

South Carolina Department of Transportation

DIGITAL SIGNATURES MANUAL

November 2015

Design Automation Office

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Digital Signature Fundamentals

Overview

As design documents are now routinely submitted, reviewed, and stored in purely electronic form, allowing them to be easily reproduced and modified, the use of digital signatures provides improved security and convenience for engineers needing to certify their work. Digital signatures allow viewers to confirm that the signature is valid, not copied or forged, and that no changes have been made to an electronic document since it was signed. As documents can be signed in electronic form without being printed and re-scanned, digital signatures also help prevent visual quality losses from scanning, eliminate paper waste, and speed up the process of revising and recertifying plans.

Visual Seals and Signatures

Computer generated seals shall be identical in size, design, and content with the approved impression seals. Computer generated signature and date shall be affixed under or across the face and beyond the circumference of the seal. The licensee's license number, name, signature, and date shall be legible.

Digital Certificates

In order for a digital signature to be verifiable, it must incorporate a digital certificate that confirms the signatory's identity. SCDOT must be able to verify the authenticity of the certificate through a certification authority, independently of the submitter or signatory and without expense to SCDOT. Verification must also be possible independent of the continued future operation of that authority; all files and programs necessary for this purpose shall be provided and stored with the signed documents.

Digital certificates for SCDOT-produced files shall be provided and verifiable using the ARX CoSign software, authorized and operated through the SCDOT network. Outside consultants may use any software that meets SCDOT requirements.

Electronic Files

The design drawings, final construction plans, and plats prepared by or under the responsible charge of a licensee(s) shall consist of separate electronic files for each sheet and carry the required seal(s), date(s), signature(s), and digital signature certificate(s) on each sheet. The electronic sheet filename(s) shall include a prefix to clearly define the sheet sequence. Electronic files shall be created in or converted to the Adobe PDF format as "full-size" (Ex., 22"x36" for plan sheets) for submittal.

For specifications, documents, and reports, where more than one page is bound together in one volume, the licensee(s) or permit holder(s) may digitally seal, date, and sign only the table of contents sheet, provided that the signed sheet clearly identifies all of the other sheets comprising the bound volume with responsibility clearly delineated.

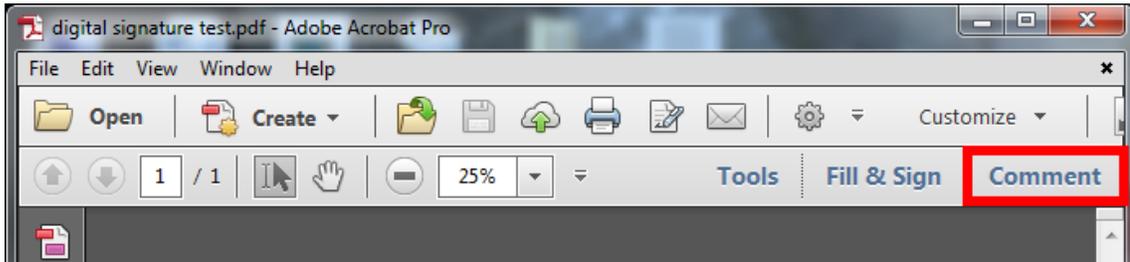
SCDOT reserves the right to request one or more paper copies of any electronic document be submitted as part of the review or approval process. The use of electronic documents signed using digital signatures is permitted, not required, by SCDOT. Traditional paper documents signed and sealed by hand are still permitted under existing standards.

Signing and Sealing Engineering Files

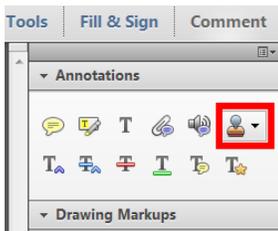
Electronically Stamping Engineering Documents

If a PE Seal was not included in your plan’s MicroStation files, it can be added to the PDF document.

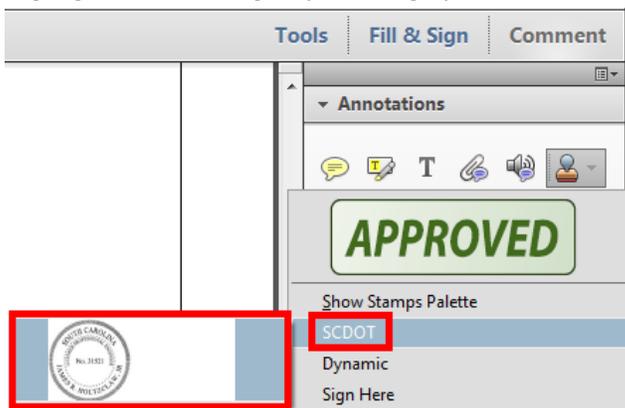
1. In Adobe Reader or Adobe Acrobat, open the “Comment” tools in the upper right corner.



