



OHDOT Cross References Tool

Description:

The OHDOT Cross References Tool is a resizable C# Windows Presentation Form MicroStation Addin that is fully integrated with ProjectWise.

This application is used to create updatable fields for sheet call outs.

Software Requirements:

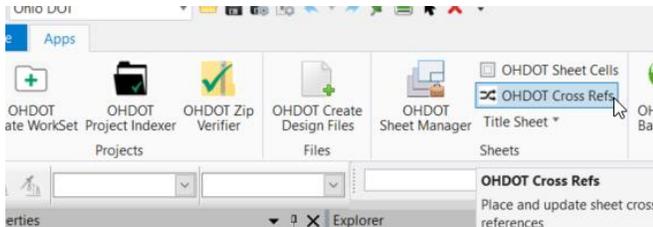
This application was developed using .NET Framework 4.6.2 in 64bit Windows 10.

Since it's a MicroStation Addin, MicroStation CONNECT edition is required to run this (or Open Roads Designer CONNECT edition, Open Bridge Designer CONNECT edition...)

This application also requires the OHDOT_ItemTypes.dgnlib to use. If using outside of OHDOT workspace then see the [Configuration Options](#) and [Technical Details](#) sections.

Loading the Application:

The application is loaded via the OHDOT XRef option from the Ohio DOT Workflow within the Sheets Group.



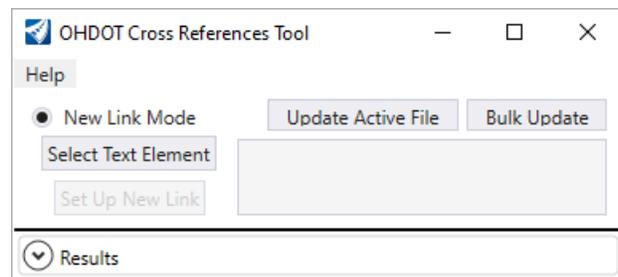
It can also be launched with the following keyin commands

```
mdl load OHDOTXRef; OHDOTXRef Open
```

Note that the OHDOT workspace must be loaded.

Application Operation:

When the application is initialized, a dialog like the example below is opened. See the sections below for information on what each item in the dialog does.

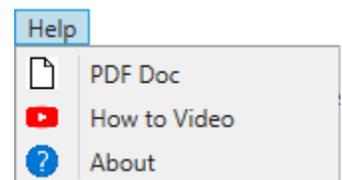


Help Menu:

The Help Menu consists of three items PDF Doc, How to Video, and About.

PDF Doc

Clicking this item will launch this document.





How to Video

Clicking this item will launch the following link to a YouTube video explaining how to use this application.

https://communities.bentley.com/communities/user_communities/ohio_dot_consultants/w/ohiodot---wikis/48474/cross-references

About

Clicking this item will open another dialog, pictured to the right. This dialog displays the following information.

- Application Name
- Application version
- Copyright
- Company
- Description



New Link Mode

New Link Mode This is currently the only supported mode for this app. This mode allows for setting up now cross references to existing text elements. After future updates are made the SDK a modify mode will be added.

Select Text Element Button

This button starts a MicroStation selection tool to select a text element to add a cross reference to. The selection tool only allows for selection of text elements that are editable (not in a reference). After a text element is selected the contents of this text element will be displayed in the [Selected Text TextBox](#).

Set Up New Link Button

This button is only enabled when a text element has been selected with the [Select Text Element Button](#) and the app is on the [New Link Mode](#). When this button is select it will open the [New Link Dialog](#). Use this dialog to enter the required information for setting up a cross reference.

Update Active Model Button

When this button is selected the active dgn file will be processed to find and update any found cross references across all models in the active dgn file. The results of the process can be found by expanding the [Results Section](#).

Bulk Update Button

When this button is selected it will open the [Bulk Update Dialog](#). Use this dialog to select which dgn files you want processed to find and update any found cross references across all models in all selected dgn files. The results of the process can be found by expanding the [Results Section](#).

Selected Text TextBox

This Textbox will be populated with the contents of the text element that is selected from the [Select Text Element Button](#). The textbox is read only.



Results Section



The results section can be expanded/collapsed by clicking the up or down arrow. The results section height can be changed by clicking on the horizontal line above this section and dragging up or down. The height can only be changed if this section is expanded.

