “Sheet format layer” can be saved separately which allows a designer to switch borders in mid drawing. This can be done by selecting “Save Sheet Format” under the file drop down menu.
Step 5: Setup shared libraries

Using shared libraries not only makes sure that everyone is using the same company standards, it can also make a designer more efficient because they can leverage the work another designer has done more effectively. Common shared libraries and folder paths can be accessed through the system options. (See below) It is important to review each of these paths and determine if it’s important to point all designers to the same location. If the shared content should be revision managed or appear in bill of materials then Enterprise PDM should be considered as a location. If not, then a simple network folder should be setup.

Design Library

The design library is located in the task pane and is an ideal spot to share files. Adding folders to the design library can be done from the library itself by selecting the icon. Many users do not realize how great it can be for sharing a lot of other content as well. Common content that is overlooked is listed below:

- Drawing notes
- Blocks
- Weld and other symbols
- Tables
SolidWorks Toolbox
SolidWorks Toolbox is the SolidWorks library for nuts, bolts and other fasteners. The folder contents (by default in “C:\SolidWorks Data”) should be moved to the network or inside of the SolidWorks Enterprise PDM vault for better control and collaboration. Once there, it is important to point everyone to that location and also to run through the toolbox setup wizard to setup all of the preferences for everyone to share. (See below) It can be accessed through the system options or under the toolbox drop down menu. (Note: Toolbox must be selected under the “Add-ins” area for configuring it and use)

Step 6: Setup Javelin support
It is important to be aware of the Javelin support contact information and encourage users to use it if they run into difficulty. The most convenient method of making the contact information available is to install Javelin’s SolidProfessor add-in. This will list the contact details and other useful information in the task pane (See right) of SolidWorks and will also encourage users to continuously improve their skills by providing them with short training videos. The installation and a portion of the training content are free and can be downloaded from the link below:

http://www.javelin-tech.com/solidprofessor

Step 7: Make a plan for skill level improvement
Proper training can not only make an enormous difference for productivity but can also lead to files that are infinitely easier to change and leverage for future projects. If you are unsure of the general skill level of the team, a good way to evaluate it is with the SolidProfessor assessment: www.javelin-tech.com/assessment

Javelin has also helped many clients evaluate their current design process to ensure the team is using best practices and is aware of some of our automation methods. Once the situation has been properly assessed, it is important to lay out a plan that will move skill level to the optimal level and will also maintain that skill level as the software evolves. (Note: make sure to take advantage of Javelin’s complimentary update training for every new release)
Step 8: Create a standardized folder structure

It is important to think about how you should organize your files into folders. Investing the time upfront to determine how to organize your folders effectively will be returned with ease when numerous employees are working in a standardized way. Here are some of the considerations when determining an appropriate folder structure for your business:

- Are you product based or project based
- How many projects or products are designed a year (if the number is over 50 then you should consider putting them in a subfolder for each year)
- Are revisions going to be managed in folders or automated with Enterprise PDM
- Are other departments going to be viewing or contributing information
- Are there certain files that need more secure access rights

Once a folder structure has been determined it is best to create a template in Enterprise PDM that will create it automatically based on information captured by a user with the appropriate rights. This way you can automatically drive it into office documents and drawing title blocks.

Step 9: Make a revision management plan

Regardless of the frequency at which changes occur, it is extremely important to have a documented plan for how revisions are captured and specifically when they should take place. Without this plan, designers will waste valuable time renaming files and fixing broken references and it may be extremely difficult to roll back to earlier revisions in a predictable way. Even more importantly, some revisions may accidentally not be captured and remodeling work may be needed to restore a previous state.

Without a PDM system you may want to try using the “Pack and Go” functionality in SolidWorks to take snapshots of the assembly and associated drawings. If this is the desired technique, it will still be important to clearly define when title blocks are manually changed to reflect a new revision. With Enterprise PDM it is much easier to define when revisions occur (i.e. When it has already been approved for manufacturing, then any changes need to be captured as an official revision) and update title blocks automatically. It also has the ability to reliably revise files individually instead of as an entire package.

Making a plan and sticking with it is the most important aspect of ISO certification. This is why automating the revision control can have such a large impact on the effort to obtain and maintain certifications such as these.

Step 10: Plan for collaboration

For designers to work together on a project the files need to be centralized in an organized way. Working off of a network drive may solve some common problems but is far from perfect. The most common complaint for working off of a network drive is the open and save performance but it also commonly leads to overwritten files and broken references. The recommended way of having engineers work together effectively is Enterprise PDM. With its check-in and check-out functionality, it has the ability to coordinate any size of engineering department and because it seamlessly works from a local cache of files, performance is never compromised.
One other challenge that many companies are facing is collaboration outside of their walls. Enterprise PDM becomes an essential tool in situations where multiple buildings need to work together because it offers out of the box file replication between sites. (See below) It also offers the ability to work directly out of a webportal which eliminates the confusion of e-mailing files or posting to FTP sites for the purpose of collaborating with suppliers or clients.