2. Click on the “Add Stamp” tool in the Annotations list to bring up the list of available stamps.



3. Highlight the SCDOT group to bring up SCDOT’s stamps. Click on your PE Seal stamp to select it.

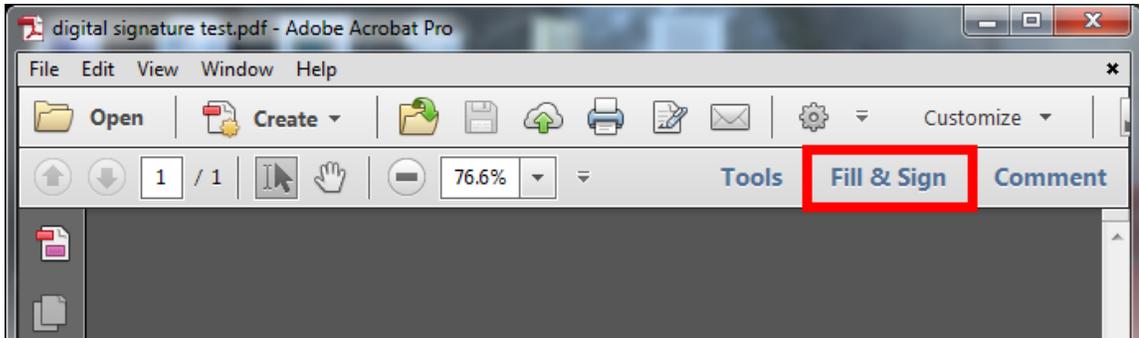


4. Click on the PDF document to place the seal. Make certain there is a space available by the seal for the digital signature text to be inserted, to the right of the seal if possible. Some versions of the stamp will mask a section of the drawing to the right to provide clear space for that text.

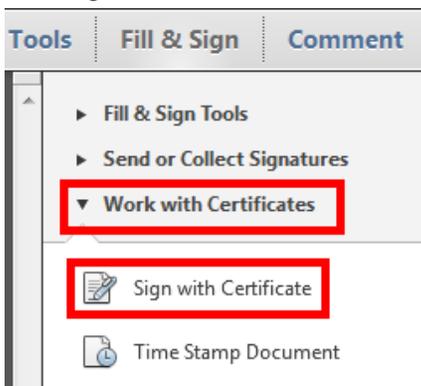


Digitally Signing Existing Documents

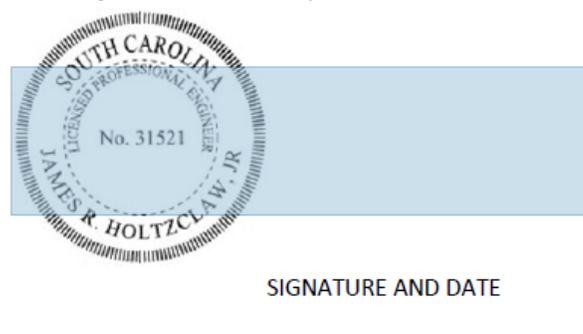
1. Open the file to be signed in Adobe Reader or Adobe Acrobat.
2. Open the “Fill & Sign” tools in the upper right corner of the program.



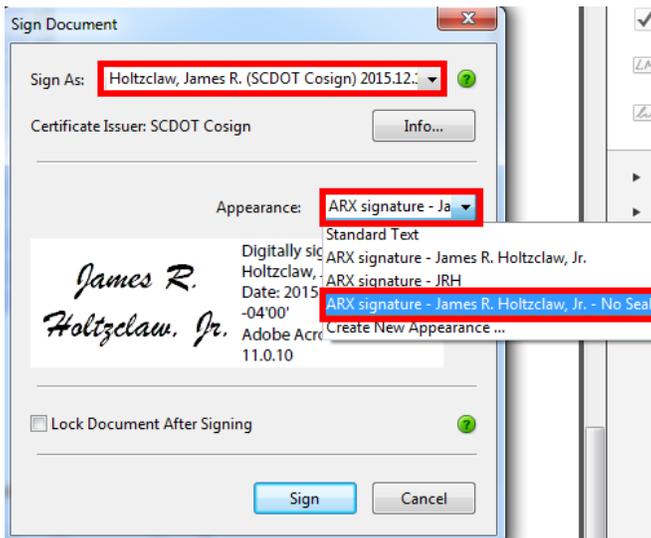
3. Expand the “Work with Certificates” menu and click on “Sign with Certificate” to enable the drawing tool.



4. Click and drag on the pdf to create the signature field. If a PE Seal was placed, the form should begin on the left side of the seal three-quarters of the way up, extending three-quarters of the way down the seal and right to the edge of the white space of the stamp. If a PE seal was not placed, the signature field needs to be large enough for the signature and all accompanying text to be legible. It can be adjusted later if it is too large or small.



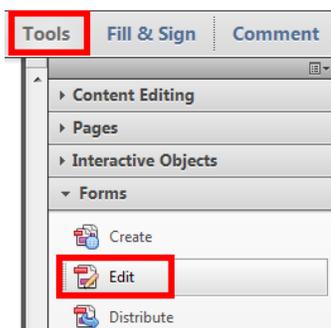
- The Sign Document window should appear. Choose your name in the Sign As box and the desired signature in the Appearance box, and then click Sign.



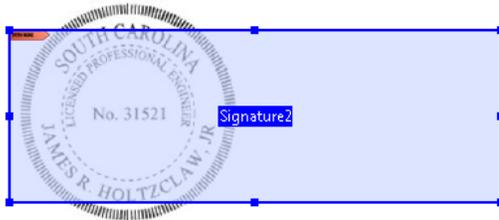
- Adobe will ask you to save the file. You can overwrite the unsigned version of the document or save it as a new document with a revised name (recommended). Adding the signature date to the name of the file may help with record-keeping.
- If necessary, reposition and resize the signature field to line up with the seal without obscuring your name or PE number. Before the field can be altered, the signature must be cleared. Right-click on the signature and select “Clear Signature” from the menu.



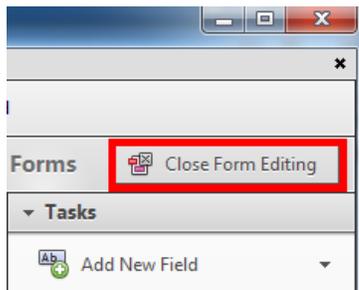
- In the Tools menu, Select Forms, Edit.



