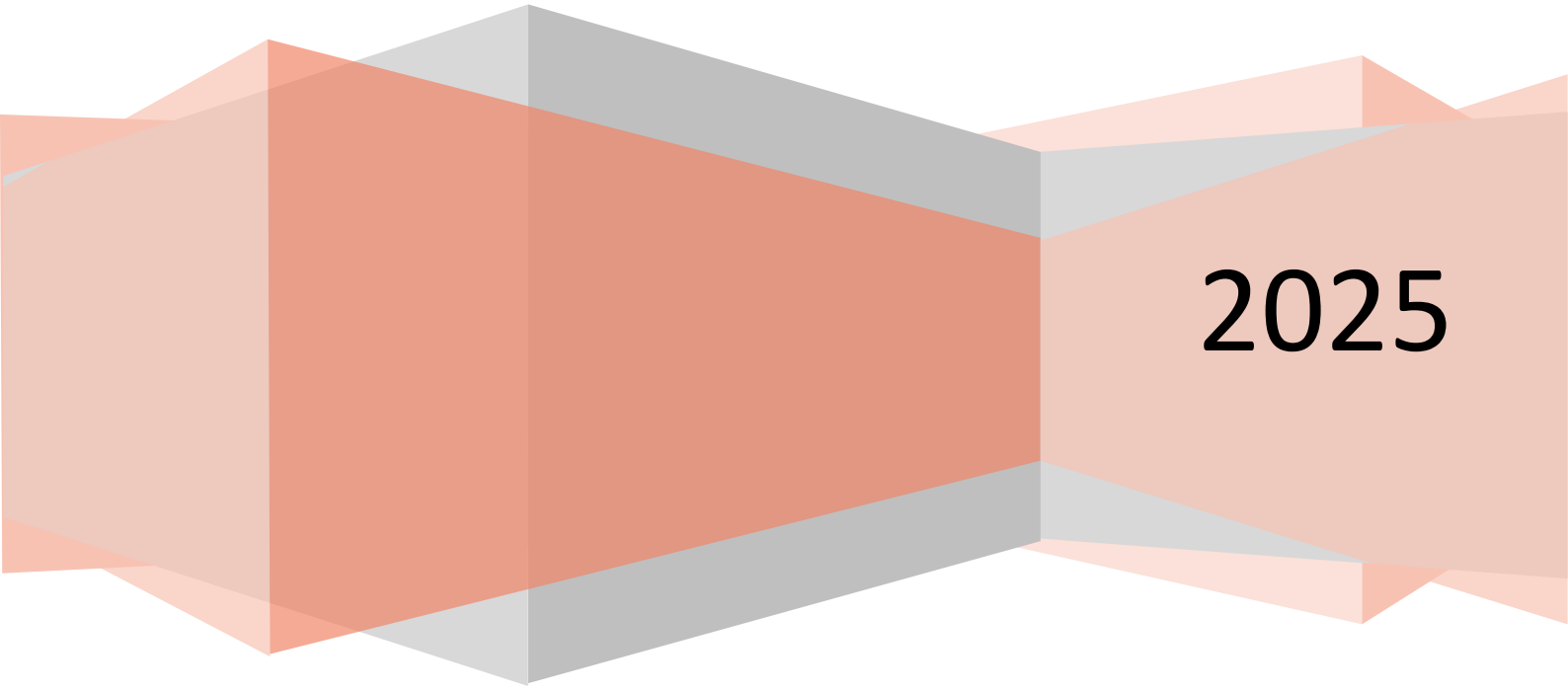
structIQe

# User Manual

## CAD Assist

structIQe Technologies



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# Contents

# 1. Introduction

CAD Assist is a powerful drafting enhancement software designed to simplify advanced drafting tasks and automate repetitive processes. Developed by structIQe Technologies, CAD Assist integrates seamlessly with AutoCAD to provide an array of functionalities for engineers, managers and drafters.

Some of the unique key advantages of this application are as follows:

- Assists user to set up project in an organised way.
- Uniform CAD settings are enforced throughout the project automatically.
- Separates and creates folders for various types of drawings in an organised manner.
- Direct Interlinking of project database with drawings.
- Version/Revision control of submitted drawings.
- Automatic PDF generation.
- Streamlining the Drawing's submission process
- Fully customizable for variable needs of projects.
- Enhances AutoCAD drafting capabilities, by providing commands for some cumbersome tasks.
- Gives controlled access to Project settings, thereby, securing crucial settings/information from getting corrupted/deleted.
- CAD Assist is flexible, user-friendly and intuitive to use. Less than one day is generally required to learn to how to use it.

As a continuous effort of improving our products, some add-on tools have also been added to CAD Assist. Refer "Add-on Tools" section for more details.

- "Rename/Replace Dwg" is very useful in keeping External Reference up to date in a dynamic way.
- "Tendon Works" is a very handy tool, while working with Prestressing Tendon Dwgs.
- "Profile Interpolation" can be used to manipulate/workout Levels like Rail Levels, Ground Levels, FRL etc. in a large scale, without compromising with time, accuracy and efficiency.

# 2. Getting Started

CAD Assist can be installed onto the user system, using the installer provided in the software package. But it should be ensured that following requirements are met with, for successful installation and utilization of the application.

- Windows 7 Onwards
- AutoCAD (Refer Section “Compatibility”)
- Microsoft Excel
- Valid License (Refer Section “License Management”)

## 2.1. Compatibility

CAD Assist is currently compatible with AutoCAD 2023, 2024 and is being continuously developed/upgraded as per requirement.

Compatibility with other versions has not been verified yet. Please contact the program vendor, for more details.

## 2.2. License Management

SafeNet Sentinel License is a must requirement to use this software and is included with the Software package. Type of licensing solution may vary as per individual requirements and should be discussed directly with the vendor for optimum utilisation of software and your resources. Issues, if any, should be resolved with the vendor or your system administrator.

## 2.3. Installation

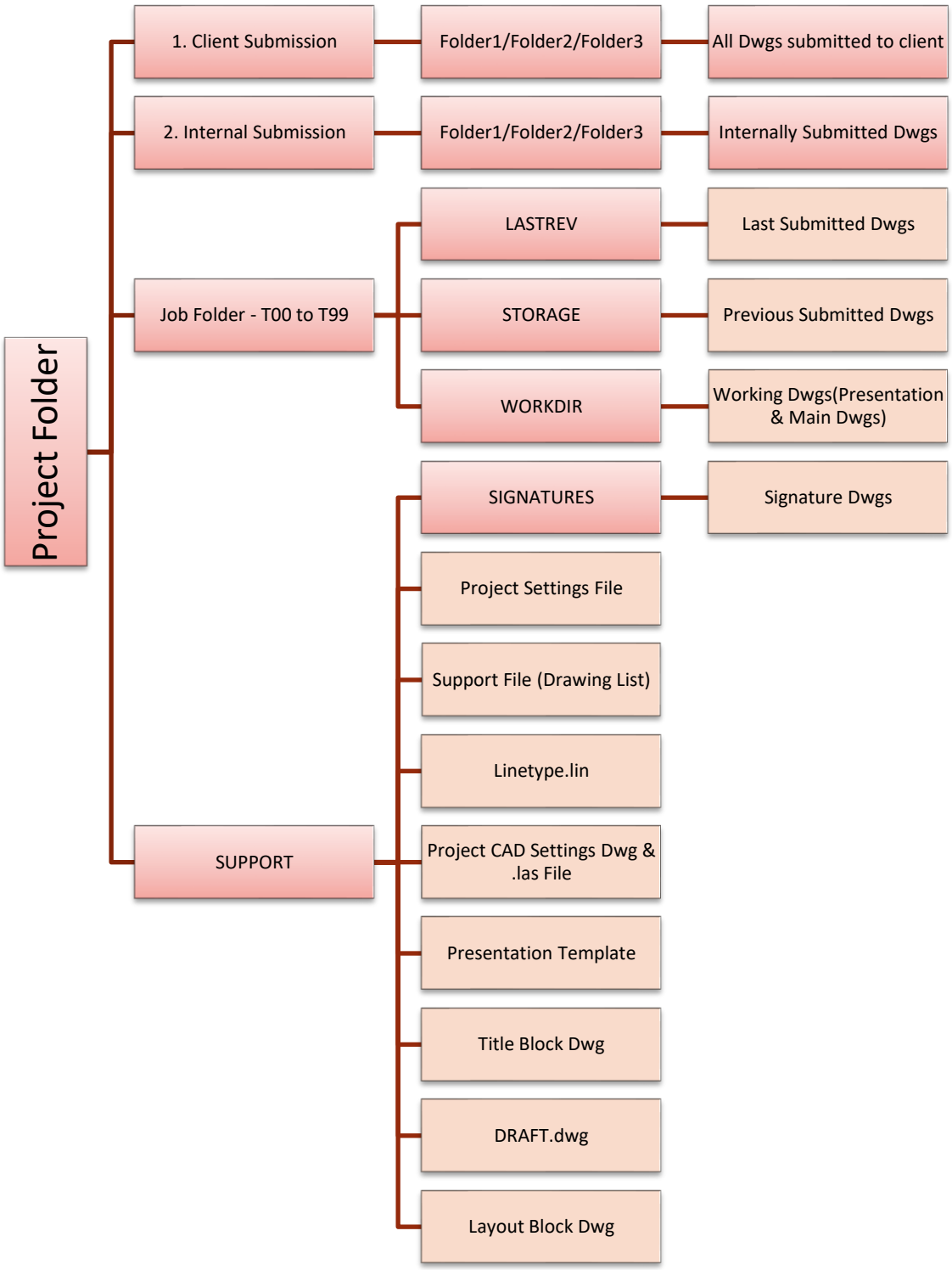
User should use the installer "structIQe Application Manager" provided with the software package to update/install the software as well as the licensing solution.

Issues, if any, should be resolved with the vendor or your system administrator.

# 3. Procedures & Guidelines

This section provides various procedures and guidelines for setting up of Projects and CAD requirements, to assist the user in managing the project related drawings, settings and details effectively, and side by side reducing time as well as chances of error.

