INTRODUCTION

Background

Program BrSheetInfo was developed to allow the bridge designer to automate the following plan preparation activities:

- Numbering (and renumbering) of bridge plan sheets
- Writing the "common" title block fields to all bridge sheets in the set
- Providing conformity between a bridge sheet's title and the title of the file in which it is contained

The initial version of the program was developed a number of years ago as a Visual basic 6.0 application. It performed properly until 2008, when an internal change by MicroStation's vendor, Bentley, caused it to introduce irreversible graphic errors into the sheet files it processed. As no viable work around was available, ODOT removed the program from use.

The nature of the error lies in the communication between MicroStation and "outside" software (such as VB6) that is using MicroStation object library. The best resolution of the problem -- and of any others of the same type that may surface in the future -- was found to be a complete rewrite of the program as a MicroStation mvba. The rewrite also afforded us the opportunity to make some improvements.

What's Different

The program has not changed significantly in terms of its internal workings or the visual appearance of its interfaces.

The major enhancement, made in response to user requests, is the ability to skip multiple sheets with a single "SKIP" command. A terminate option has been added to the user's choices of what to do with a problem file, and the reporting capabilities have been expanded some to include information on problems encountered during processing.

Users will notice that the common title field edit controls are always enabled in this version. The default processing option has been set to numbering only in order to help protect against blanking-out of the file's title block information when the editing fields remain empty.

It is thought that information from the bridge sheet numbering may be of use in a possible future application for creating and updating a project's title sheet plan index. To that end, some additional information collecting capability has been written into the revised code.

Various Windows controls that were available to VB6 cannot be used in MicroStation, so there are some changes to the user interfaces:
- The drive, drive directory and file list box controls are different from those used in the older version. Other than the operability of the directory control, however, the user should not notice any changes in functionally.
- The text area of the report form uses a different control than the VB6 program. As there is no capability of printing the report directly from mvba, the print button has been removed from the report.
- Menus are not available in mvba, so small buttons have replaced the original program's menu items for help and file save/load.

The good news is that there are some major improvements in the program's performance:
- MicroStation remains open during the program run.
- The active file may be included in the files to be processed.
- The new version is exponentially faster than its predecessor.

- The "hang" problem has been eliminated.

Requirements

File Naming

Unlike the general sheet numbering program (ODOT_Sheet_Numbering.mvba), the bridge information and numbering program does not particularly care how a dgn file is named. However, if the file is not named in accordance with the ODOT CADD Standards, the general numbering program and other ODOT software will not work correctly in many instances.

Models

As per the ODOT CADD Standards, there must be only one sheet per design file and it must be in the sheet model. The sheet model must be named "Sheet".

Bridge Sheet Cells

The program does not work on *bridge* sheet cells that have been completely broken. The cells must also be ODOT standard bridge sheet cells or, alternatively, must be named in a similar manner and have the same color coding for the pertinent text and number fields. Several of the ODOT bridge sheet cells do contain cell sub-elements; these cells may be broken as long as the sub-element cell containing the sheet border and title block remains intact.

Text fields

Each text element in the title bar of an ODOT bridge sheet cell has a unique color code. The program uses these codes to determine the elements to which it will be writing or from which it will extract information. Users who wish to use the program on files that employ other than an ODOT bridge sheet cell must ensure that the color codes of the cell's pertinent text elements are consistent with those used by ODOT.

As the design of the ODOT bridge sheet cells' title bars precludes any need for multi-line single-element text entries, all numbering and text fields in a sheet cell's title bar are to be text elements, not text nodes. Nodes are not recognized by the program and will cause fatal errors.

System Requirements

The program was written in MicroStation for use with the ODOT build. The user must have a "V8istd" configuration variable defined and the program is expected to reside in the vba sub-folder of the directory to which "V8istd" points. The user guide pdf is to be in the vba\Doc\ sub-folder.

The program uses several secondary files. The graphic files used for its directory controls – drive.ico, openfold.bmp and clsdfold.bmp – must be located in the same directory as the program itself. These three files are included in the ODOT downloads. There are two Windows ActiveX control files that must be present in the c:\Windows\System32\ directory of each work-station upon which one wishes to run the program. The two files are COMDLG32.OCX and MSCOMCTL.OCX. These files are not included in the downloads but are available from ODOT should a user need them.

Contents

The body of the guide concerns itself with how to use the program correctly. The following "How It Works" section touches on the program's underlying logic, presents step-by-step directions for using it correctly, and provides some useful tips. Following that, there is a section on things to be aware of which includes information on various types of errors that may arise and their causes. Lastly, future development considerations are mentioned and the contact information is provided for user questions, comments and suggestions.