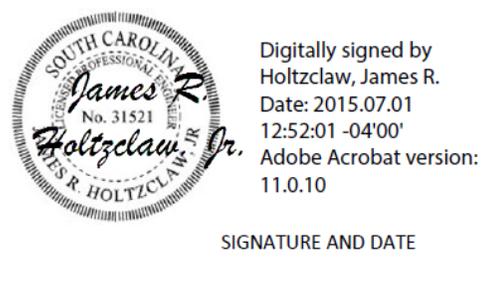
9. Select the signature field and drag it to reposition it. Use the grips on the sides and corners, marked with boxes, to resize it.



10. At the top of the screen, click “Close Form Editing” to complete the process.



11. Left-click on the signature field to open the Sign Document window again and follow steps 8 & 9 to re-sign the document.



12. Any changes to the document, including adjustment of stamps, will invalidate the signature. It must be cleared and reapplied by following steps 11 & 15 again.

If multiple signatures are required on a document, the signatures must be applied after ALL stamps have been added. Engineers may be required to each apply their PE Seal stamp in turn, then recirculate the document to each sign it.

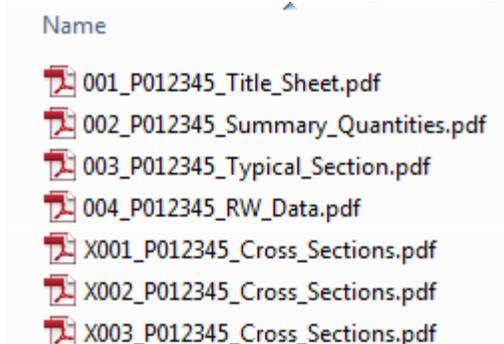
To delete a signature field entirely, follow steps 7 and 8 above to clear the signature and open the field editor. Then, simply select the field and press the “Delete” key to remove it.

File Naming Conventions

All PDF sheets intended as part of a plan set must follow naming conventions to ensure they can be identified and printed in the correct order quickly and easily.

File names should contain no spaces, using underscores in their places. All files should include **a prefix consisting of a three-digit sheet number**, an underscore, and the project ID number (ex., **001_P012345_Title_Sheet.pdf**). Once this prefix is included, sheets can be named as desired to correspond with the plan set's index or sheet descriptions.

In order to separate cross-section sheets from other plan sheets, they will be given a special prefix. Follow the same rules as above, but begin the name of cross-section sheets with an 'X' and number them separately from the rest of the plan set. Thus, if a plan set began with sheets **001_P012345_Title_Sheet.pdf** and **002_P012345_Summary_Quantities.pdf**, the first cross-section sheet in the set would be **X001_P012345_Cross_Sections.pdf**.



Do not use numeric-alpha prefixes for sorting the file names (2, 2A, 2B). The prefix used should allow the sheets to fall in order of the plan set.

In order to insert any additional sheets into an existing plan set, add a letter designator to the sheet number of the previous sheet. For example, if a Moving Items sheet needed to be added following the second sheet of a set, **002_P012345_Summary_Quantities.pdf**, the Moving Items sheet would be named **002A_P012345_Moving_Items.pdf**. This is for additional sheets only.

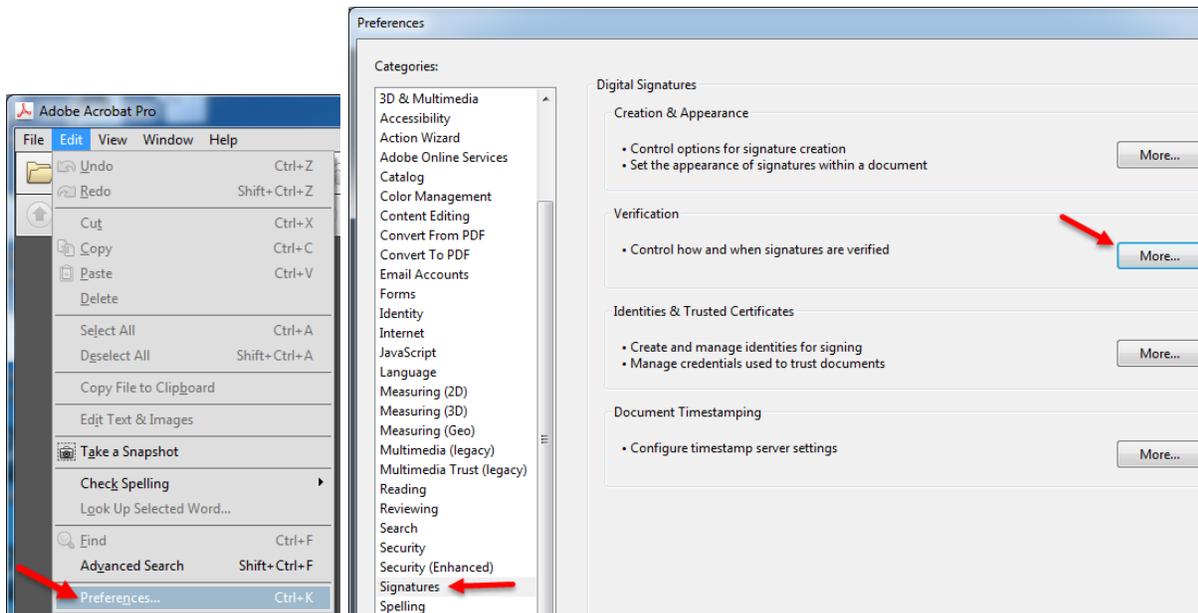
These additional plan sheets should be sent in a separate folder to Plans Storage for processing and adding into the Plans Library. Revised sheets should also be sent in a separate folder for processing and adding into the Plans Library.

