

INTRODUCTION

Background

As per the ODOT CADD Engineering Standards, bridge sheet models may reference design details at other than 1:1 scale, as needed. Dimensioning may be done in either the detail's design model or the sheet model.

Standard practice is to check all dimensions, etc. in the finished sheet model. Unfortunately, the MicroStation Measure Distance tool does not take any reference scaling into account, which causes a time and quality issue for the review process.

MicroStation has not yet provided a fix.

The purpose of ODOT_RefMeasure.mvba, therefore, is to provide a short-term fix: a tool that works reasonably enough like the MicroStation Measure Distance but *can* recognize and use reference scaling.

Requirements

The program runs in MicroStation in the active design file and model. Two small picture files, odot.ico and open.bmp, must be present in its sub-directory in order for the program to appear as in the figures in this user guide.

It is most important that all reference files attached to the active file have clip boundaries that do NOT overlap the clip boundaries of other referenced attachments. It is also not wise to have clip boundaries overlap any elements of the active model that have nothing to do with the referenced drawing.

Contents

The following section of this guide goes into the specifics of how to use the tool, along with a bit about how it works. After that, there is a section on the things you should watch out for when using the program, including ODOT contacts for reporting any problems, suggestions or comments you may have with/on the program, followed by a brief statement regarding future development.

Contacts

If you have any questions, suggestions, or problems please contact the ODOT Office of CADD and Mapping Services CADD Support team or use the following form on the ODOT web site at:

<http://www.dot.state.oh.us/Divisions/Engineering/CADDMapping/CADD/Pages/suggestions.aspx>

WHAT IT DOES, HOW IT DOES IT

Before You Start

Make sure to check your clip boundaries for any reference files you may have.

Start by turning on the clip boundary display for the active view. Select Settings>View Attributes from the main MicroStation menu, check "boundary display" on in the resulting dialog and click on the "Apply" button.



Next, make sure that all attachments are visible.

Dashed lines representing each attachment's clip boundaries should appear in the active model. Alter the clip boundaries as necessary to eliminate any overlaps.

If no dashed lines appear for a reference, it has no clip boundary and it is overlapping everything in the active model. Create a clip boundary *now*.

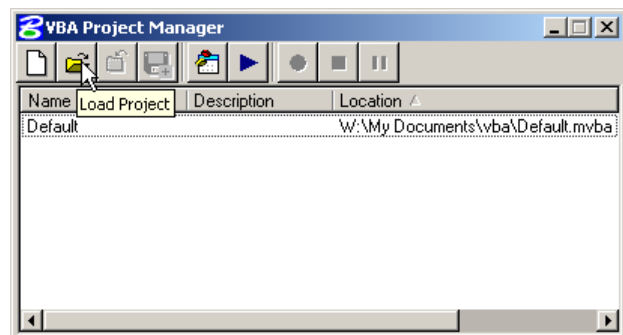
Once the boundary overlaps are cleared up, turn off the visibility of any references that had to be viewed for the overlap check. For the remaining references, it is advised that you leave the clip boundaries visible while working with the tool.


Step by Step

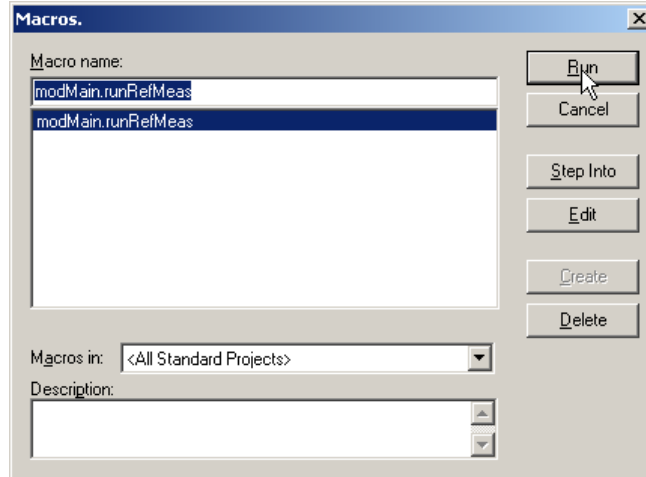
Starting the Program

If you have the ODOT menu on your MicroStation menu bar, merely select "Measure Reference" from the menu's drop down list to activate the program.