## 3.1. Project Setup



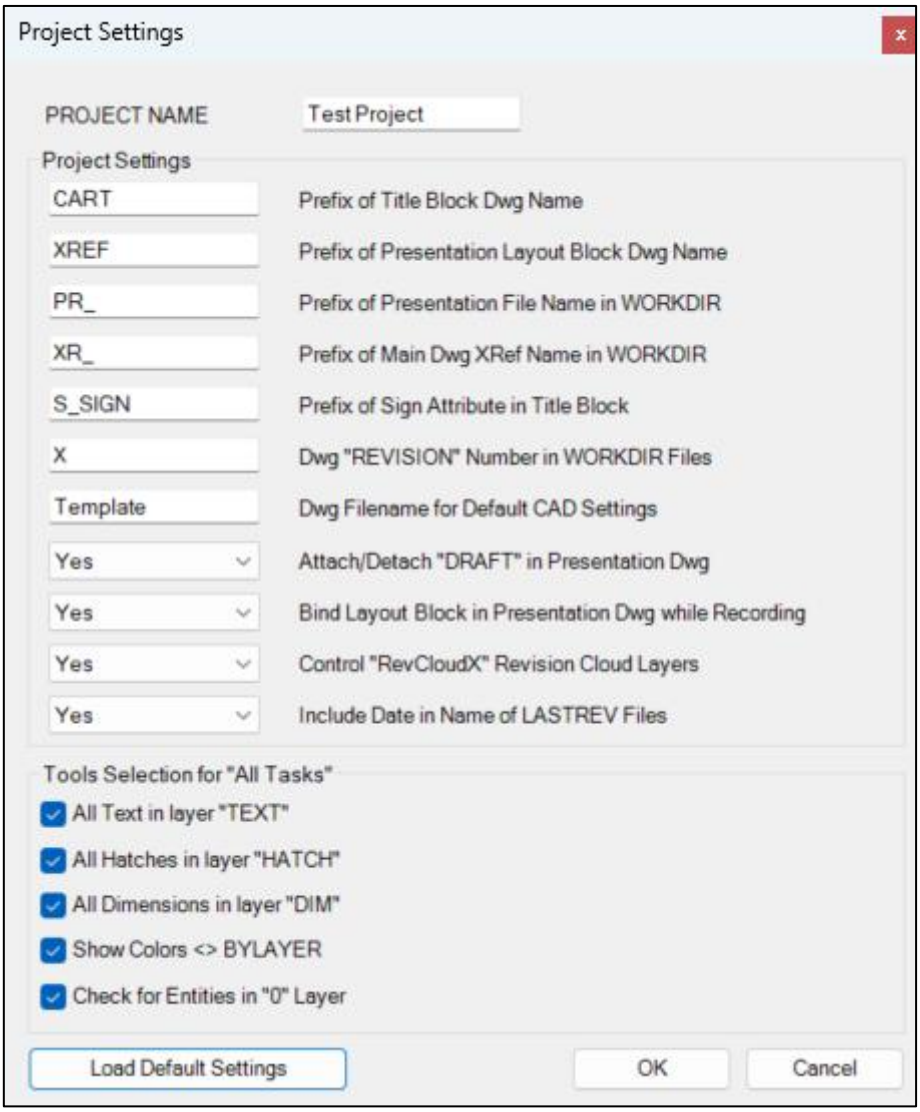
Either use the already inbuilt command to setup a new project, refer "New Project" command, or manually create project folder and its sub folders along with other files required in the project as described below.

***Note:*** *CAD Assist creates only folders and Project Settings file in "SUPPORT" folder. User must ensure that all other files are available in respective folders in proper formats.*

- Project Folder - Entire project related data and folders must be placed in this folder. Let's assume the name given to the folder is "**Test Project**".
    - **"1. Client Submission"** folder, located inside the Project folder, contains all the PDFs submitted to the client, in date wise order, duly arranged as per the Sub-folder schema/categorisation defined in Support file. Refer "New Project" command.
    - **"2. Internal Submission"** folder, located inside the Project folder, contains all the PDFs submitted internally directly from WORKDIR, in date wise order, duly arranged as per the Sub-folder schema/categorisation defined in Support file. Refer "Submit PDF Internally" command.
    - **Job Folder** – Each job folder contains subfolders and drawings arranged in pre-defined sets. Name of these job folders must contain only 3 letters, i.e. one alphabet followed by two integers. For e.g. "T00", "P11", "S99". These names will help in differentiating the support files for each job in SUPPORT folder. For e.g. "T00_Support", "P11_Support", "S99_Support".
        - "**LASTREV**" – This folder contains recorded copies of presentation dwgs to be submitted to client.
        - "**STORAGE**" – This folder contains a database of all the previously recorded dwgs.
        - "**WORKDIR**" – All the presentation dwgs & main dwgs (under progress) are to be placed in this folder.
    - "**SUPPORT**" folder must be present directly inside the project folder, which will contain all the project related data to control parameters and behaviour of the project related tasks.
        - "**SIGNATURES**" – Drawings containing signatures should be placed in this folder that will be added as blocks into the presentation dwgs as and when required. Refer "Fill in Title Block" section for more details.
        - Project Settings File – A file named as "**Project Settings**" containing all the parameters required for the project. Refer "Project Settings" section for more details.
        - Job Support File – Support files are the files containing details and parameters to be filled in title block of presentation dwgs. Refer "Support File" section for more details.
        - "**Linetype.lin**" - This linetype file contains any additional linetypes (not available in default linetype files - "acad.lin" or "acadiso.lin") that may be required in the project, when Project CAD settings are being imported.
        - Project CAD Settings dwg & ".las" file - A typical drawing containing Project CAD Settings respective to each project, with dwg name as specified in Project Settings file. The settings include Layers, Linetypes and Dimension Styles which will be imported into any dwg, if "Import Template Settings" command is used. It should be noted that there could be only one template dwg per project.
        - Presentation Template- User can create template dwgs "xx.dwt" and place inside the SUPPORT folder, which can be directly used, when creating new drawings.

- Title Block Dwg– Dwg containing an array of attributes to be inserted as a block in Presentation Dwg. There can be any number of such Title Block Dwgs in a project with same prefix as specified in Project Settings file. Refer “Presentation Dwg” section for more details.
- “**DRAFT.dwg**” – A typical drawing, to be attached as X-Ref in presentation dwg, by which anything can be displayed in Presentation dwgs in WORKDIR. It will be detached, while recording the presentation dwg to LASTREV. Refer “Presentation Dwg” section for more details.
- Layout Block Dwg – Dwg containing the Layout Block to be attached as X-Ref in Presentation Dwg. There can be any number of such Layout Block Dwgs in a project with same prefix as specified in “Project Settings” file. Refer “Presentation Dwg” section for more details.

## 3.2. Project Settings




A file named as “**Project Settings**” containing all the parameters required for the project should always be available in the SUPPORT folder. A description of each input in settings file is described below.

- Project Name – In order to identify the project settings file or the current project selected, the name provided in this field will be used. Ideally, the name of the project folder should be the project name.
- Prefix of Title Block Dwg Name – In order to identify the name of the attribute block, to fill dwg specific details from Support file, this prefix will be used. For e.g. if you provide "**CART**" in this field, program will look for any attribute block inside paper space of the presentation block with block name as "**CARTxxx.dwg**".
- Prefix of Presentation Layout Block Dwg Name – In order to identify the name of the layout block, attached as X-Ref in each presentation dwg, this prefix will be used. Like if you provide "**XREF**" in this field, program will look for any X-Ref inside paper space of the presentation block with X-Ref name as "**XREFxxx.dwg**"**.**
- Prefix of Presentation File Name in WORKDIR – In order to differentiate between presentation dwgs of the project and other dwgs, this prefix will be used. Like if you provide "**Pr_**" in this field, program will assume all dwgs name as "**Pr_xxxxxx.dwg**" as presentation dwgs**.**
- Prefix of Main Dwg XRef Name in WORKDIR – In order to differentiate between main working dwgs of the project and other dwgs, this prefix will be used. Like if you provide "**Xr_**" in this field, program will assume all dwgs name as "**Xr_xxxxxx.dwg**" as main working dwgs**.**
- Prefix of Sign Attribute in Title Block - The attributes, whose prefix match with the prefix provided in this field, will be assumed as Signature attributes. Like if you provide "**S_SIGN**" in this field, program will assume all attributes with tag as "**S_SIGNxxx**" as signature attributes. Refer "Fill in Title Block" section for details of how this signature attribute is manipulated/used.
- Dwg "REVISION" Number in WORKDIR Files - The attribute with tag "REVISION" in presentation dwgs will be filled up with this value in WORKDIR, to indicate that this dwg is still under progress.
- Dwg Filename for Default CAD Settings – Program will regard the dwg, located in the support folder with same name as provided in this field, as the template file having Project related CAD settings.
- Attach/Detach "DRAFT" in Presentation Dwg – If selected "Yes" in this field, "DRAFT.dwg" will be attached as X-Ref in paper space of Presentation dwgs in WORKDIR and detached while recording to LASTREV folder.
- Bind Layout Block in Presentation Dwg while Recording - If selected "Yes" in this field, Layout Block attached as X-Ref will be bind to the Presentation dwg while recording.
- Control "RevCloudX" Revision Cloud Layers – If selected "Yes" in this field, program will control Revision Cloud Layers during recording. Refer "Record" section for more detail.
- Include Date in Name of LASTREV Files- If selected "Yes" in this field, program will include the date on which the dwg is recorded as a suffix at the end of the file name.
- Tools Selection for "All Tasks"- Select which of the provided tasks are to be included in the command "All Tasks as per Settings". Refer "All Tasks as per Settings" section for more details.

## 3.3. Support File

As described in "Project Setup" section, support file contains information which will be filled automatically using this program for each presentation dwg in the job folder. Following points must be kept in mind while preparing a support file.

- A single support excel file named "**Support**" is made for all job folders, with individual tab for each job folder in the excel file. Name of the tab must be "**T11_xxxx**" for T11 Job folder.
- Row "1" contains tag names of the attributes present in the title block of the target presentation dwg.

- You can enter as many tag names as you wish in this row.
- If the tag mentioned in the support file is not present in the title block, program will just ignore the entry.
- If an attribute is present in title block but no entry for that tag is mentioned in support file, program will ignore that attribute and will not modify the value in it.
- There should be no empty cells in columns of Row “1”, i.e. Tag names, until the list has ended. Otherwise, the program will ignore all tag names after the empty cell in Row “1”.

- Row “2” and Column “A”, is ignored by the program, and should not be used for any entry of a dwg. However, it can be used for any other purpose like Comments or Description of anything as required.
- From Row “3” onwards, entries are to be filled in, corresponding to each dwg in the WORKDIR of the job folder.
- Column “B” must contain Dwg Reference Number or Name.
  - Dwg Reference number or name will be used to locate the presentation dwg in WORKDIR after adding the prefix as described in “Project Settings” section. For Job Folder with name as, let’s say, T11, the dwg reference number must be T11xxx, where xxx can be any number from 000 to 999.
  - There should be no empty cells in rows of Column “B”, i.e. Dwg Reference Number, until the list has ended. Otherwise, the program will ignore all entries of dwgs after the empty cell in Column “B”.
- Column “C” must contain the Actual dwg number that will be mentioned on the dwg itself. This number will also be used to rename the dwg when recording to LASTREV folder.
- Column “D” must contain the latest revision number of the dwg to be submitted to client.
  - The tag name for this column must be “REVISION”.
  - This revision number will be used in the name of the dwg when recording to LASTREV folder to differentiate between various revisions of recorded presentation dwgs.
- Column “E/F/G” may or may not contain the name/categorization of each Drawing, which will be used to categorize/save the PDFs of the drawings in either “1. Client Submission” or “2. Internal Submission” folders.