Verifying Digital Signatures

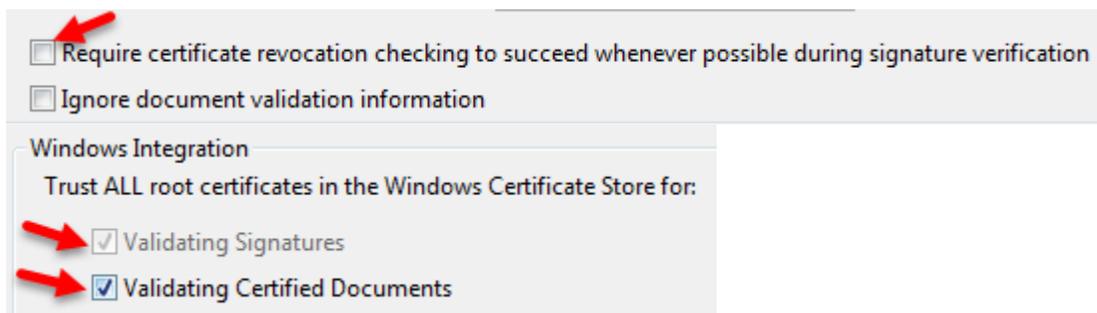
Verifying Digital Signatures Using a Certificate

Adobe automatically checks digital signatures against a list of certificates loaded onto your computer or your network. Each 'signatory' has their own certificate which can be downloaded from the internet, emailed, or transferred on a disc. Consultants will be required to provide a copy of their certificate the first time they submit a digitally signed document to SCDOT. Certificates must be installed (See "Installing a Certificate for Signature Validation" below) before attempting to validate associated signatures.

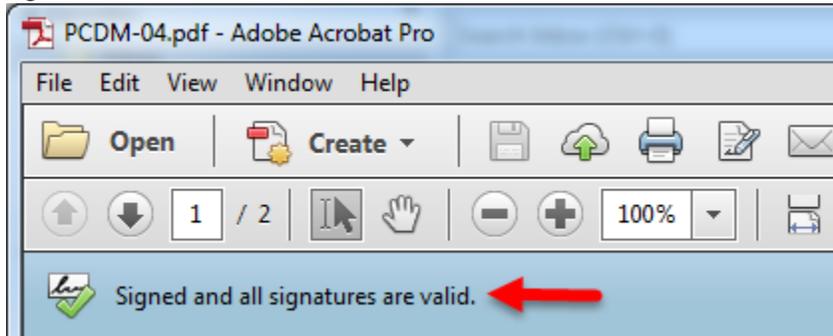
The first time you use Adobe to verify digital signatures; there are several settings you will need to check. In Adobe, go to Edit -> Preferences in the menu bar. In Preferences, select the Signatures category, and click the "More..." button next to Verification.



In the Signature Verification Preferences window, you will need to ensure that "Require certificate revocation checking..." is unchecked, and that the two options under Windows Integration "Trust ALL root certificates..." are both checked.



When opened, a PDF file containing digital signatures will attempt to verify those signatures and give its results in a bar at the top of the screen. A file that has been correctly signed will report that all signatures are valid.



Documents whose signatures are not correct in some way will report that their signatures require validating.



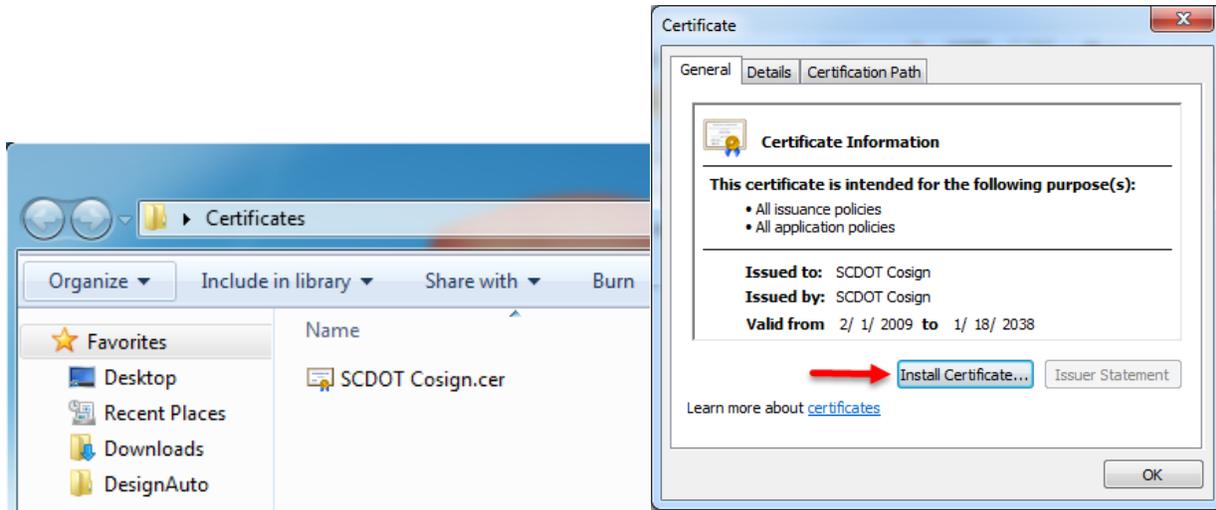
In this case, you can determine the nature of the issue by clicking on the signatures one at a time. Doing so will bring up individual reports on each signature and identify any problems. The most common issue is that the document has been changed since being signed, in which case you must review any changes, then clear and reapply the signature.