Otherwise, you can always start the program by loading it into the Macro Project Manager. Select Utilities>Macro>Project Manager, click on the Load Project icon, as shown at right, then, in the resulting Load Project Dialog, navigate to the sub-directory where ODOT_RefMeas.mvba is stored (typically, .../ODOTstd/<versionstd>/vba), select the program file, and click on OK.



ODOT_RefMeas.mvba now appears in the VBA Project Manager dialog. Select it and click on the run macros button  to open the Macros dialog. In the Macros dialog, select the macro named modMain.runRefMeas and click on the run button, as shown below, to start the application.



The User Interface

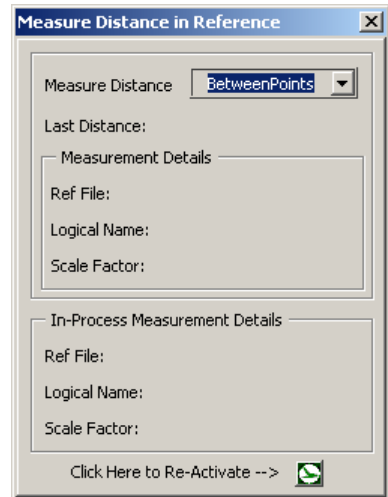
The user interface should now appear on the screen, as shown to the right.

It is similar in appearance to the standard MicroStation tool, and for the most part, works the same as well.

The most obvious difference in appearance is the two frames, "Measurement Details" and "In-Process Measurement Details".

For the measurement currently being performed, but not yet completed, the "In-Process" frame tells you something about the reference file within which the measurement was initialized as well as the scale factor that will be used to compute the distance when the measurement is completed.

The "Measurement Details" frame tells you about the reference file, if any, and scaling factor for the most recently completed distance computation – the value that is currently showing for "Last Distance".




These two measurement detail frames are provided to allow the user to check that he/she is measuring/computing distance in the desired reference file/scale.

Watch Your Scale Factor!

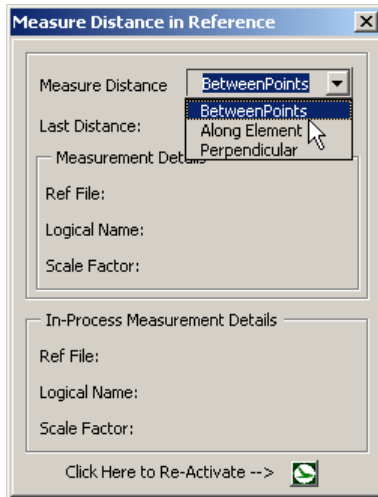
For "Along Element" and "Perpendicular" measurements (see page 6), the reference/scale is set by the location at which the element to measure along or perpendicular to is selected. If that point is within the clip boundaries of a reference file, the program uses the master to reference scale to determine the scaling factor for distance computation(s). If the selection point is not within the clip boundaries of any reference file, the scale factor is set to 1:1 which is in accordance with ODOT CADD standards.

For "Between Points" measurements, the location of the last point entered determines the reference file/scaling factor for the next distance computation (see page 4 for details).

Reactivation

The reactivate button  at the bottom of the form allows the user to re-start the tool when he/she has left off measuring for some other activity within MicroStation. The means by which other Windows can "know" that they are once again the focus of attention is not available, as far as we know, in MicroStation vba. So, if you've left the program running while you used some other MicroStation tool or menu, you may need to use this button to "wake it up".