Any and every action taken in this app will be added to the results section. A summary of that action will be display in the results header so it can be seen even if this section is not expanded. All results will have one of four background colors to help identify the type of result. Note that the newest results will be at the top!

- White: Message Result
- Red: Action Failed Result
- Orange: Warning Result
- Green: Action Successful Result

Copy Results to Clipboard

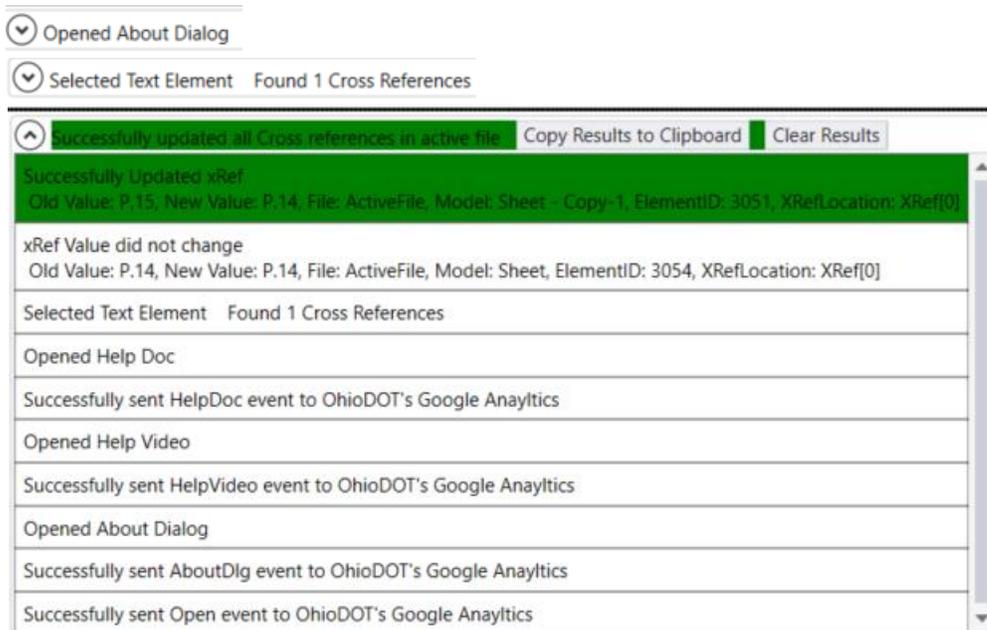
Copy Results to Clipboard This button is only displayed when the Results Section is Expanded. When selected all results currently listed in this section will be copied to the clipboard.

Clear Results

Clear Results This button is only displayed when the Results Section is expanded. When selected all results currently listed in this section will be cleared.

Result Examples

The following shows some examples of the results (not a complete listing of all possible results)





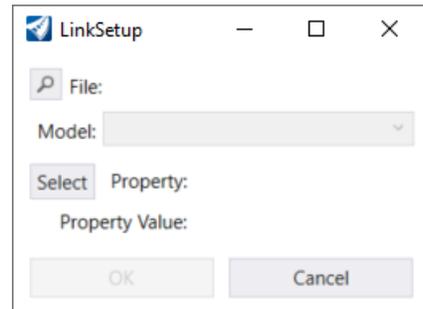
New Link Dialog

This dialog opens when the [Set Up New Link Button](#) is selected. This dialog is used to create a cross reference to a given property in another file.

File Select Button



When this button is selected a file select dialog will open. If the dgn was launched from inside ProjectWise then the file select dialog will be for selecting a dgn within projectwise, if not then the regular windows file explorer dialog will open. After a dgn file is selected the file path will be listed in the dialog and the [models dropdown](#) will be populated with the names of the models in the selected file.



Models Dropdown



This dropdown gets populated with the models found in the dgn file that was selected with the [File Select Button](#). The first model is automatically selected.

Select Button



This Button is only enabled after a Model is selected. When it is selected the Property Selector Dialog is opened. This dialog is used to select a property from the model that's selected in the [models dropdown](#).

Property Label



This label will have the name of the selected property.

Property Value



This label will show the value of the selected property.

Ok Button



This button is only enabled once a property is selected from the [Select Button](#). When this is selected a cross reference will be added to the end of the selected Text element. The [New Link Dialog](#) will close and the result will be added to the [Results Section](#).