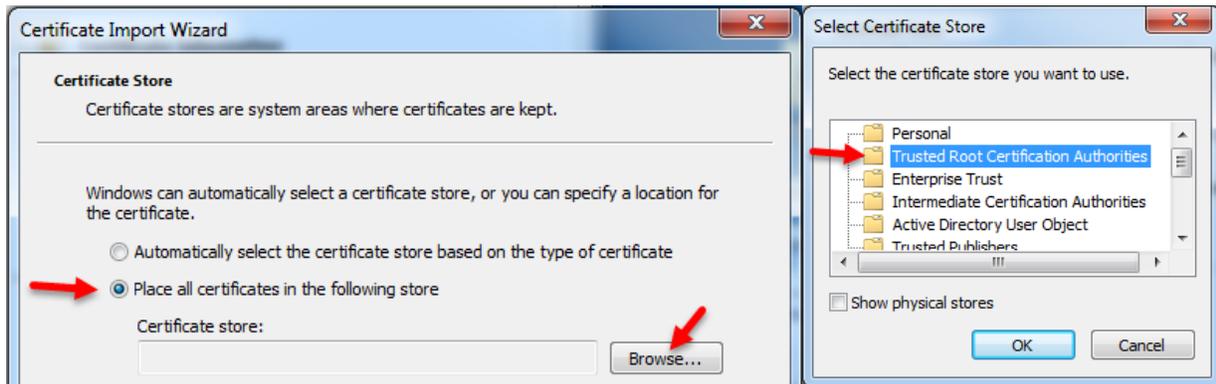
Installing a Certificate for Signature Validation

Certificates can be installed in the Windows Certificate Manager or directly into Adobe. Installing to the WCM will allow any program to access the certificate for signature validation, while installing to Adobe will only allow validation on PDF documents.

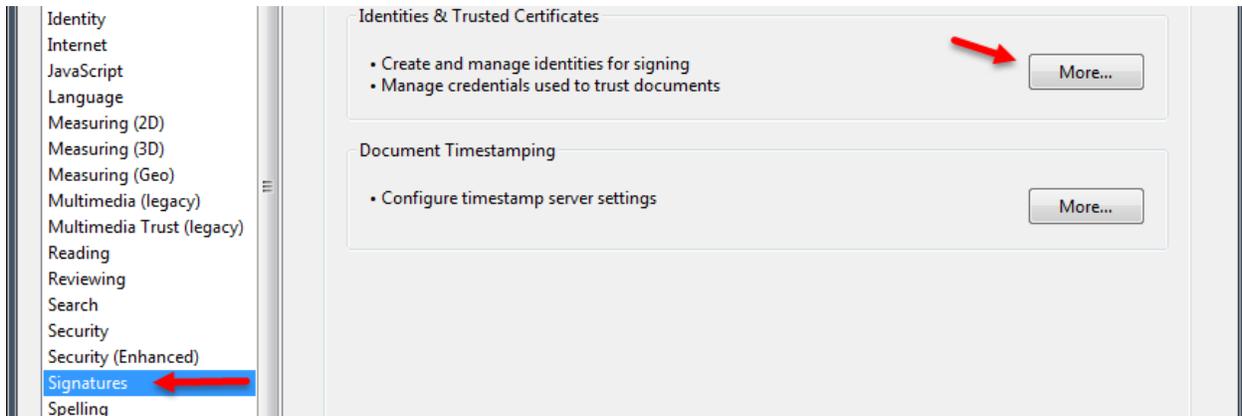
In order to install a certificate in the WCM, locate the certificate on your computer and double-click it. In the General tab of the Certificate window, click “Install Certificate” to activate the Certificate Import Wizard.



Click “Next”, and then choose the option of “Place all certificates in the following store”. Press “Browse” and select the “Trusted Root Certification Authorities”, then click “Ok”, “Next”, and “Finish.”



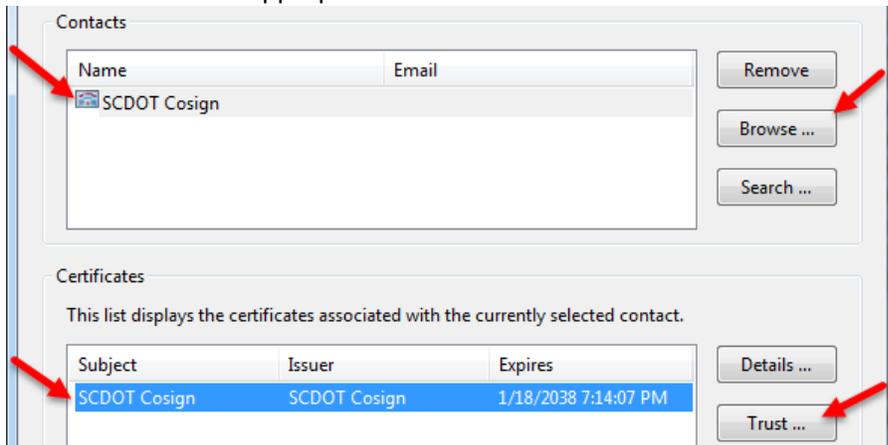
To install the certificate to Adobe, open the program and select Edit -> Preferences from the menu bar. In the Preferences window, select the Signatures Category and click the “More...” button beside “Identities & Trusted Certificates”.