HOW IT WORKS

General

File Selection and Ordering

The user must indicate, via the main interface, which bridge sheets are to be numbered and the order in which they are to be numbered. Future/absent sheets may be accounted for by entering a skip or skips at the locations where they would be in the order.

The file list may be saved for future re-use.

Processing: Pre-Writing Phase

The program first performs an examination of each file during which it locates and stores the file and model name, the sheet cell ID and the IDs of the various pertinent text-fields in the cell.

The total number of bridge sheet files is accumulated during this phase.

Any errors encountered during the pre-writing processing are displayed to the user for disposition (omit/skip/terminate), if applicable, and all such problems are written to the report at the end of the phase.

Processing: Writing Phase

Once the program knows the total number of bridge sheets and has stored the file and model names and element IDs to which it will be writing, it re-accesses each file, goes to the sheet model, fetches the elements to which it is to write, and performs the necessary edits.

Reporting

The report form serves two main purposes. First, it informs the user of any problems encountered and what, if anything, was done about them, thereby providing a list of those files/models whose numbering or other editing is not complete. Secondly, it tells the user exactly what was accomplished in each file.

The report may be saved to a text file for future reference/printing.
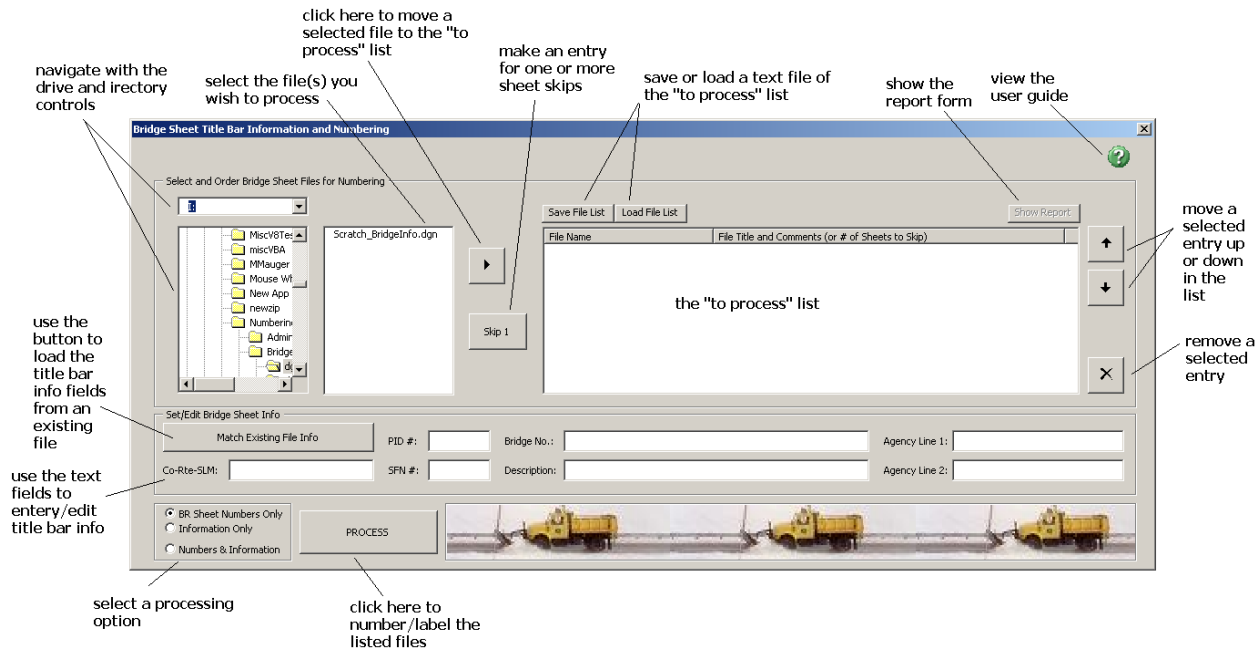
Step by Step

Starting the Program

The bridge sheet numbering and title block information program is typically accessed via the "ODOT: item of the main MicroStation menu bar. Merely select ODOT>Bridge Apps>Bridge Sheet Numbering to bring up the program's main interface.

If you do not have the ODOT item on your main menu bar, you may also load the program via the VBA Project Manager Dialog. Select Utilities>Macro>Project Manager from the main menu bar, use the dialog's icons to navigate to the V8istd directory, go to the vba sub-folder, and select ODOT_BRSheetInfo.mvba. The program may then be activated via the dialog's run icon. For complete details on working with the VBA Project Manager, refer to the MicroStation help.