Measuring "Between Points"

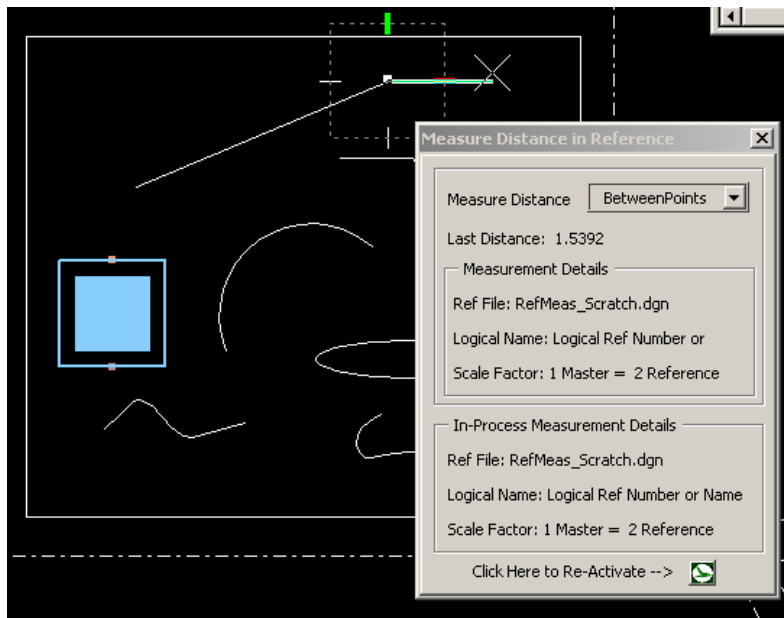


To measure from data point to data point, merely select "Between Points" from the Measure Distance drop down list, just as you would with the standard MicroStation tool.

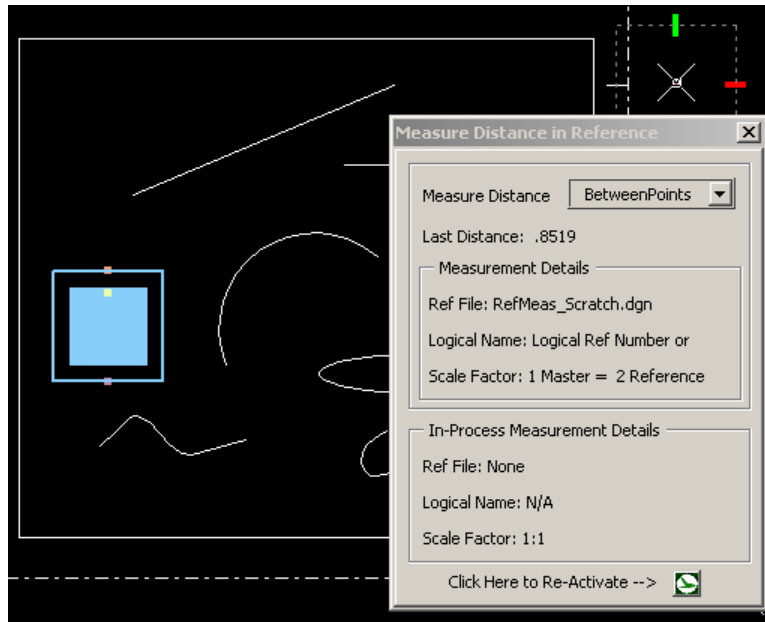
Select a data point within the active model to start the measurement.

The tool works very much like the standard MicroStation Measure Distance tool, with the exception of the effect of scaling factor on cumulative measurements, as is explained in the following example.