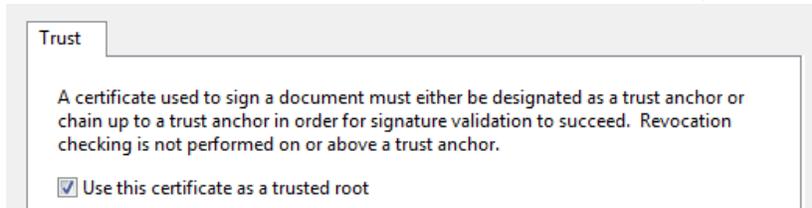
In that window, select Trusted Certificates and click the “Import” button.



Under Contacts, click on Browse and navigate to the certificate you wish to install. Open it and it will appear in the Contacts list. Select it, and one or more items will appear in the Certificates section below Contacts. Select the appropriate item and click “Trust...”.



Turn on “Use this certificate as a trusted root” and click Ok, then click “Import” to finish.



Creating Digital Signatures

Create a Digital Signature Using CoSign

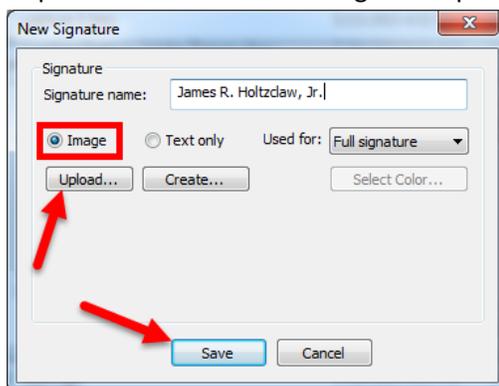
1. Open the ARX CoSign Control Panel from your Start Menu. If you do not have CoSign, contact Design Automation or your District IRC.



2. Open the Graphical Signatures tool in CoSign. Click the “New Signature” button.

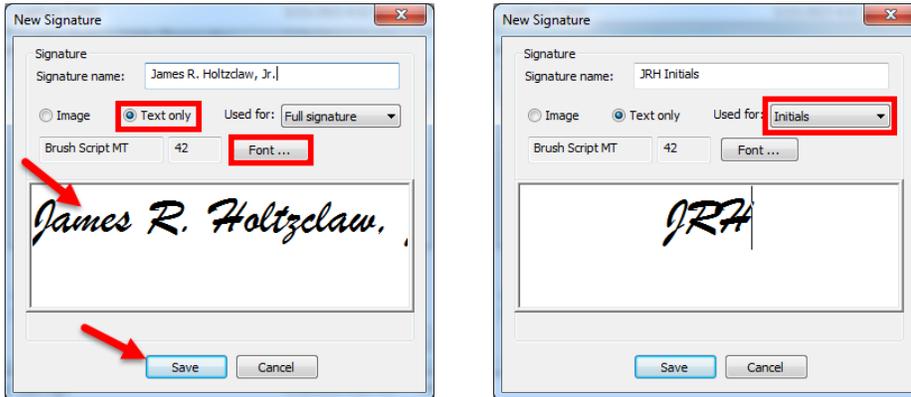


3. Enter a name for your signature at the top of the new window – a common choice is your name, written as you would when signing.
4. If you have an image of your signature that you wish to use, such as a scan of a handwritten signature, you can upload it using the “Image” option. Activate the Image button, and then click “Upload”. Browse to the image and open it, then click the “Save” button.



- If you don't have a picture of your signature or are fine with using a generated signature, choose "Text Only" instead of "Image". You can then type your name in as you wish it to be shown, choosing a font and text size. Click save when you are satisfied with the signature's appearance.

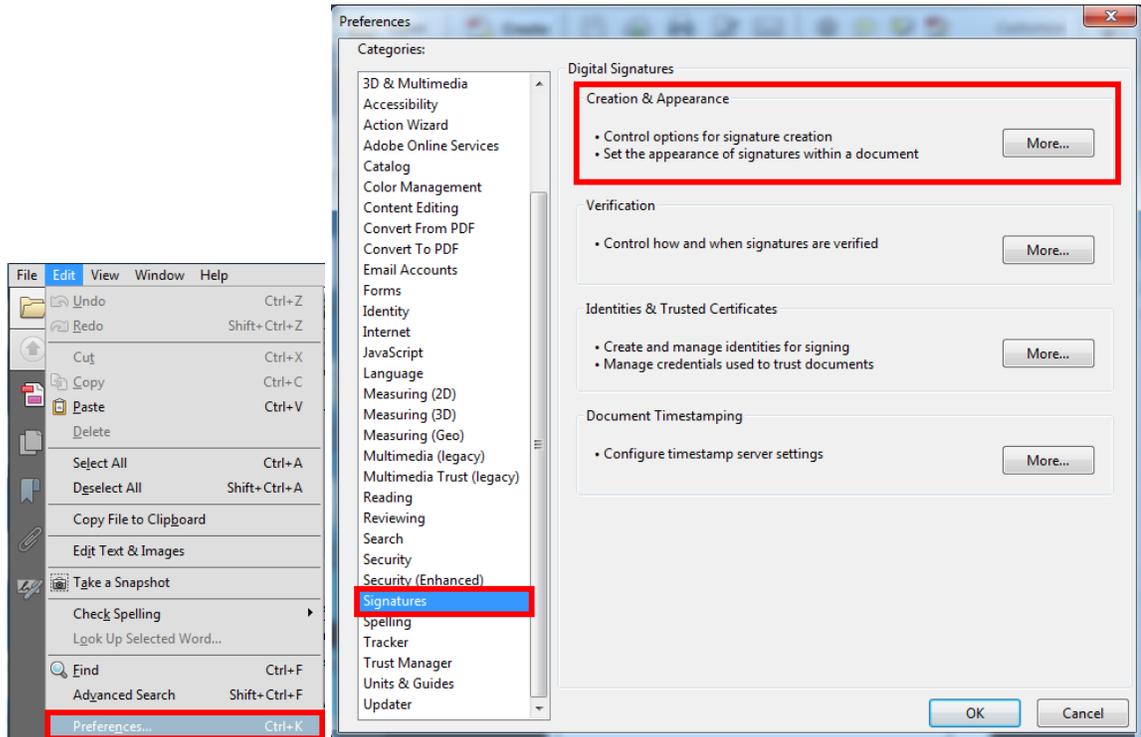
You can repeat steps 2 through 5 to add an additional signature showing your initials only, if desired. In the New Signature window, change "Used for: Full Signature" to "Initials", and make certain that you give the new signature a clearly identifiable name.