Step 11: Define your processes

Every company has some form of processes that makes it run. The most common process that design departments implement is an approval process. To make a design department run efficiently it is also important to evaluate what takes place on a daily or weekly basis and should therefore also have an associated process. By implementing processes, design teams work together systematically and can therefore obtain goals efficiently. Here is a list of common processes that design departments have mapped out:

- Approval process
- Change or revision process
- Delivery of drawing package to client or shop floor process
- Sales process (for companies that involve engineering in sales activity)
- Purchasing process
- Design process (i.e. Data reuse, templates, use of specific functionality like “SolidWorks Weldments”)  
- Bill of materials approval process

This is another key area where Enterprise PDM is helping companies out. By centrally coordinating and enforcing most of these processes, companies find that they are reliably followed while saving time and effort. If you have a company flow chart made up, it can easily be graphically recreated in the system. (See below)
Step 12: Automate repetitive tasks

Now that you have processes defined, it is important to identify and automate repetitive tasks that are part of that process. The most common tasks that companies automate are administrative ones like printing or producing PDFs, but depending on your product, there might be an opportunity to automate a portion or perhaps the entire design process. If you are an “engineer to order” type company and two designers assigned with the same design parameters should theoretically produce identical designs (because they are following the same design rules), then there is a good chance that these rules can be mapped directly into DriveWorks to control SolidWorks to output the same design in a matter of minutes. Here is a list of some common time consuming tasks that Javelin is helping companies automate:

Administrative Tasks
1. Exporting drawings as other formats when approved for manufacturing (i.e. PDF, DWG, DXF, eDrawing)
2. Printing entire drawing packages and sending files to the appropriate printer based on sheet size
3. Exporting BOM for import into an ERP or MRP system
4. Filling in title blocks with approver name, date and updating revision numbers
5. Informing designers or other employees when a file needs their attention
6. Creating project folder structures and common project files (i.e. Project plan, quotes, assemblies, etc)

Design Tasks
1. Changing dimensions without knowledge of how the models were designed
2. Replacing components based on selected options
3. Suppressing and unsuppressing common features based on rules about the design and options selected
4. Producing updated drawing packages with properly scaled views
Sales Tasks
1. Producing quotes based on rules about the design output (i.e. Mass of materials, number of cuts, etc.)
2. Producing customer deliverables such as photo renderings or eDrawings of design proposal
3. Bypassing engineering all together for completely automated designs

Step 13: Integrate with other engineering departments
Now that the mechanical engineering group is working efficiently, there is still room for engineering wide improvements by integrating with other departments. The top departments that are usually integrated with Mechanical Engineering are Electrical Engineering and Manufacturing Programming.

Electrical Engineering
Depending on the type of electrical engineering that you do, the recommended solution may vary. For smaller electronics and circuit board design, it is important to understand the full capabilities of CircuitWorks which is integrated with SolidWorks Premium. For doing logical schematics for wiring and cable harnesses (as well as most other aspects of electrical engineering) it is important to understand the electrical design product that Javelin works with called Zuken E3 WireWorks. Not only does it offer many advantages to electrical engineers, it also integrates with SolidWorks Routing for cable sizing and Enterprise PDM for a unified bill of materials.

Manufacturing Programming
Many companies will take this step much earlier because it has the potential to reap high rewards, but it is important to leverage your 3D models as best you can for CNC code generation. Javelin has some recommendations but it can change a lot depending on your needs so it is best to talk with us.

Step 14: Adopt continuous improvement mentality
Now that you've gone through this guide and are hopefully implementing some of the recommendations, you are on the path to having an efficient design team. As technology evolves, business goals change and markets open up or close, it is important to reflect back on this guide or talk with someone from Javelin periodically to see if there is opportunity for further efficiency gains. Below is our contact information:

Phone: **1-877-21-WORKS (96757)**
Sales e-mail: sales@javelin-tech.com
Support e-mail: support@javelin-tech.com
Web: [www.javelin-tech.com](http://www.javelin-tech.com)
Guide Author: eric.vanessen@javelin-tech.com
Appendix
Listed below is more information about the products featured in this white paper:

**DriveWorks**
DriveWorks is a SolidWorks Add-in product that allows you to capture and re-use the rules needed to specify, design, manufacture and Engineer-to-Order. With DriveWorks you can automate repetitive tasks and automatically generate design and manufacturing outputs required to create new and variant products. You will save time and be able to specify the products whilst maintaining your engineering controls.


**PropertyLinksXpress**
PropertyLinksXpress is a FREE SolidWorks add-in product, created by Javelin, that allows the easy and consistent input of custom file properties into SolidWorks documents. Integrated with the SolidWorks PropertyManager, simply type or select values from pre-defined lists to add custom properties to models.

[http://www.javelin-tech.com/propertylinksxpress](http://www.javelin-tech.com/propertylinksxpress)

**SolidWorks**
Straightforward 3D CAD software, offering unmatched 3D design capabilities, performance, and ease-of-use. Evaluate more design alternatives, reduce errors, and enhance product quality. Create 3D models from existing 2D data with the best available transition tools. Enjoy unmatched design communication capabilities.

[http://www.javelin-tech.com/solidworks](http://www.javelin-tech.com/solidworks)

**SolidWorks eDrawings**
SolidWorks eDrawings is an ideal tool for anyone that needs to share data and collaborate with their extended design team. SolidWorks eDrawings eliminates the communication barriers that designers and engineers deal with daily. SolidWorks eDrawings gives you and your extended design team the tools necessary to visualize, interpret and collaborate with 2D and 3D product design data.


**SolidWorks Enterprise PDM**
SolidWorks Enterprise PDM is a product data management (PDM) software solution based on proven technology that can be deployed in a fraction of the time required for other enterprise PDM systems. Helping organizations to manage and share product data more effectively and automate workflow to allow better collaboration from engineering to the shop floor, resulting in better products, lower costs, and faster time to market.

[http://www.javelin-tech.com/pdm](http://www.javelin-tech.com/pdm)

**Zuken E3. WireWorks**
E³.WireWorks is a Windows-based, modular, scalable and easy-to-learn system for electrical design of wiring, harnesses, and cable assemblies. Its modules include Schematic (for circuit diagrams), Cable (for advanced electrical design), Panel (for cabinet and panel design), and Formboard (for wiring harness nail board drawings).

[http://www.javelin-tech.com/main/products/e3wireworks.htm](http://www.javelin-tech.com/main/products/e3wireworks.htm)