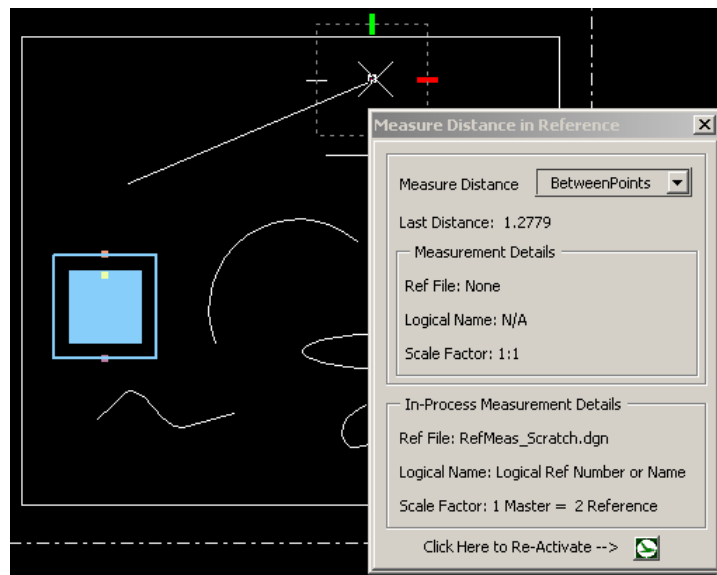
In the graphic below, the first data point is selected within the test reference file "RefMeas_Scratch.dgn". Note that the "in-Process Frame shows that the point is indeed in the reference file and that the scale factor that will be used is 1 Master = 2 Reference.



When the second point is placed, its distance from the first point is computed using the scale determined by the first point. But, remember that the second point determines the reference/scale of the *next* distance computation, as shown in the continuation of our example at the top of the next page.



Note that although the distance computed so far used a scale of 1:2, as shown in the upper information frame, the scale for the next segment of the measurement is set to 1:1. See what happens when the third point is placed at the location of the first:

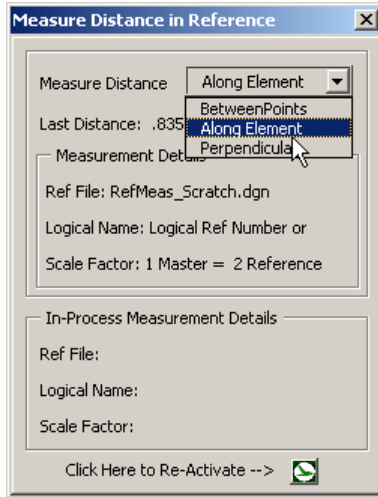


Since the scale for the return leg of the measurement is only half that of the first leg, the cumulative measurement is just 1.5 times the length of the first leg. Also, check out the lower information frame. Since the last point entered is within the clip boundaries of the attachment, the scale factor for the next distance computation will be 1:2.

To stop the cumulative measuring and re-start point-to-point measuring from a new first point, merely send a reset (right mouse click) or change the mode of measurement, just as you would for the standard MicroStation Measure Distance tool.

The above example should explain why the information frames were added to the tool's interface, and why you might just want to keep the reference boundaries displayed while you are using the program.

Measuring "Along Element"



To measure a distance along an element, first select "Along Element" from the Measure Distance drop-down list.

To start the measurement, select the point on the element from which you wish to measure. The location of this point relative to any reference clip boundaries will determine the scale factor that will be used for all subsequent measurements along the element. The scale factor will not change until you send a reset or change the measurement mode.

Otherwise, except for a few minor details, the program works exactly like the MicroStation standard tool. The main difference that you will see is that you do not get a cursor-change indicator when you are over/attempting to select an element that it cannot handle (such as a dimension element). Instead, the program lets you select it, sends an error message, then goes back to waiting for you to select an element.

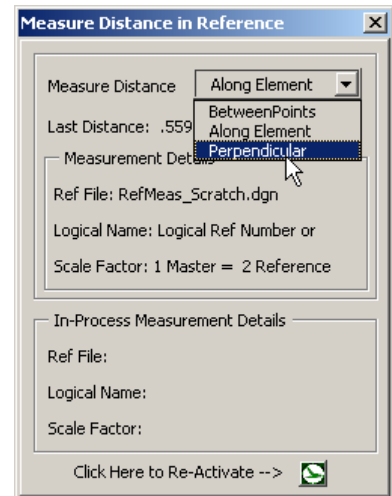
Other differences may arise from the fact that the program's depth and detail of element identification is probably not as robust as that of the standard tool. Furthermore, the order in which it handles various aspects of element types may differ and therefore cause the program to react a little differently in some cases than the standard. Please notify us of any and all such instances, especially if they are causing routine problems for your work flow.