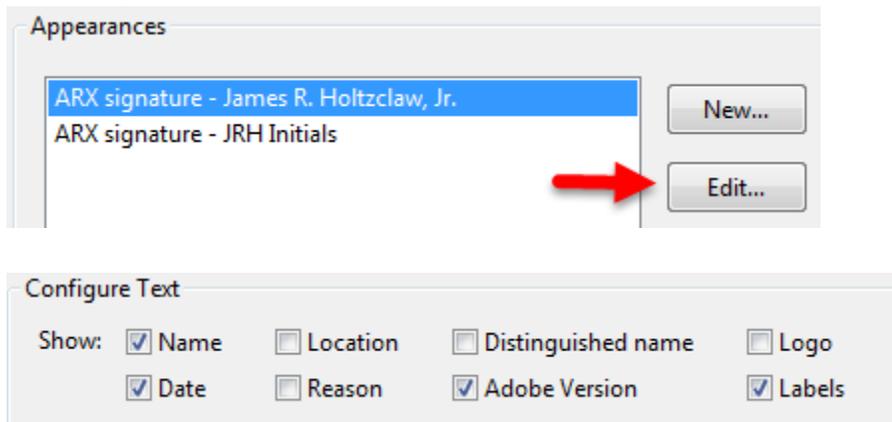
- Once all desired signatures have been created, you must install them into Adobe Acrobat. In the Graphical Viewer window, click the linked labeled "Update Acrobat". If you have multiple signatures, use the arrow keys below the image to cycle to each signature in turn and click "Update Acrobat" for each one.



- Open Adobe Acrobat and select “Edit -> Preferences”. In the Preferences window, select “Signatures”, then click the “More” button beside “creation & Appearance”.

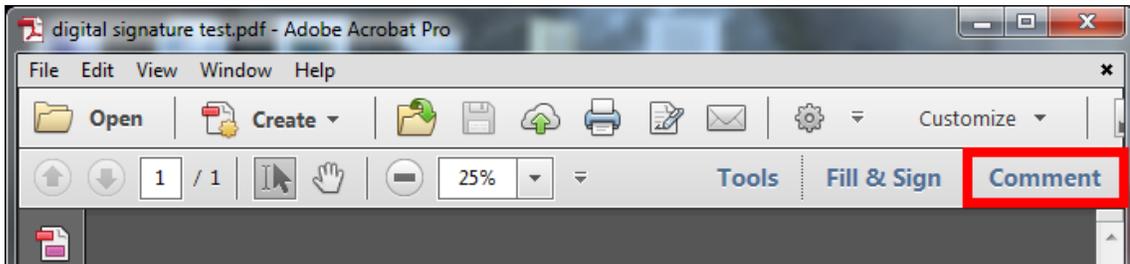


- Choose the first signature in the Appearances section and click “Edit”. In the new window, under “Configure Text”, turn on the Name, Date, Adobe Version, and Labels options, and turn everything else off. Repeat for each signature. Your signatures are now configured for use.

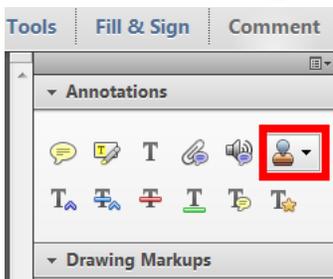


Create a Digital PE Seal in Adobe

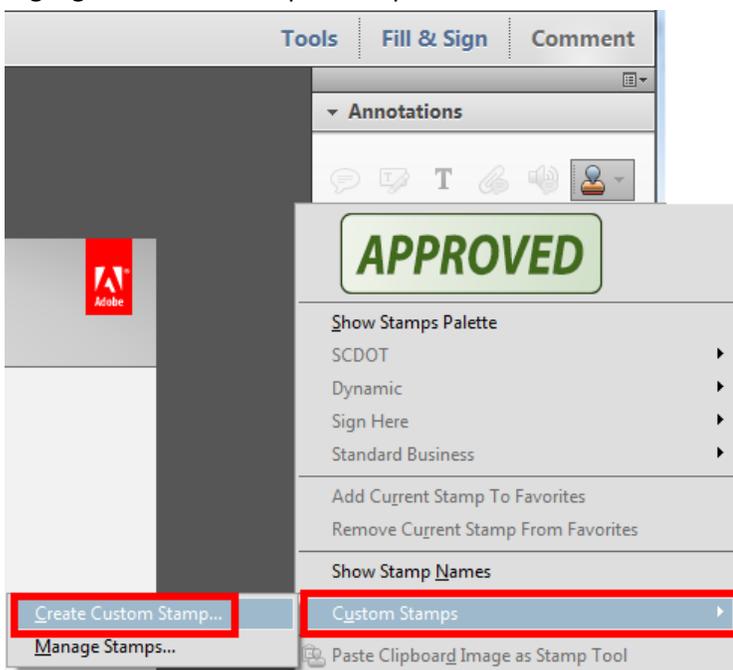
1. Prepare an electronic image of your PE seal by scanning a paper copy, drawing one in a drafting program and transferring it to an image file, etc.
2. Open Adobe Acrobat.
3. Open the “Comment” tools in the upper right corner of the program.