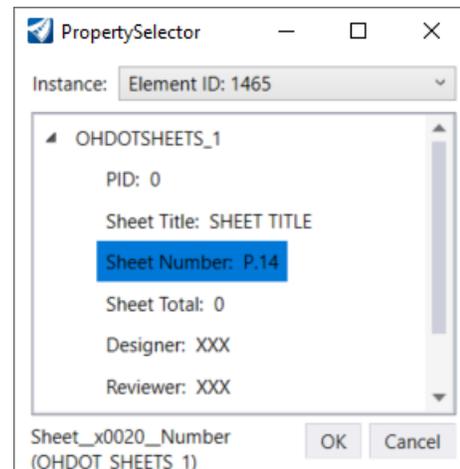
Cancel Button



When this button is selected the [New Link Dialog](#) will be closed.

Property Selector Dialog

This dialog is opened when the [Select Button](#) is clicked. This dialog will be populated with all the found and valid Item Type instances inside the selected Model of the selected file from the [New Link Dialog](#). See [Configuration Options](#) for details on what makes a valid item type instance.





Instance DropDown

Instance:

The instance drop down is populated with all Elements that have a valid item type Instance attached to itself. See [Configuration Options](#) for details on what makes a valid item type instance. When the dialog is first loaded the first found instance is selected.

Properties ListBox

OHDOTSHEETS_1
PID: 0
Sheet Title: SHEET TITLE
Sheet Number: P.14

When an instance is selected from the [Instance DropDown](#) this listbox is populated with all the item type properties and their current values.

Selected Property Info

Sheet_x0020_Number
(OHDOT_SHEETS_1)

When a property is selected from the [Properties ListBox](#) the property info will be displayed here. It will display the access string (how to locate that property in the itemtype) as well as the item type the selected property is from.

OK Button

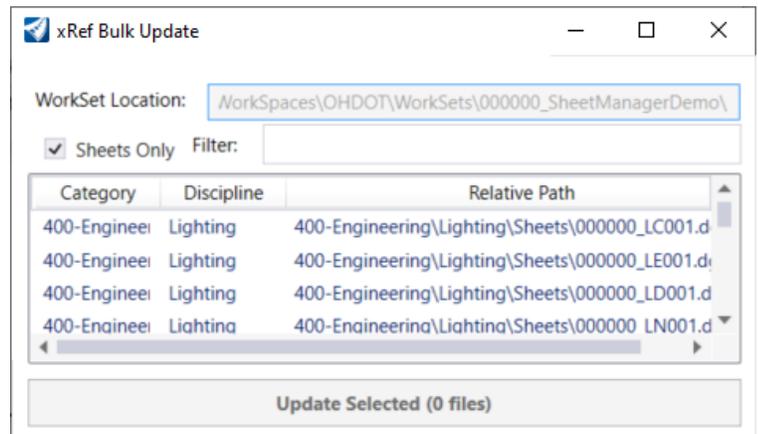
This button is only enabled is a property is selected in the [Properties ListBox](#). When selected the dialog will close and the selected property and property value will be displayed in the [Property Label](#) and [Property Value](#) of the [New Link Dialog](#).

Cancel Button

When this button is selected the [Property Selector Dialog](#) will close.

Bulk Update Dialog

This dialog opens with the [Bulk Update Button](#) is selected. It does take a couple seconds to load this dialog as it searches the active workset for all dgn files. Once loaded the dialog shown below will appear. This dialog is used to select multiple files to be processed. Processing means the file is checked for cross references and if found they are updated.



WorkSet Location

WorkArea Location:

When this dialog is opened it is populated with the location of the active workset. this can not be changed.

Sheets Only Checkbox

Sheets Only

When this check box is checked on the [Files ListView](#) will only show dgn files that exist directly inside a folder with the name of Sheets. When it is un checked then all dgn files found within the active workset will be shown in the [Files ListView](#). The default is to be checked on.



Filter TextBox



This textbox can be used to filter the [Files ListView](#) to include only files that contain the entered text within the relative path of that file.

Files ListView

Category	Discipline	Relative Path
400-Engineer	Lighting	400-Engineering\Lighting\Sheets\000000_LC001.d
400-Engineer	Lighting	400-Engineering\Lighting\Sheets\000000_LE001.d
400-Engineer	Lighting	400-Engineering\Lighting\Sheets\000000_LD001.c
400-Engineer	Lighting	400-Engineering\Lighting\Sheets\000000_LN001.c

This ListView will display three columns. Each column is sortable by selected the column header. This Listview can be multi-selected. Select all the files the user wants to update cross references in.