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | REFERENCE NAME | REF_NO | DWG_NO | REVISION | SUB_FOLDER1 | SUB_FOLDER2 | SUB_FOLDERNAME | SUBMISSION_DATE | TITLE_1 | TITLE_2 |
| 2 | DESCRIPTION (if any) | | | | | | | | | |
| 3 | | T01011 | PARTICULARS-01011 | B | Title2 | Title3 | Title4 | 22-11-2013 | Title1 | Title2 |
| 4 | | T01012 | PARTICULARS-01012 | B | Title2 | Title3 | Title4 | 22-11-2013 | Title1 | Title2 |
| 5 | | T01111 | PARTICULARS-01111 | A | Title2 | Title3 | Title4 | 06-09-2013 | Title1 | Title2 |
| 6 | | T01999 | PARTICULARS-01999 | A | Title2 | Title3 | Title4 | 06-09-2013 | Title1 | Title2 |

  - Do note that if this is to work as intended, then, Tag Names of Column E, F, G should be “SUB_FOLDER1”, “SUB_FOLDER2” & "SUB_FOLDERNAME" respectively. If any mistake is made, entire entries will be ignored.
  - “SUB_FOLDER1” and “SUB_FOLDER2” can be as per your requirement, in order to categorize the submission folders inside submission folders. The entry from "SUB_FOLDERNAME" column will be used to create a folder named " Submission Folder> Title 2 > Title 3 > Date_Title4".
  - If you don’t enter “SUB_FOLDER2”, the program will create folder as “Submission Folder> Title 2 > Date_Title4 > PDF”
  - If you don’t enter “SUB_FOLDER1” as well, then the program will create folder as “Submission Folder> Date_Title4 > PDF”
  - Inside the final folder, a copy of PDF to be submitted will be pasted.

## 3.4. Presentation Dwg

A Presentation dwg consists of a lot many things put together. All of them are described in detail below:

- Main Dwg: Working dwg attached into the presentation dwg as External References (X-Refs) are referred to as Main dwg.
    - These dwgs should be located in the same project only (preferably in the same folder) as that of presentation dwg. Program gives a warning, while recording, if any of the attached X-Refs are placed outside the project folder.
    - Main dwgs must be attached into the presentation dwg into the model space at (0,0,0) coordinates only.
    - There can be as many number of X-Refs/Main dwgs as user wants that can be attached into a presentation dwg.
    - Revision Cloud Layers – Program gives an automatic control over RevCloud Layers to the user while recording.
        - Program turns Current Revision Cloud layer “RevCloudX” on and turn off all the rest Revision Cloud layers, if specified in Project Settings file, where “X” represents the current revision as mentioned in support file for tag “REVISION”.
        - Revision Cloud layers can contain only texts and lines. AutoCAD identities like Hatch and Dimensions are not allowed in these layers. They will be moved to respective layers upon using commands provided in the program. For more details, refer commands in “Working Dwg” Section.
- Layout Block Dwg: This dwg contains a layout block which will be attached into the presentation dwg as X-Ref.
    - X-Refs name must be in accordance with the one provided in project settings file.
    - This Dwg must be located inside SUPPORT folder.
    - This dwg must be attached into the presentation dwg into the paper space at (0,0,0) coordinates only.
    - User can select to bind this Layout Block with the presentation dwg while recording in Project Settings.
    - There must be only one layout block in a presentation dwg.
- Title Block Dwg: This dwg contains an array of attributes located in a separate dwg, which will be inserted into the presentation dwg as a block.
    - Title Block name must be in accordance with the one provided in project settings file.
    - This Dwg must be located inside SUPPORT folder.
    - This dwg must be attached into the presentation dwg into the paper space at (0,0,0) coordinates only.
    - There must be only one title block in a presentation dwg.
- Draft.dwg: This dwg can contain any data/details that the user wants to display on the presentation dwg, while the dwg is still in development stage.
    - This Dwg must be located inside SUPPORT folder.
    - This dwg will be attached as X-Ref into the presentation dwg into the paper space at (0,0,0) coordinates only.
    - This dwg will be detached from the presentation dwg while recording.
    - This dwg will always be attached as X-Ref.

# 4. Command Categories

## 4.1. Default

Commands falling in this category are by default provided in all versions/packages of the program.

## 4.2. Management

Commands falling in this category are required for project management purposes and are included in the manager's version/package of the program.

## 4.3. Advanced

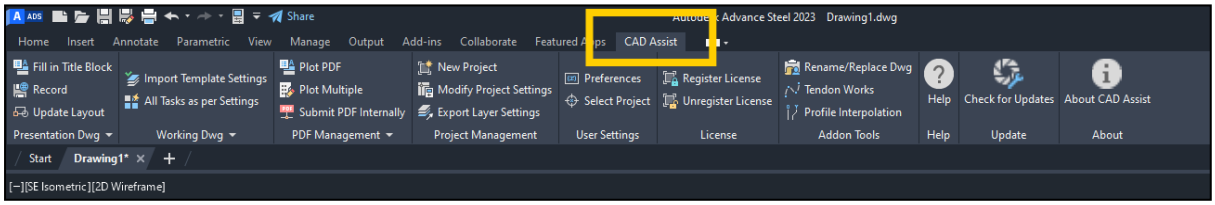
Some advanced level commands are provided in the advanced version/package of the program, which are very helpful in reducing time and efforts of draftsmen and managers as well.

## 4.4. Add-on Tools

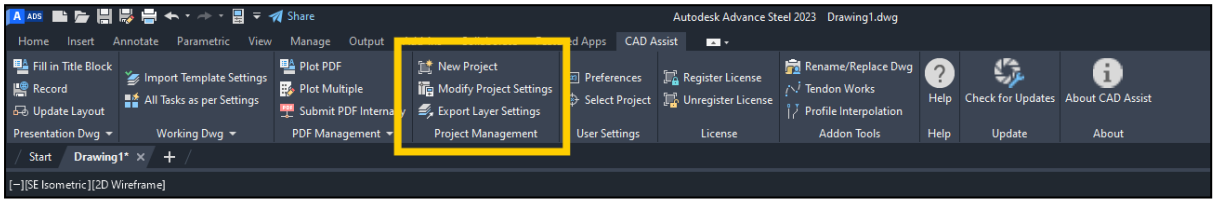
Some tools are included in the program as add-ons and can be opted for by the user, which are separate from regular functioning of the CAD Assist but can be very handy in some cumber-some tasks.

# 5. Commands

An array of commands is provided in CAD Assist to increase the capabilities of AutoCAD and manage projects more efficiently. To start with, commands related to Project Management, which are required in the beginning of the project, are described first.




# 5.1. Project Management




## 5.1.1. "New Project"

Command - <**CANEWPROJECT**>
Scope - Engineer/Manager
Category - Management

Use this command to setup a new project as per CAD Assist requirements. Following actions are performed in this process.

- Program asks for the directory in which New Project is to be created.
- User is asked to enter all the necessary settings required for initialisation of the project.
- New project in the Directory as specified by the user is created.
- Sample Working folder (including subdirectories) and Support subdirectory is created.
- Project Settings File is created as per settings entered by the user.

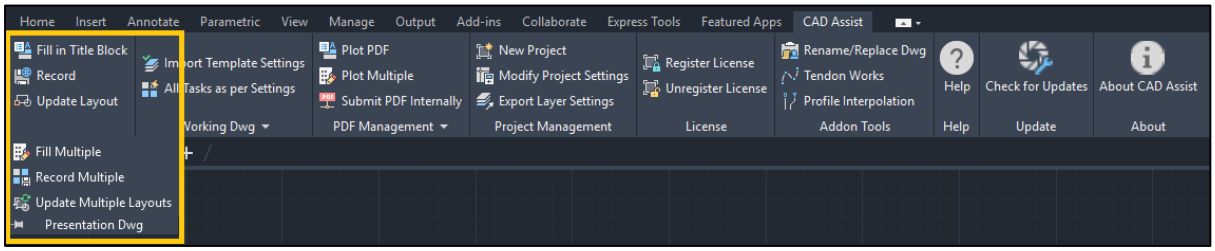
**Note:** CAD Assist creates only folders and Project Settings file in "SUPPORT" folder. User must ensure that all other files are available in respective folders in proper formats. Refer "Project Setup" section for more details.

## 5.1.2. "Modify Project Settings"

Command - <**CAMODIFYPROJECTSETTINGS**>
Scope - Engineer/Manager
Category - Management

Use this command to read/modify project settings.

# 5.2. Presentation Dwg




## 5.2.1. "Fill in Title Block"

Command - <**CAFILL**>
Scope - Draftsman
Category - Default

Use this command to fill up the title block attributes as per details in the support file. Following actions are performed while filling up the title block, which are collectively termed as "FILL IN TITLE BLOCK" in this manual.

- Read the details respective to the current dwg from the support file.
- Fill all the attributes as per details read.
- Change the layer of all Viewports to "Defpoints".
- Lock all Viewports.
- Delete any signature blocks present in the dwg with the same name as tag of Signature attribute. Signature attributes are the attributes having initials matching with the prefix as provided in Project settings file.
- Insert signature at the place of Signature attributes as blocks. If signature file is not found in the support folder, a notification is given to the user.
- Make the value of attribute with tag "REVISION" as the value provided in Project Settings file for presentation dwgs in "WORKDIR".

**Note:** Please refer "Procedures & Guidelines" Section for limitations, details and requirements to be fulfilled while setting up project.

## 5.2.2. "Record"

Command - <**CARECORD**>
Scope - All Users
Category - Default

Use this command to make a copy of the current finalised dwg, into the "LASTREV" folder, for submission. Following actions are performed while recording, which are termed as "RECORDING" in this manual.

- Check if the presentation dwg is already open or read-only.
- If presentation dwg is not open/read-only, program continues with the process.
- Select the Plot Settings available to plot PDF.
- Check if any of the X-Ref attached in the presentation dwg is still open or read-only.
- Check if any of the X-Ref attached, is referring to dwg outside the project.
- If X-Ref is not open/read-only/wrongly referenced, "Fill in title Block" of the presentation dwg.
- Save the changes made in current presentation dwg in "WORKDIR".

- Check for the current revision of dwg with previous revisions and if current revision is not issued then copy the presentation dwg into the “LASTREV” folder.
- Bind all the X-Refs attached in Model space of the dwg.
- Bind Layout Block in Paper space of dwg, if specified in Project Settings file.
- Detach “DRAFT.dwg” X-Ref from Presentation dwg, if specified in Project Settings File.
- Make the value of attribute with tag “REVISION”, the revision value as per support file.
- Turn Current Revision Cloud layer “RevCloudX” on and turn off all the rest Revision Cloud layers, if specified in Project Settings file, where “X” represents the current revision as mentioned in support file for tag “REVISION”.
- Plot PDF of the final recorded drawing as per the Plot Settings selected.
- Save and close the recorded presentation dwg.
- Make the recorded dwg as Read-only, to protect it from future editing.
- If you have provided the submission folders in the support file, then a copy of the PDFs will be saved in “1. Client submission” folder as well as per the directory defined in the “Support File” section of this manual.

| REFERENCE NAME | REF_NO | DWG_NO | REVISION | SUB_FOLDER 1 | SUB_FOLDER 2 | SUB_FOLDERNAME | SUBMISSION_DATE | TITLE_1 | TITLE_2 |
|---|---|---|---|---|---|---|---|---|---|
| DESCRIPTION (if any) | | | | | | | | | |
| | T01011 | PARTICULARS-01011 | | Title2 | Title3 | Title4 | 22-11-2013 | Title1 | Title2 |
| | T01012 | PARTICULARS-01012 | | Title2 | Title3 | Title4 | 22-11-2013 | Title1 | Title2 |
| | T01111 | PARTICULARS-01111 | | Title2 | Title3 | Title4 | 06-09-2013 | Title1 | Title2 |
| | T01999 | PARTICULARS-01999 | | Title2 | Title3 | Title4 | 06-09-2013 | Title1 | Title2 |

**Note:** Please refer “Procedures & Guidelines” Section for limitations, details and requirements to be fulfilled while setting up project.