The Main Interface

The main form appears as shown here:

navigate with the drive and irectory controls

select the file(s) you wish to process

click here to move a selected file to the "to process" list

make an entry for one or more sheet skips

save or load a text file of the "to process" list

show the report form

view the user guide

use the button to load the title bar info fields from an existing file

use the text fields to entery/edit title bar info

move a selected entry up or down in the list

remove a selected entry

select a processing option

click here to number/label the listed files

Assembling an Ordered List of Bridge Sheet Files to Process

Work from the top down and left to right.

Use the drive and directory boxes on the left side of the form to navigate to each folder that contains bridge sheet files for the project. Typically, these dgn files will be structure-numbered sub-folders of the project's bridge sub-directory.

When a selected folder contains dgn files, they automatically appear in the list box to the immediate right of the directory navigation box. Select those files you wish to include in the processing and press the ▶ button to add them to the "to process" list:
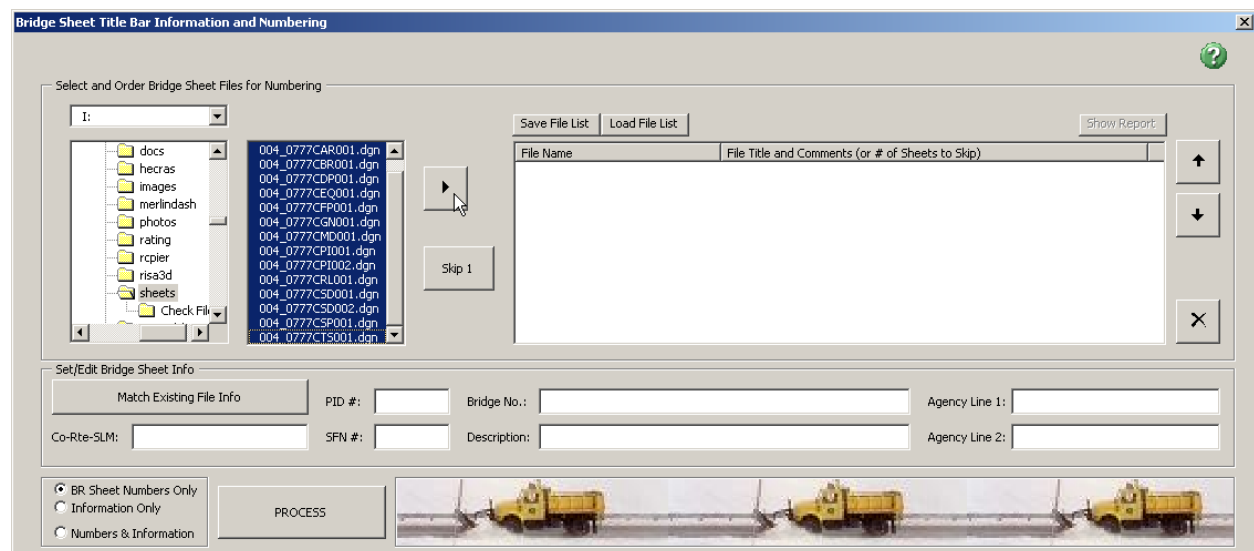

The user is responsible for ordering the entries in the "to process" list in the sequence required for a bridge's finished plan set. To change an file's position in the list, select it and then click on the up ▴ or down ▾ arrow key to move it one position in the designated direction. If you wish to completely remove an entry, use the × key at the lower right of the list.