The Category column is populated with the name of the top level folder directly inside the WorkSet Folder for the given file.

The Discipline column is populated with the name of the folder directly inside the Category folder for the given file.

The Relative Path is populated with the directory path to the given file. the directory path starts from inside the WorkSet folder.

Update Button

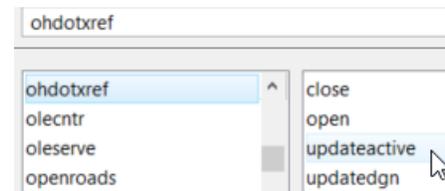


This button will only be enabled once there is atleast one file selected from the [Files ListView](#). The

number of selected files will be display in the button. Once this button is clicked the selected files will be processed. Processed means that all models in the given file are searched for cross references and are updated. Results can be found in the [Results Section](#). The [Bulk Update Dialog](#) is closed after processing completes.

Keyins

There are also two keyins available with this addin. Note in order to use these keyins the addin must be loaded first with the following key-in “mdl load OHDOTXRef”.



OHDOTXRef updateactive

This keyin will process the active dgn file. Processing means that all models in the active file are searched for cross references and updated. Results are send the message center.

OHDOTXRef updatedgn

This keyin takes an additional parameter in the key-in window. This additional parameter specifies the dgn file to be processed. Processing means that all models in the active file are searched for cross references and updated. Results are send the message center.

For dgnf iles outside of Projectwise simply pass the fullpath of that dgn file with the keyin, an example is shown below.

OHDOTXRef updatedgn I:\CONNECT\WorkSpaces\OHDOT\WorkSets\123456\400-Engineering\Roadway\Sheets\123456_GTO01.dgn



For dgn files inside ProjectWise simply pass the GUID for that document, an example is shown below.

OHDOTXRef updatedgn dcf246d9-e99f-40e0-8281-4ee4b6ea367f

Configuration Options

This addin does look at certain configuration variables to determine two things.

1. What item type to use to hold the cross reference data.

This information is set by the **OHDOT_XRefInfo** configuration variable.

This variable can only be set with the = operator (append, prepend cannot be used)

This variable sets three things, the name of the dgnlib file containing the XRef item Type, the Name of the Item Type Library the XRef item Type is in, and the name of the XRef item type.

The configuration variable is set in the following way.

OHDOT_XRefInfo = DgnLib Name~ItemTypeLibraryName~ItemTypeName

An example is shown below.

OHDOT_XRefInfo = OHDOT_ITEMTYPES~OHDOT_Linkers~OHDOT_XRefs

Make sure that the specified dgnlib is included in the MS_DGNLIBLIST configuration variable. If this variable is not set, then it will use OHDOT defaults which is shown in the example above. Please see [Technical Details](#) to ensure that the XRef item type is valid.

2. What item type(s) to use to as properties the cross reference can link to (like a sheet number). This information is set by the **OHDOT_SheetItemTypesInfo** configuration variable and the **OHDOT_SheetManagerKeyWord** configuration variable. These configuration variables are also used with the OHDOT_SheetManager app.

Both variables can only be set with the = operator (append, prepend cannot be used)

The OHDOT_SheetItemTypesInfo variable sets three things, the name of the dgnlib file containing the Sheet Item Types, the Name of the Item Type Library the Sheet Item Types are in, and the name of the master itemtype (this parameter is only used in the OHDOT_SheetManager app and is not used with this app) the master item type contains every item type property used for sheet info (like sheet number).

The configuration variable is set in the following way

OHDOT_SheetItemTypesInfo = DgnLib Name~ItemTypeLibraryName~Master ItemType Name

An example is shown below.

OHDOT_SheetItemTypesInfo =

OHDOT_ITEMTYPES~OHDOT_ItemTypes~OHDOT_SHEETS_MASTER

Make sure that the specified dgnlib is included in the MS_DGNLIBLIST configuration variable. If this variable is not set, then it will use OHDOT defaults which is shown in the example above.

The OHDOT_SheetManagerKeyWord variable sets the keyword. The keyword is a common name that is included in all the Item Types within the specified Item Type Library. Only Item



Types that contain the keyword will be included when searching for properties that a cross reference can be linked to (like sheet number).

The configuration variable is set in the following way
OHDOT_SheetManagerKeyWord = Keyword

An example is shown below.
OHDOT_SheetManagerKeyWord = OHDOT_SHEET

If this variable is not set, then it will use OHDOT defaults which is shown in the example above.