## 5.2.3. “Update Layout”

Command - <**CALAYOUTUPDATE**>
Scope - Draftsman
Category - Advanced

Use this command to update/ replace layout and title block of the current presentation dwg with the ones available in the SUPPORT folder, by just providing a serial no of the Layout and Title Block dwgs.

## 5.2.4. “Fill Multiple”

Command - <**CAFILLMULT**>
Scope - Draftsman
Category - Advanced

Use this command to fill title block for multiple files, in one go. The same process of “Fill in Title Block”, used for any individual dwg, will be repeated for all the selected dwgs.

**Note:** Dwgs selected to fill using this option, must not be open or read-only. Otherwise, program will give notification and not fill the title block of that dwg.

## 5.2.5. “Record Multiple”

Command - <**CARECORDMULT**>
Scope - All Users
Category - Advanced

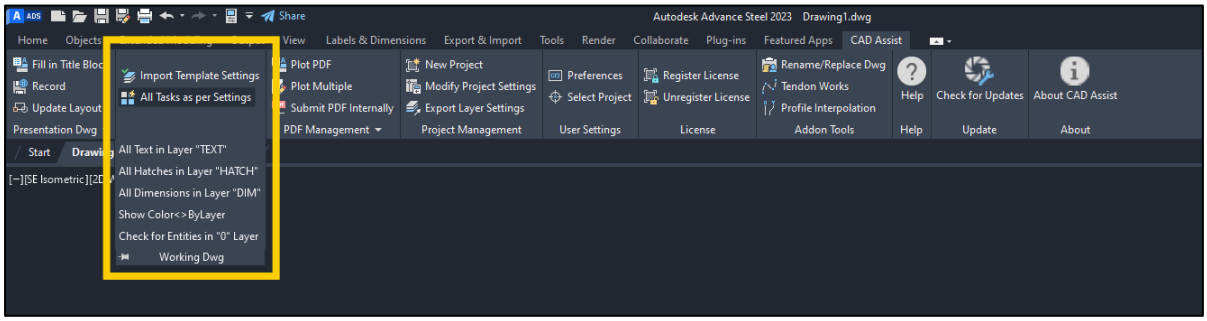
Use this command to record multiple files, in one go. The same process of “Record for Issuing”, used for any individual dwg, will be repeated for all the selected dwgs.
**Note:** Dwgs selected to record using this option, must not be open or read-only. Otherwise, program will give notification and not record that dwg.

## 5.2.6. “Update Multiple Layouts”

Command - <**CAMLAYOUTUPDATE**>
Scope - Draftsman
Category - Advanced

Use this command to update/modify/replace layout and title block of mutiple presentation dwgs with the ones available in the SUPPORT folder, by just providing a serial no of the Layout and Title Block dwgs and selecting the presentation dwgs in the subsequent dialog box.

# 5.3. Working Dwg




## 5.3.1. "Import Template Settings"

Command - <**CAIMPORT**>
Scope - Draftsman
Category - Default

Use this command to import Project CAD Settings, i.e. Layers, Linetypes and Dimension Style settings, specific to a project, as present in the template file in the support folder of the project.

**Note:** Following points must be kept in mind, while using this command.

- ".las" file must be present in the support file, which could be generated using **Error! Reference source not found.**.
- Any Layer settings, if modified in the working dwg, will be reverted back to the original settings as per layer settings in template file.
- Any layer present in working dwg, but not present in template file, will not be modified or deleted.
- Linetypes to be imported from template file must be present in either "acad.lin" or "acadiso.lin" (Default Linetype files of AutoCAD). If any linetype is not found in these two files, then the program looks into "Linetype.lin" (must be available in Support folder) for the linetype to import into the current dwg. And if not found in all the three files, a notification is given to the user that the required linetype is not found.

## 5.3.2. "All Tasks as per Settings"

Command - <**CAALLTASKS**>
Scope - Draftsman
Category - Default

Use this command to perform sequentially all standardisation tasks, as specified in Project Settings file, on the current dwg, like All Text to Layer "TEXT", All Hatch to Layer "HATCH" etc. Refer following sections, to know more about each of these tasks. Any of the following tasks can be performed individually as well using their separate commands.

## 5.3.3. "All Text to Layer "TEXT""

Command - <**CATEXTLAYER**>
Scope - Draftsman
Category - Default

Use this command to move all texts, mtexts and attribute texts present in the dwg to Layer “TEXT”.
**Note:** Any texts/entities inside Revision Cloud layers & blocks will not be affected by this command. However, attributes in Attribute blocks will be moved to “TEXT” layer.

## 5.3.4. “All Hatch to Layer “HATCH””

Command - <**CAHATCHLAYER**>
Scope - Draftsman
Category - Default
Use this command to move all Hatches present in the dwg to Layer “HATCH”.
**Note:** Any Hatch inside blocks will not be affected by this command.

## 5.3.5. “All DIM to Layer “DIM””

Command - <**CADIMLAYER**>
Scope - Draftsman
Category - Default
Use this command to move all dimensions present in the dwg to Layer “DIM”.
**Note:** Any dimensions inside blocks will not be affected by this command.

## 5.3.6. “Show Color<>ByLayer”

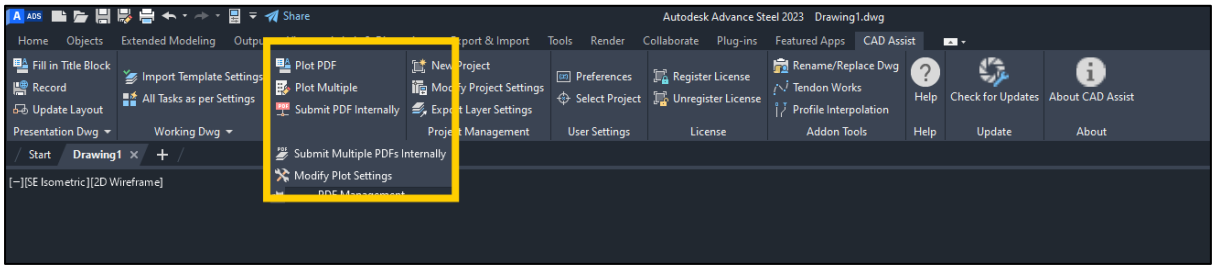
Command - <**CACOLORBYLAYER**>
Scope - Draftsman
Category - Default
Use this command to make color of all entities present in the dwg as “ByLayer”.
**Note:** Any entities inside blocks and entities inside Revision Cloud layers will not be affected by this command. However, color of entire block will be made “ByLayer”.

## 5.3.7. “Check for Entities in “0” Layer”

Command - <**CACHECK0LAYER**>
Scope - Draftsman
Category - Default
Use this command to check if any entity is inside “0” Layer. A notification will be raised for the user.

# 5.4. PDF Management

In order to assist in Drawings' PDF generation & management, following commands are provided in the program.




## 5.4.1. "Plot PDF"

Command - <**CAPLOTPDF**>
Scope - All Users
Category - Default

Use this command to create PDF of the currently opened presentation dwg, as per the previously selected Plot Settings. The program will then create the PDF and save it in the folder where the presentation dwg is located.

**Note:** This command will not ask the user to change/select the Plot Settings.

## 5.4.2. "Plot Multiple"

Command - <**CAPLOTPDFMULT**>
Scope - All Users
Category - Advanced

Use this command to create PDFs of multiple files, in one go. The same process of "Plot PDF", used for any individual presentation dwg, will be repeated for all the selected dwgs.

**Note:** Dwgs selected to be plotted using this option, must not be open or read-only. Otherwise, program will give a notification and will not plot that dwg.

## 5.4.3. "Submit PDF Internally"

Command - <**CASUBMITPDFINTERNAL**>
Scope - All Users
Category - Default

Use this command to create PDF of the currently opened presentation dwg and also save a copy of it in "1. Internal submission" Folder. Do note, if you haven't provided the submission folders in the support file, then the program will bypass the copy into "1. Internal submission" process and simply create the PDF and save it in the folder where the presentation dwg is located.

**Note:** This command will first ask the user to change/select the Plot Settings.

**Note:** Please refer "Procedures & Guidelines" Section for limitations, details and requirements to be fulfilled while setting up project.

## 5.4.4. "Submit Multiple PDFs Internally"

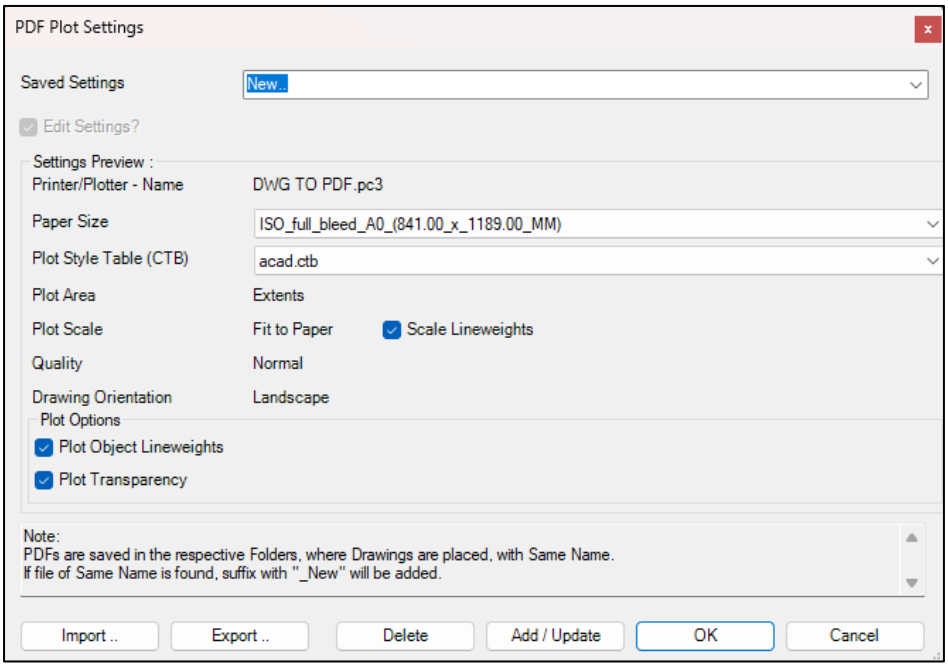
Command - <**CASUBMITPDFMULTINTERNAL**>
Scope - All Users
Category - Advanced

Use this command to create & submit PDFs of multiple files, in one go. The same process of "Submit PDF Internally", used for any individual presentation dwg, will be repeated for all the selected dwgs.

**Note:** Dwgs selected to plotted & submitted using this option, must not be open or read-only. Otherwise, program will give a notification and will not plot & submit that dwg.