To allow for future/absent bridge sheets, a "skip entry" may be made that will indicate the number of sheets that are to be passed over. The current caption of the skip button indicates the number of sheets it will ascribe to the entry. To edit the number of skips, then, merely right click on the button to bring up the "skip number edit" frame:
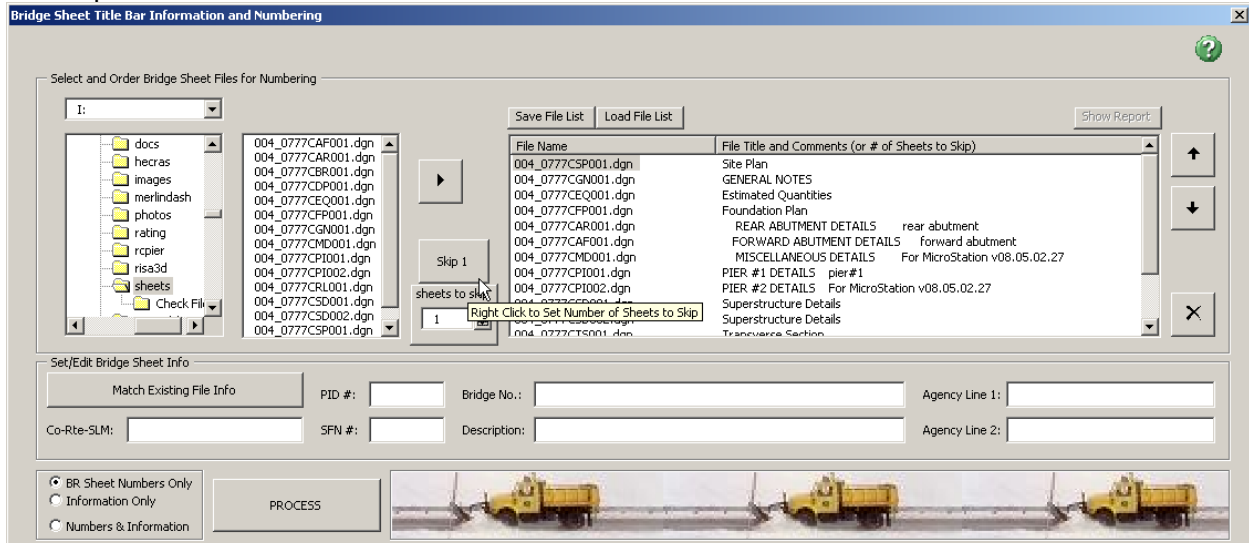
Once you have edited the skip number, the button's caption will reflect the new value. Clicking on the button will then add the skip entry to the "to process" list.

Skips that have already been entered into the "to process" list may be edited by double clicking on the pertinent item. A small form that is identical to the pop-up frame will appear.
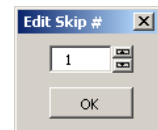
Ordering and skips are, obviously, only of importance for the actual bridge sheet numbering; they are not necessary for information only runs.

Creating and ordering the list takes time and attention and can be quite tedious. You may, therefore, wish to save your completed list for future use/revision. To do so, click on the "Save File List" button to bring up a standard Windows Save File dialog box that will allow you to save a txt file of the list under the name and path of your choosing. To use such a file to populate the "to process" list, clicking on the "Load File List" button will allow you to retrieve the file via a standard Windows Open File dialog; the program will automatically enter the selected file's contents into the list.

Setting Up the Common Title Block Fields

The title block information fields in the center panel of the form correspond to the "common" fields on ODOT standard bridge sheet borders. To load the fields from one of the files in the "to process" list, click on "Match Existing File Info". A sub-interface will appear from which you may select the match file:
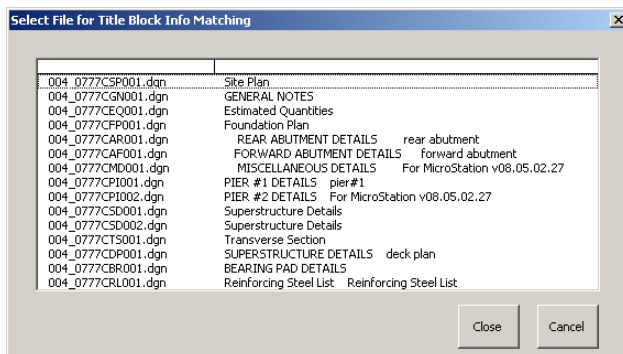
When you have made your selection, close the form to return to the main interface. Click the cancel button if you decide not to do a match after all.

The main form will now display the "common" title block information from the selected file:

Set/Edit Bridge Sheet Info					
Match Existing File Info	PID #: 79569	Bridge No.: BRIDGE NO. MOT-4-0712		Agency Line 1:	ODOT CENTRAL OFFICE
Co-Rte-SLM: MOT-4-7.12	SFN #: 5700280	Description: S.R.4 OVER BEAR CREEK		Agency Line 2:	OFFICE OF PRODUCTION

You may manually edit/enter this information. However, only limited input editing has been provided for these fields. PID and SFN entries are edited for numeric only and the number of digits allowed. All other fields are unchecked save to ensure that any lowercase entries are converted to uppercase.

Processing

Activation
The processing options are located in the lower left corner of the form. You may choose to process title block information only, bridge sheet numbers only, or both.

All options are always available, so be sure to be aware of what you want the program to do versus which option is actually selected.