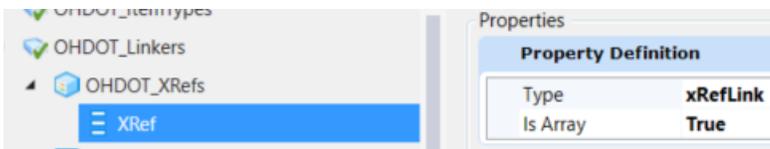
Technical Details (Behind the scenes)

This section will go over how the cross references application actually works.

Cross Reference Info

First when a cross reference is added to a text element, an item type gets assigned to that text element. This Item type holds the information needed about the cross reference, like what file/model/property the cross reference is pointing to. The text element get a text field added. This text field actually links to a item type property. This property is actually from the item type that was added to the text element that contains the needed information just described.

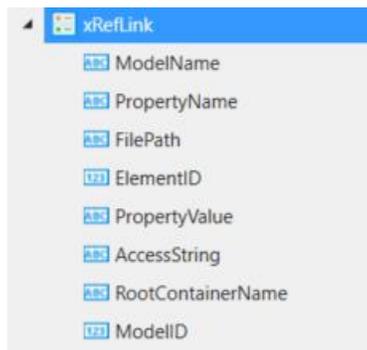
The OHDOT_XRefInfo configuration variable allows for customizations to be made to the item type or make your own. But there are requirements in order for the item Type to be valid and work with this app.



First this Item Type must have a property named XRef. It must be an array property and set to a custom property type named xRefLink.

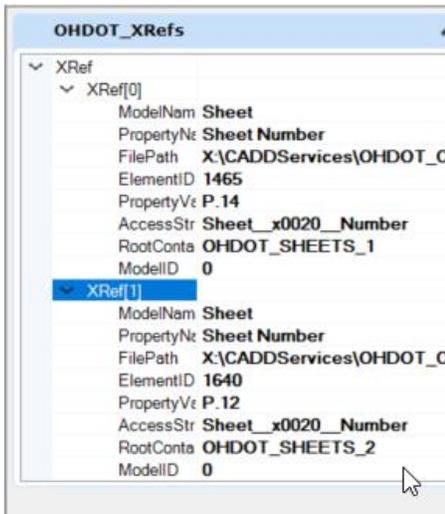
Additional properties can be added as desired.

This xRefLink custom property type must include the following properties.



All properties must be of text type except for ElementID and ModelID which should be integers. These properties cant be an array.

Additional properties can be added as desired.



So in summary the user can set the dgnlib name, item type library, and Item type name that represents the cross reference data (make sure to set it with the OHDOT_XRefInfo variable). But the XRef property name, xRefLink custom property names must be named as specified and include at minimum the above listed properties.

When a Cross reference is added to a text element. This XRef Item Type is attached to the text element if its not already. Then an entry is added to the array property, xRef. This way an unlimited number of cross references can be added to a given text element.

The screen shot to the left shows the properties of a text element that has two cross references.

The data listed for each array entry is what is used to get updated values for that cross reference.

Finding Properties

Cross references can only be linked to certain Item Type properties. Only properties from specified Item Types are allowed to be linked to. This criteria is set with the OHDOT_SheetItemTypesInfo and OHDOT_SheetManagerKeyWord variables which are describe in the [Configuration Options](#). Basically only properties from Item Types that contain the keyword set by OHDOT_SheetManagerKeyWord variable and are contained inside the Item Type Library set by the OHDOT_SheetItemTypesInfo will be included.

Updates

Version 1.0.0.0: Initial Build

Version 1.0.0.1: Updated to allow add a cross reference to the active file.

Version 1.0.0.2: Rebuilt, no functional change

Version 1.0.0.3: Fixed problem that was showing all instances in file rather than selected model.

Version 1.0.0.4: Updated to have default search directory set to the active dgn file directory after that it will retain the last selected location

Version 1.0.0.5: Updated to find item type dgnlib with new variable that was added with ORD 10.10. (will still work with previous versions of ORD)

Version 1.0.0.6: Removed Google Analytics from app.

Contacts

For any questions, suggestions, or problems with this document please contact the ODOT Office of CADD and Mapping Services by use of the following form on the ODOT website:

https://odot.formstack.com/forms/cadd_servicerequest