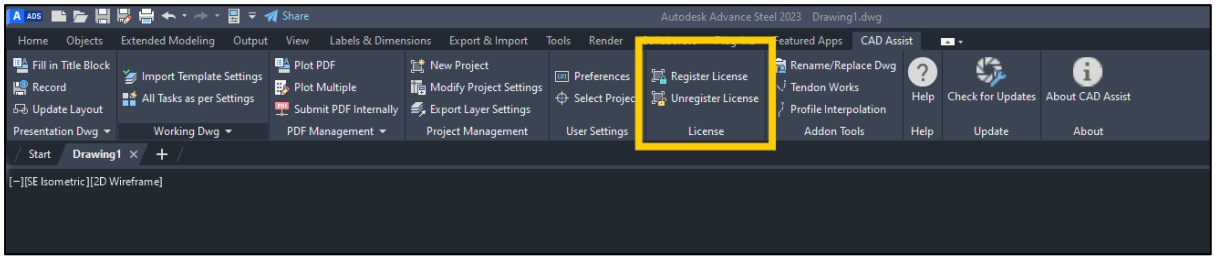
## 5.4.5. "Modify Plot Settings"

Command - <**CAPLOTSETTINGS**>
Scope - All Users
Category - Default




Use this command to select/change the various Plot Settings, to assist you in automatically plot your Presentation Drawings.

## 5.5. License



## 5.5.1. "Register License"

Command - <**CAREGLICENSE**>
Scope - All Users
Category - Default

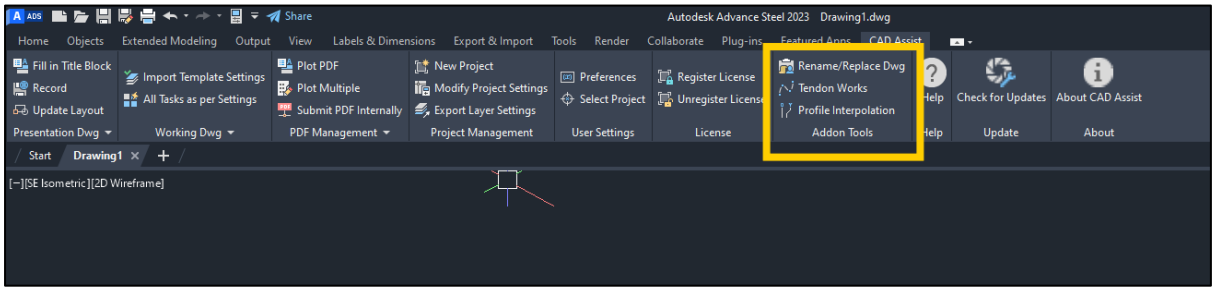
Use this command to register/activate the program functions. By default, if license is available, the program is registered as activated. However, at times user might wish to Unregister/release program license. So, this function must be used again to register the program to use it.

## 5.5.2. "Unregister License"

Command - <**CAUNREGLICENSE**>
Scope - All Users
Category - Default

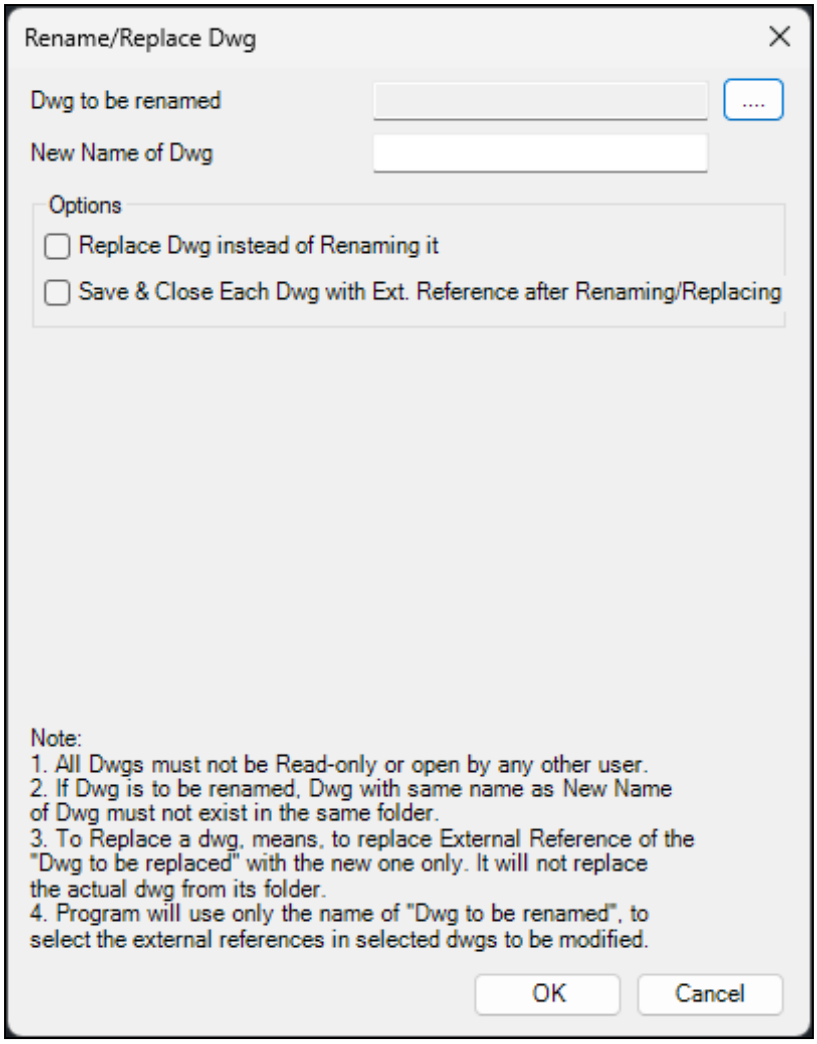
Use this command to unregister/release the program license. By using this function, one can deactivate the program functions, which could be helpful in suppressing notifications, which program may give again and again, in case program license is not available.

# 6. Add-on Tools




## 6.1. Rename/Replace Dwg

Command - <**CARENAMEDWG**>
Scope - All Users
Category - Advanced/Add-on



## 6.1.1. Introduction

This tool can be used for following functions:

- To rename a dwg and update the external references of that Dwg in other dwgs.
- To replace external reference of a dwg (in selected dwgs) with the new dwg.

## 6.1.2. Advantages

This tool provides following exceptional advantages/customizations:

- In scenarios where we need to rename a dwg, references to that dwg needs to be updated.
- At times, dwgs along with the referenced dwgs are copied, but references to those dwgs still refer to old locations. This tool can be used to update those references in a comprehensive way.

## 6.1.3. Pre-requisites

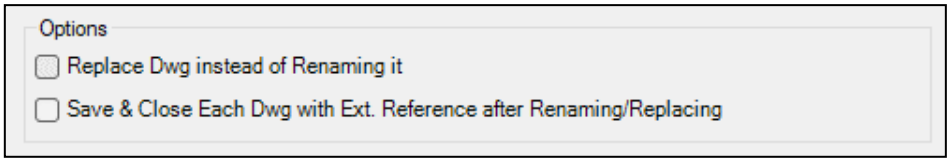
In order to use this tool, following points must be kept in mind:

- All Dwgs must not be Read-only or open by any other user.
- If Dwg is to be renamed, Dwg with same name as New Name of Dwg must not exist in the same folder.
- To Replace a dwg, means, to replace External Reference of the "Dwg to be replaced" with the new one only. It will not replace the actual dwg from its folder.
- Program will use only the name of "Dwg to be renamed", to select the external references in selected dwgs to be modified.

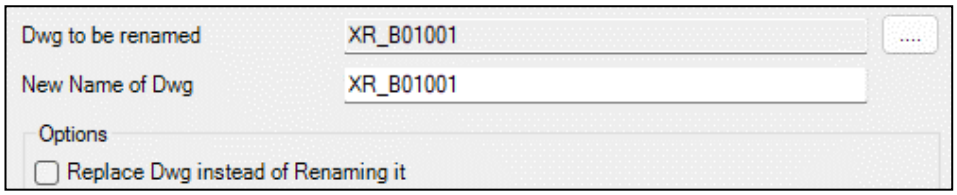
## 6.1.4. Renaming/Replacing Dwg

In order to rename/replace a dwg and its references using this tool, following steps should be followed:

1. Do ensure that all the "Pre-requisites" of the program are met with. Any deviation from these, may result in an exception.
2. To start with, one need to select the "Options" first.

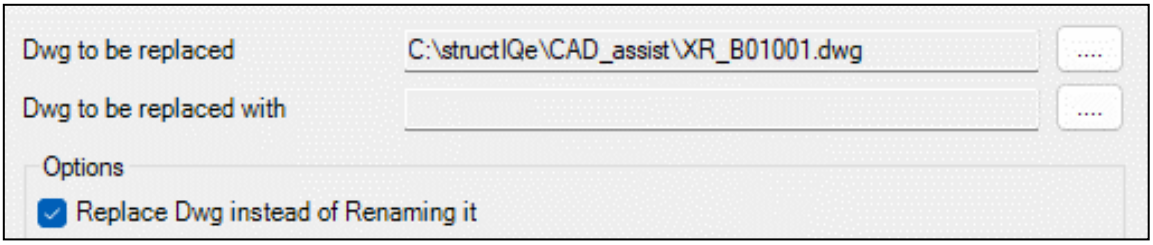



   - Replace Dwg instead of Renaming it
     - If unchecked, you need to select the dwg to be renamed. After selecting the dwg (using the button provided on right hand side of the text box), you need to provide the new name of Dwg, which will be used to rename the dwg as well as the references of the dwg.



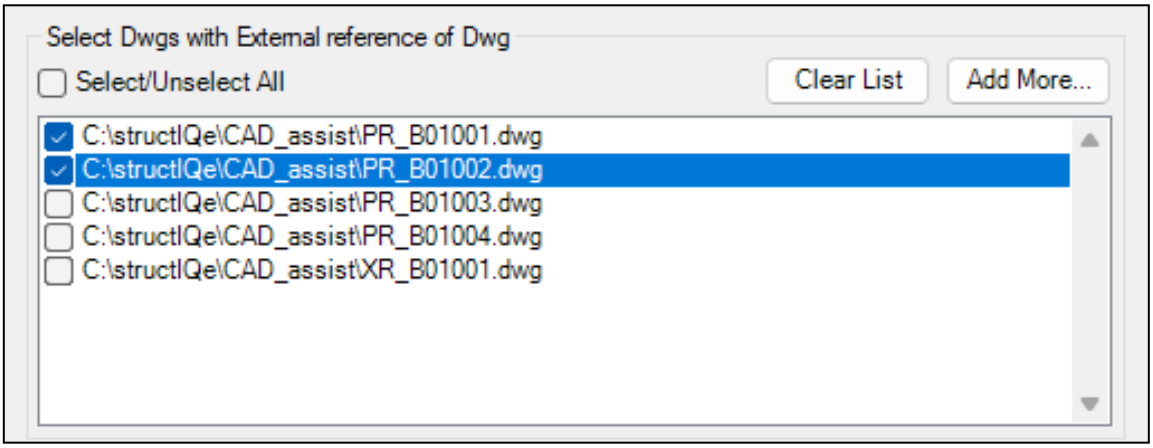

     - If checked, the above-mentioned options will change as below. And then, you need to select the dwg to be replaced. After selecting the dwg (using the button

provided on right hand side of the text box), you need to provide the Dwg, which will be used to replace the dwg as well as the references of the Dwg to be replaced.