Measuring "Perpendicular"

Simply choose "Perpendicular" from the Measure Distance drop-down tool.

To start the measurement, select the element from which you wish to compute perpendicular distance. The location of the selection point relative to any reference clip boundaries will determine the scale factor that will be used for all subsequent measurements perpendicular to the element. The scale factor will not change until you send a reset or change the measurement mode.

Like the "Along Element" mode, the perpendicular measurement mode works exactly like the standard tool, with, of course a few minor exceptions. Again, the main difference is in how the program handles attempted or potential selection of an element it does not handle. Rather than a cursor-change indicator, the program allows you to select it, sends you an error message, and discards the selection.



Other differences, once again, may arise from the possible differences in the depth and detail of what the program can do in the way of element identification and handling compared to the standard tool. Again, please let us know of any such situations that you may experience.

THINGS TO WATCH OUT FOR

Do You Have the Reference/Scale You Want?

The *most important* thing to be aware of in using this tool is how it is affected by the location(s) of reference clipping boundaries relative to the points you are inputting. Always make sure you know where your clipping boundaries are relative to each other, and keep an eye on the interface's information frames to see if you are getting what you expect.

The Effect of the Data Point Location

The location at which the element is selected for measurements along or perpendicular to that element determines what scale factor will be applied. If the element overlaps a reference boundary, selection at one end will set the scale to that of the active model (1:1), but selecting it from the other end will set the scale to whatever the master:reference scaling. Check your information frames to make sure that you are getting the reference/scaling factor that you want.

The location of the first data point in a between points measurement will set the scale for the final distance computation. However, when doing cumulative point-to-point measurements, the last point entered will set the reference/scale for the next increment's distance computation, and a cumulative distance that used more than one scaling factor is probably meaningless. So, once again, keep an eye on the information frames to make sure that the reference/scale remains consistent.

The Effect of Clip Boundary Overlaps

In determining the scale to use, the program takes the data point's location and checks it against the clip boundaries of the active model's attachments. It goes through the attachment list in order, and takes the scale factor from the first attachment it finds whose boundaries enclose the data point's location. If the location is in an area where two or more clip boundaries overlap, the program will take the reference/scale from the first attachment it finds that encloses the point, which may not necessarily be the reference/scale that you want.



Your best prevention is to follow the Before You Start instructions on page 2 for checking/correcting your clip boundaries, then, to be on the safe side, leave them "turned on" while you are working with the program.

An Element is Not Handled the Same Way as in the MicroStation Tool

Testing so far has not yet found any definitive case where the tool did not perform for "along element" or "perpendicular" mode in a manner similar to that of the standard tool. However, the program's algorithms for element identification and the detail/sequence of element handling is most assuredly not as robust as those of the standard tool, so we expect some such situation will arise. It is most important that users inform us of such situations, especially when they are affecting work flow/productivity.

The Perpendicular and Along Element Options Aren't Working

This situation arose a few times during development, with no clear indication as to its cause. We suspect that the source may have been something in the IDE's debugger. Nevertheless, if this happens to you, first try the following steps:

- Close the interface.
- Click on the  icon, if you have it showing, or else select Utilities>Macro>Visual Basic Editor from the MicroStation menu bar to bring up the VBA editor.
- In the VBA editor, click on the stop icon  a few times.
- Close the VBA editor
- Restart the ODOT_RefMeas.mvba

If the options still aren't working, you will need to exit MicroStation completely to rectify the problem.

If you should ever experience this problem, please notify us immediately.