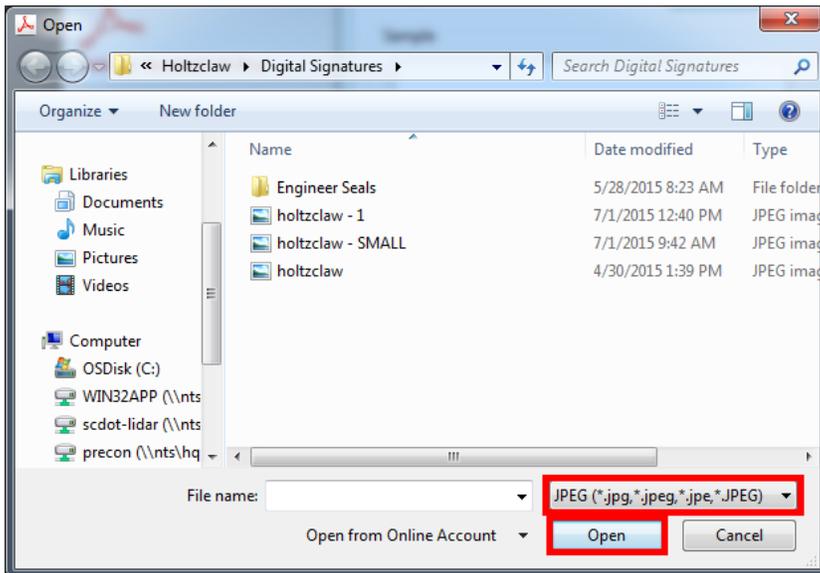
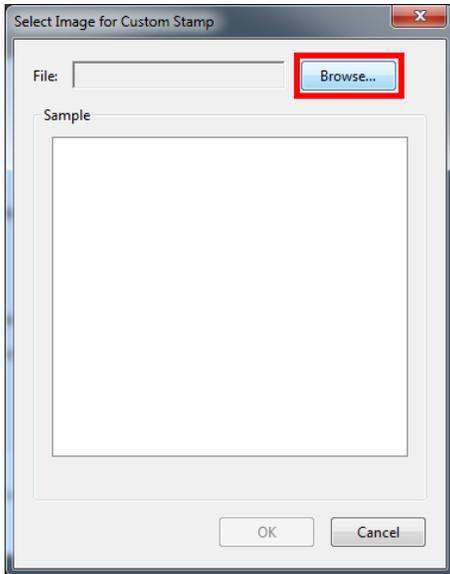
4. Click on the “Add Stamp” tool in the Annotations list to bring up the list of available stamps.



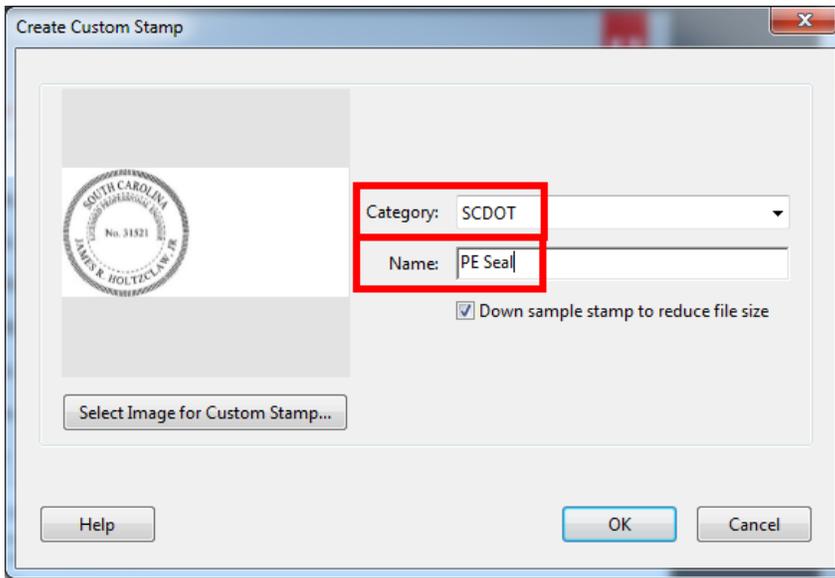
5. Highlight “Custom Stamps” to expand its menu. Click on “Create Custom Stamp”.



- In the Custom Stamp window, select Browse. Change the File Type option in the bottom right corner of the Open window from “Acrobat PDF Files” to the file type of your seal image (JPEG for prepared SCDOT seals). Locate the image of your PE Seal, click on it, and press “Open.” Press “OK” in the Custom Stamp window.



- In the next window, enter SCDOT for the Category and PE Seal for the Name. Press “Ok”.



- The finalized stamp can be accessed by using the Add Stamp tool in the Comment toolbar, highlighting the SCDOT category, and clicking on the image of the stamp. Click on the document to place the stamp as desired.