- Save & Close Each Dwg with Ext. Reference.....
  - If checked, program will save and close all the dwgs selected for modification of External references after updating references in them.

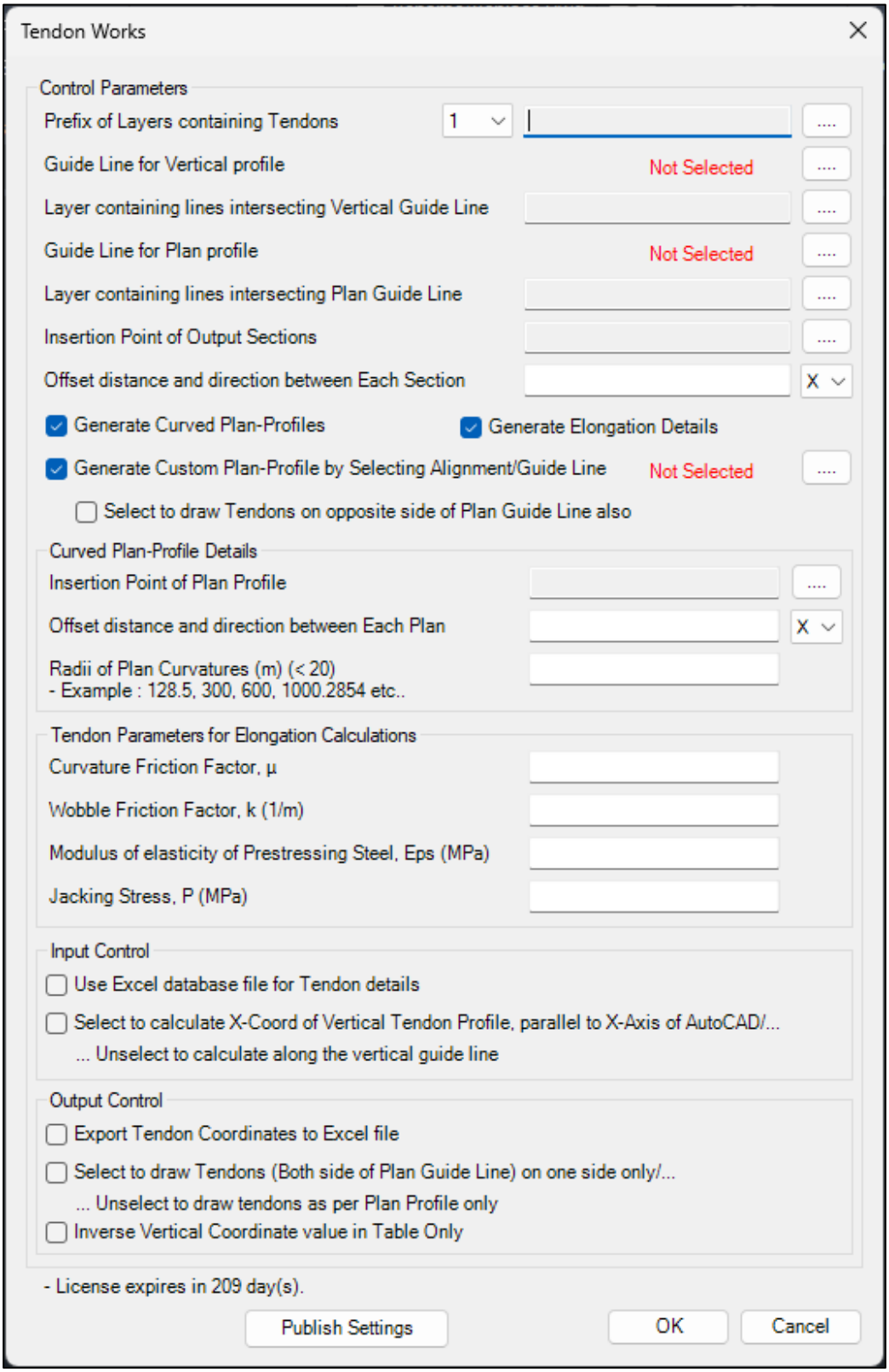
3. Select Dwgs with External Reference of Dwg




- By default, the moment you select a dwg to be renamed/replaced, all the dwgs in the same folder location, will be added to the list shown above.
- You can add more dwgs to this list by clicking on "Add More..." button provided on right.
- Additionally, one can clear the entire list, if one wishes to.
- Now, one need to select all dwgs from this list, in which external reference of the "Dwg to be renamed" is there. Program will look for references in these dwgs, with same name as that of "Dwg to be renamed" and update it with the new reference as chosen in earlier steps.

# 6.2. Tendon Works

Command - <**CATENDONWORKS**>
Scope - All Users
Category - Add-on



## 6.2.1. Introduction

This tool can be used for following functions:

- To generate Sections, at any specified section with Tendon locations in it.
- To generate Table, showing coordinates of all the tendons at any section.
- To export all the tendon coordinates into an Excel file.
- To generate plan profiles as per Custom Plan profile or for different plan curvatures.
- To generate elongations of all the tendons.

## 6.2.2. Advantages

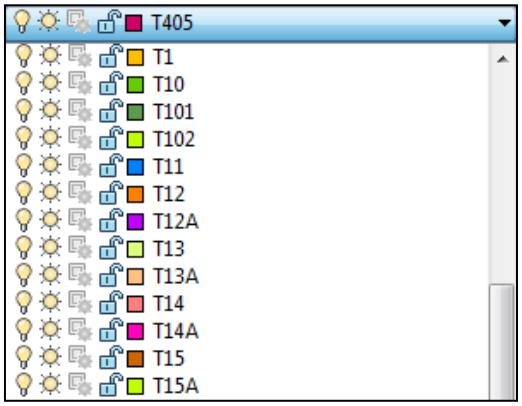
This tool provides following exceptional advantages/customizations:

- Any type of vertical and plan profile of the structure can be catered by this tool.
- There can be multiple tendons in plan with same vertical profile.
- Almost every parameter related to Section generation can be altered as per requirement.
- Tendon Drafting gets easy, efficient and accurate.
- Tendon/Duct Diameter (which will be used while drawing Sections) can be made dynamic by providing Excel Database file. (By default, Diameter of 115mm is taken)
- Tendon coordinates are exported to Excel in two types of tables for better efficiency.
- Spans with multiple curvature radii or custom alignment could be generated in a matter of seconds.
- Elongation of all tendons gets calculated in one go.

## 6.2.3. Pre-requisites

In order to use this tool, following points must be kept in mind while drafting:

- All the Tendons must be drawn Layer wise. Means, for each Tendon, a separate drawing layer should be created. And this layer will contain both vertical and plan profile of the tendon. Below is a sample of various layers created for each tendon.



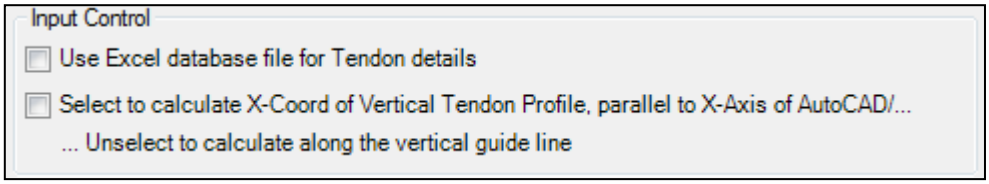

- There are two ways of communicating the number and names of tendons to the program.
  - Either use a common/unique prefix for all tendons.
  - Provide an Excel database file containing Tendon/Layer Name and Duct Dia for each tendon.
- Guide/Axis Lines or polylines for both vertical and plan profiles must be created and provided to the program.

- Intersection lines are used to mark the location and the section plane along which coordinates will be calculated and Section will be generated. These intersection lines can be at any angle or slope. But they must intersect all the tendons and the guideline at that section.
- All the entities must be in X-Y plane only. Means, with Zero Z-Coordinate.

## 6.2.4. Generating Sections

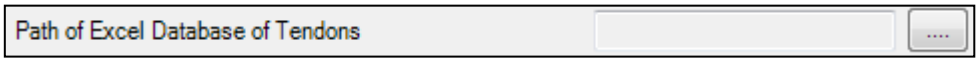
In order to generate sections using this tool, following steps should be followed:

1. Do ensure that all the "Pre-requisites" of the program are met with. Any deviation from these, may result in an error or incorrect results.
2. To start with, one need to confirm the Input controls first.



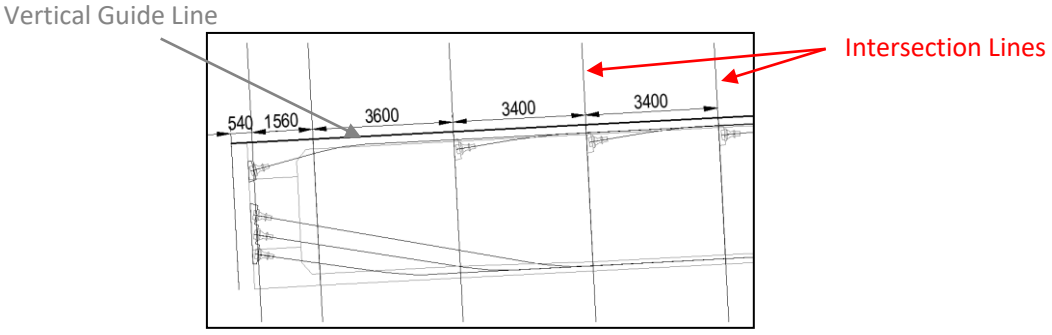

   - Use Excel database file for Tendon details
     - If unchecked, you need to select any tendon in the dwg to select its layer. Then you need to select the number of characters of the prefix, by which the program will differentiate between layers containing tendon and other layers.


     - If checked the option of providing the prefix of layers will change to path of excel database file, and you need to provide the excel database file to the program. A sample of database file is available in "***C:\Program Files (x86)\structIQe\CAD Assist\Support\Tendon Works Support\Tendon Data.xlsx***".

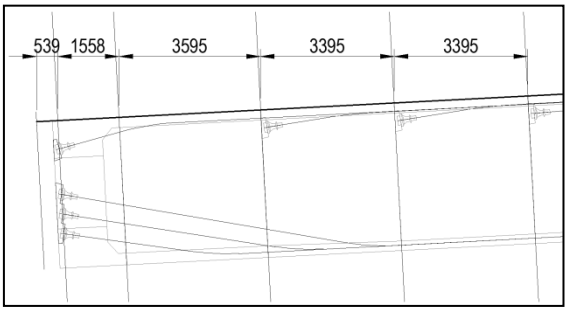



| Tendon Name\Layer Name | Duct Dia (mm) |
|---|---|
| PT-1 | 85 |
| PT-2 | 85 |
| T1 | 115 |
| T2 | 115 |
| T3 | 115 |
| T4 | 115 |
| T5 | 115 |

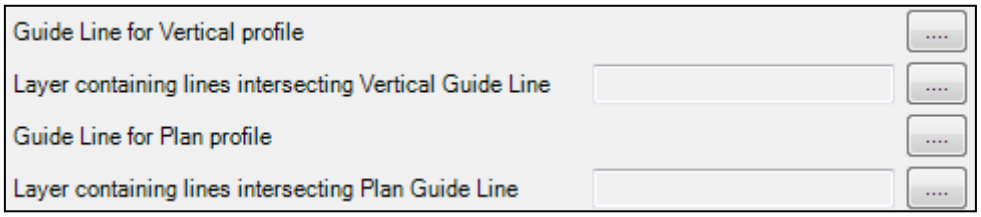
   - Select to calculate X-Coord of Vertical Tendon Profile.....
     - If unchecked, program will calculate the X-Coordinate of structure along the guide line, as shown below. It should be noted that this X-Coordinate will be used to identify the Section location throughout the procedure.




- If checked, program will calculate the X-Coordinate of structure parallel to X-Axis of AutoCAD, as shown below.



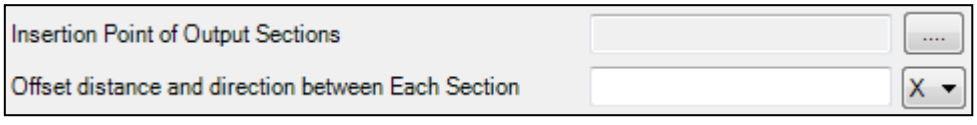

3. Selecting Guide Lines and intersection lines




- Selecting Guide Lines
  When user clicks on the button provided on the right side, the user is opted to select the guide lines.
- Selecting Layer containing Intersection Lines
  When user clicks on the button provided on the right side, the user is opted to select any intersection line, so that, program can select the layer in which the intersection lines are placed.

  **Note:** 1. Program will assume all the lines in these layers as intersection lines.
  2. Intersection lines of Vertical and Plan profile must be in separate layers.
  3. X-Coordinate of each intersecting point of intersection line and Guide line for both vertical and plan profile must be same. A tolerance error of 1mm is however incorporated in the program.

4. Section Insertion Parameters

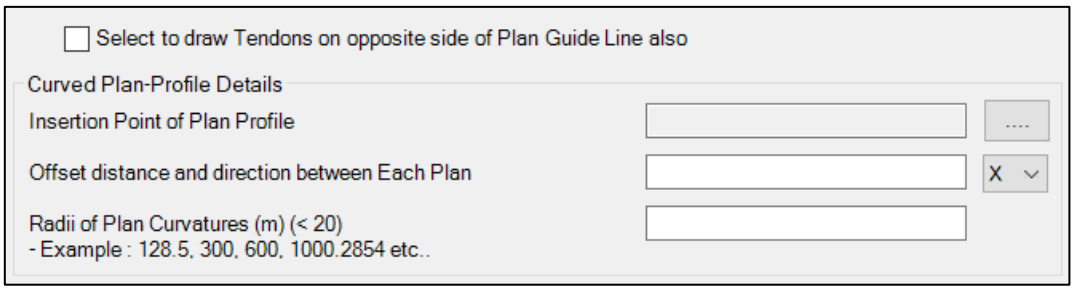



- Insertion point of Output Sections
  User must provide the Coordinate at which the first section will be generated. By clicking on the button provided on the right side, the user is opted to select a point anywhere in the dwg.

**Note:** 1. User must ensure that there is enough empty space for insertion of sections. Program will not delete/modify any existing entity of the dwg on its own.

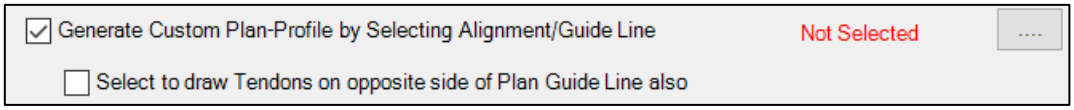
- Offset distance and direction between Each Section
  User must provide the distance and direction of the subsequent sections which will be generated w.r.t "*Insertion point of Output Sections*".

5. Curved Plan-Profile Addon




- Select to draw Tendons on opposite side of Plan Guide Line also
  - If unchecked, program will draw the plan profile as per geometry of tendons in plan profile only.
  - If checked, program will draw additional plan profiles of tendons on other side of the plan guide line also. This feature is useful because generally tendon coordinates/lengths on both sides of the plan guide line is different.
- Insertion point of Plan Profile
  User must provide the Coordinate at which the first plan profile section will be generated. By clicking on the button provided on the right side, the user is opted to select a point anywhere in the dwg.
  **Note:** 1. User must ensure that there is enough empty space for insertion of plan profiles. Program will not delete/modify any existing entity of the dwg on its own.
- Offset distance and direction between Each Plan
  User must provide the distance and direction of the subsequent plans which will be generated w.r.t "*Insertion point of Plan Profile*".
- Radii of Plan Curvatures (m)
  User must provide the radius of curvature of span, for which plan profile is to be generated. Additionally, if multiple plans (Limited to 20 Nos.) with different radius of curvatures are required, user just need to provide different radii in the same field separated by Comma (,). For e.g. - 128.5, 300, 600, 1000.2854 etc.

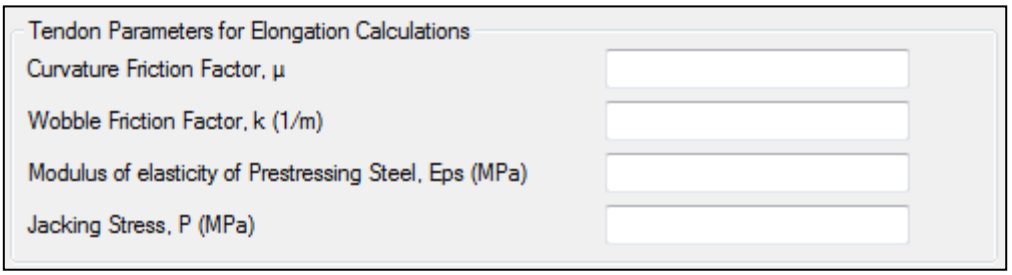
6. Custom Plan-Profile Addon




- Selecting Plan Profile Guide Lines
  When user clicks on the button provided on the right side, the user is opted to select guide lines (Polylines), limited to a maximum of 20 Nos.
- Select to draw Tendons on opposite side of Plan Guide Line also
  - If unchecked, program will draw the plan profile as per geometry of tendons in plan profile only.

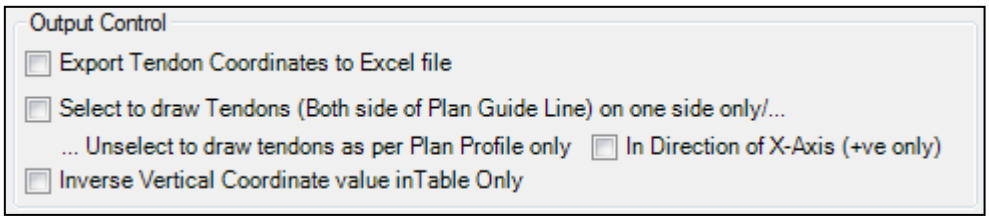
- If checked, program will draw additional plan profiles of tendons on other side of the plan guide line also. This feature is useful because generally tendon coordinates/lengths on both sides of the plan guide line is different.

7. Elongation Calculations Add-on




- Tendon Parameters
  User must provide Curvature Friction Factor, Wobble Friction Factor (k), Module of elasticity of Prestressing steel (Eps) and the Jacking Stress (P) to calculate elongations of each tendon.
  Program will then calculate elongations for each tendon for all the three cases, i.e. Jacking End - Begin, End and Both ends, and then export all the details in excel file names "Elongation Details".

8. Output Controls

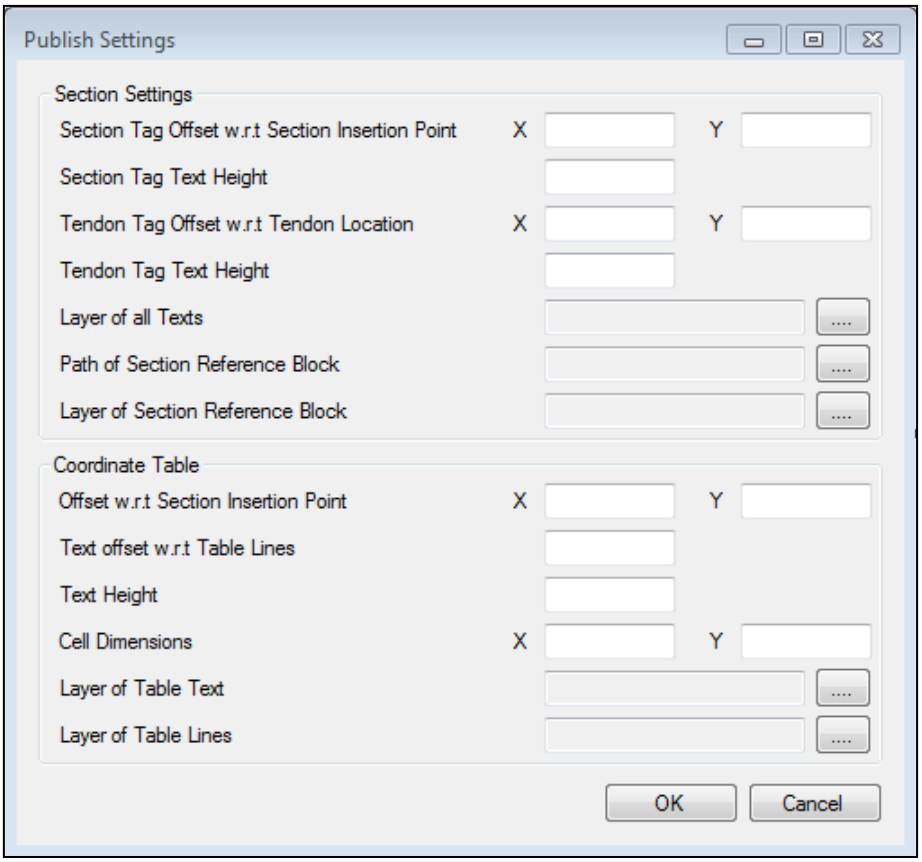



- Export Tendon Coordinates to Excel file
  If checked, program will generate an excel file containing coordinates of all the tendons, at the sections as marked by the user, in the same folder location as that of AutoCAD Dwg under the name of "***Tendon Details***"
  Excel file hence generated will contain two tabs i.e. "***Table-1***" and "***Table-2***". Both tabs will contain coordinates of all tendons in two separate tabular forms.
- Select to draw Tendons.....
  - If unchecked, program will draw/calculate the tendon coordinates as per actual geometry of tendons in plan profile.
  - If checked, program will read tendon coordinates from both side of the plan guide line, but draw it on one side of the Plan guide line only. Additionally, user can also opt for which side of the section will be used to draw tendons. (For e.g. This feature could be used to draw Half Sections of a structure, where Tendon Plan profile is made on both sides of the guide line for clarity purposes.)
- Inverse Vertical Coordinate value in Table Only
  - If unchecked, program will draw the tendon coordinates as per actual geometry of tendons in vertical profile.
  - If checked, program will draw tendon coordinates as per actual geometry of tendons in vertical profile, but inverse the sign of vertical coordinate of a tendon w.r.t. vertical guide line, in table only.

9. "Last Used Parameters" - Button

By clicking this button, user can fill up all the parameters/controls of the program with the parameters that were used the last time the program was used.

10. "Publish Settings" - Button
    By clicking this button, user can change various settings which are used while generating a section and corresponding coordinates table. These settings are divided into two parts: Section Settings and Coordinate Table settings.
    - Section Settings
      These settings relate to offset distance of texts/tags, text height and layer of texts which will be written along with the section. Another setting is the path and layer of the Section reference block, which will be inserted as a block at every Section Reference point, so as to mark the reference point of each section. A sample of this dwg is available in "***C:\Program Files (x86)\structIQe\CAD Assist\Support\Tendon Works Support\Block.dwg***".




    - Coordinate Table Settings
      These settings relate to offset distance of table insertion point w.r.t Section Insertion point of each section, text offset distance of coordinates w.r.t to the adjacent table line, text height, cell dimensions and layer of texts and table lines.

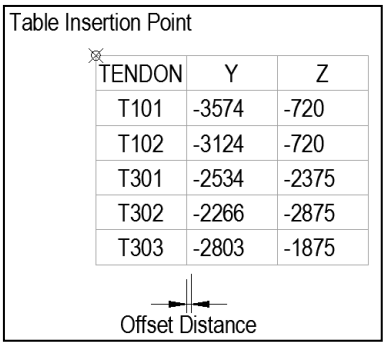
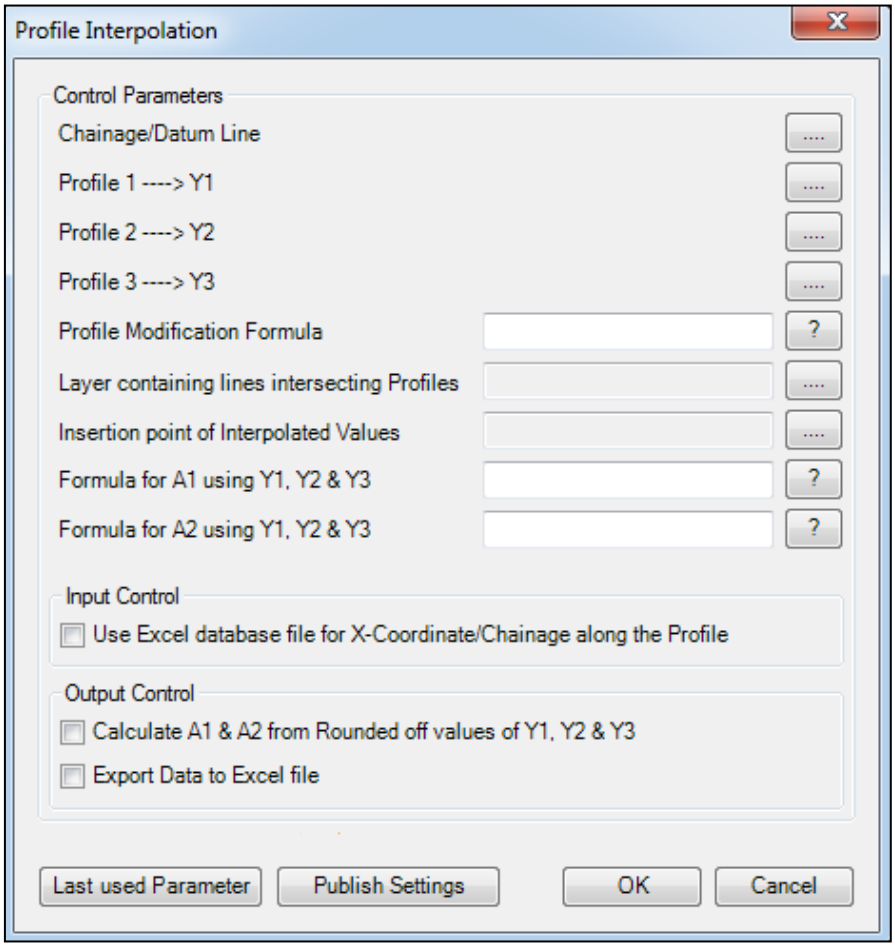


Table Insertion Point
TENDON Y Z
T101 -3574 -720
T102 -3124 -720
T301 -2534 -2375
T302 -2266 -2875
T303 -2803 -1875
Offset Distance

# 6.3. Profile Interpolation

Command - <**CAPROFILEINTERPOLATE**>
Scope - All Users
Category - Add-on




## 6.3.1. Introduction

This tool can be used for following functions:

- To measure/interpolate levels at any specified chainage.
- To generate interpolated levels in table form at the respective chainages.
- To calculate any parameter based on interpolated levels like Level diff., Pier Heights etc.
- To export all the levels/parameters into an Excel file.

## 6.3.2. Advantages

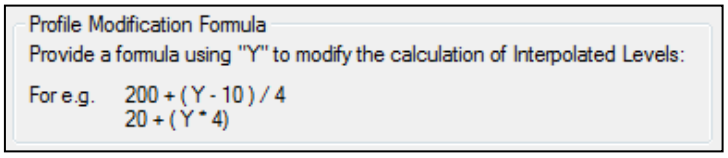
This tool provides following exceptional advantages/customizations:

- Any type of profile can be catered by this tool.
- One can specify chainages directly in AutoCAD as well as via Excel database.
- Almost every parameter related to value generation can be altered as per requirement.
- Interpolated levels are exported to Excel along with plotting in AutoCAD.
- Additional dynamic parameters based on levels can be calculated and plotted also.

## 6.3.3. Pre-requisites

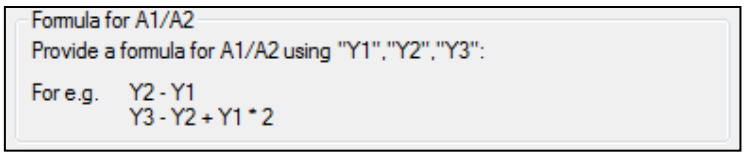
To use this tool, following points must be kept in mind while drafting:

- A straight line referred as Chainage/Datum line must be drawn and provided to the tool. This line will be used to calculate the chainage as well as a datum line to calculate level above it.
    - Chainage Calculation (X) - Chainage at a particular point will be the distance between that point and start of the Chainage Line.
    - Level Calculation (Y1, Y2 & Y3) - Level at a particular chainage will be the difference between Y-Coordinate of Profile line and Datum line. And to arrive at the exact level, you could use "Profile Modification Formula", because mostly the levels are not directly the difference between Datum and profile level. You can use this formula as follows:




**Note:** 1. The formula must not contain any alphabet other than "Y", otherwise an error will be generated.
2. You can use any mathematical operator/number in this formula.
3. If omitted, program will assume that the levels so calculated are actual levels.

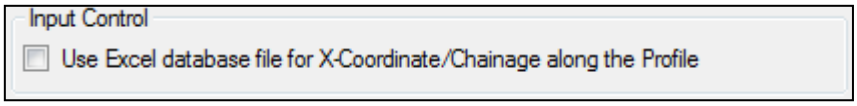
- There are two ways of communicating the chainage location to the program.
    - Either use intersection lines placed in a common layer marking the location of calculation of levels. These intersection lines should be perpendicular to X-axis and must intersect profiles and the chainage line at a chainage.
    - Provide an Excel database file containing Chainage of all the locations.
- All the entities must be in X-Y plane only. Means, with Zero Z-Coordinate.
- If any dynamic parameter is required to be calculated using " Y1, Y2 & Y3", one can use formula for A1 & A2, and these parameters will also be plotted along with other details. Formula to be provided must meet following criteria:




## 6.3.4. Generating Interpolated Levels

In order to generate levels using this tool, following steps should be followed:

1. Do ensure that all the "Pre-requisites" of the program are met with. Any deviation from these, may result in an error or incorrect results.
2. To start with, one need to confirm the Input controls first.




    - Use Excel database file
        - If unchecked, you need to select any line to select it's layer, in which intersection lines are placed.

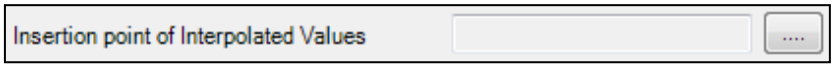

- If checked, the option of providing the layer containing intersecting lines will change to path of excel database file, and you need to provide the excel database file to the program. A sample of database file is available in "***C:\Program Files (x86)\structIQe\CAD Assist\Support\Profile Interpolation Support\Profile Data Input.xlsx***".


| Chainage/X |
|---|
| 505.000 |
| 530.000 |
| 558.500 |
| 580.000 |
| 600.250 |
| 628.000 |
| 656.500 |
| 684.000 |
| 712.000 |

3. Selecting Chainage/Datum Line and Profiles


When user clicks on the button provided on the right side, the user is opted to select the corresponding lines/polylines.

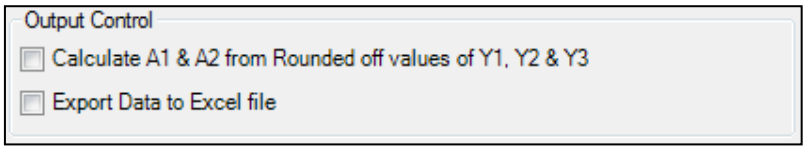
4. Profile Modification formula
Formula as described in "Pre-requisites" section shall be provided.
5. Insertion Point of Interpolated Values




User must provide the Y-Coordinate which will be used as reference for generation of values. By clicking on the button provided on the right side, the user is opted to select a point anywhere in the dwg to select its Y-Coordinate. For offset distance of values w.r.t insertion point, "Publish Settings" must be referred.

**Note:** 1. User must ensure that there is enough empty space for insertion of values. Program will not delete/modify any existing entity of the dwg on its own.

6. Formula for A1/A2
In order to calculate any dynamic parameter, Formulas for A1 & A2 as described in "Pre-requisites" section shall be provided.
7. Output Controls




- Calculate A1 & A2 from Rounded.....
If checked, program will calculate A1 & A2 from rounded off values of Y1,Y2 & Y3. This feature is provided, so as to avoid ambiguity arising out of rounding off of levels for

presentation purposes. For e.g., Level 1 may be 200.0564 and level 2 may be 190.1546. And rounded off values will be then 200.056 and 190.155. Thus, difference of actual values will be 9.9018 and rounded off values will be 9.901.

- Export Data to Excel file
  If checked, program will generate an excel file containing all levels, in the same folder location as that of AutoCAD Dwg under the name of "***Profile Data***"

8. "Last Used Parameters" - Button
   By clicking this button, user can fill up all the parameters/controls of the program with the parameters that were used the last time the program was used.
9. "Publish Settings" - Button
   By clicking this button, user can change various settings which are used while generating interpolated values. These settings relate to offset distance of texts containing interpolated values and the precision of these values. Further, as general settings, text height, rotation angle, justification criteria and layer of texts can be modified also.