When everything is set to your satisfaction, click on the "Process" button to start the numbering/labeling. If in, fact, you have included a labeling option and one or more of the title block edit fields is blank, the program will inform you of the situation and ask whether or not you wish to continue the processing.

There are two phases – pre-writing and writing.

The Pre-Writing Phase
In this phase, each bridge sheet's pertinent text elements are identified, information is stored for use by the writing phase, and the total number of bridge sheets is accumulated.
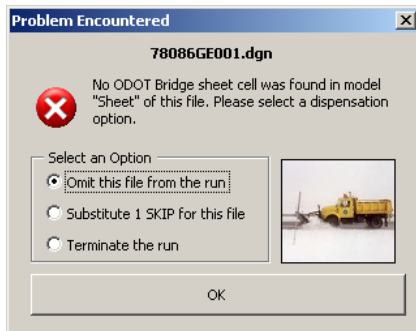
If the run includes the numbering, the program will communicate with the user about various errors it may encounter during this phase. These include: inability to find/open a file; not finding a sheet model in a file, or not being able to find the sheet border cell or; not being able to find one or more of the bridge numbering fields within the border cell.

In these instances, such as the example, to the left, the user must indicate to the program how he/she wishes the problem to be dealt with. The offending file may be omitted or skipped, or the run may be terminated.

Please be aware that the program does not report non-numbering pre-writing errors in this manner.

The program also checks the sheet title field in the border cell against the file title as they will typically be the same (see section 304.4, Supplemental Description Guidelines, of the CADD Standards). If there is a discrepancy, the program asks the user to indicate what he/she wishes to do – change the file title, change the sheet title, or simply leave both "as is".

At the end of the phase, all numbering and title block pre-writing issues are written to the report form. You should note that title discrepancies, if any, are NOT included.
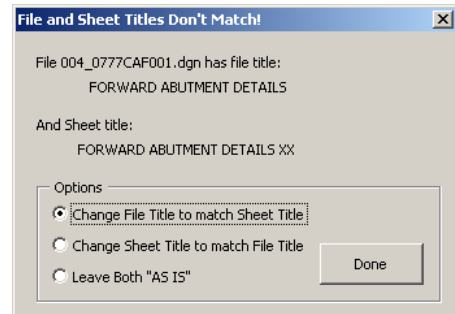
The Writing Phase
In this phase, the information on files, models and text elements, along with the total number of bridge sheets computation, is used to perform the actual writing/editing.

There is little or no interactive communication between the program and the user during this phase. At most, an error message will appear if there is a problem accessing a file, model, cell or text field. Such errors are also written to the report as they occur.

Fatal errors will occur in certain situations. See the caveats section for more information.

Reporting
The pre-writing phase's reporting is written at the conclusion of the phase, and although the writing phase reporting is written concomitantly with the processing, it is not shown to the user until the phase is complete.

The main purpose of the report is to give the user sufficient record of what was or wasn't done and why.
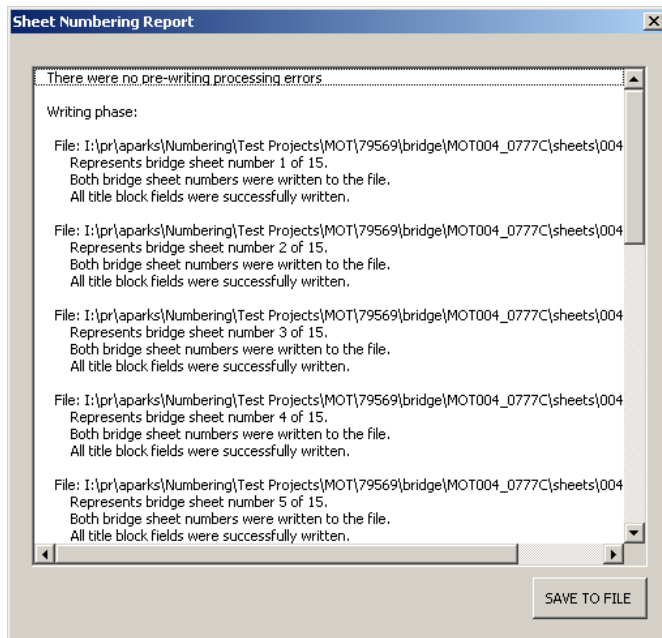
The report from the pre-writing phase summarizes all problems encountered in that phase, if any, as well as the user's disposition for such, where applicable.

The writing phase writes information about each entry from the "to process" list.

If the processing includes numbering, the bridge sheet number and total sheet number is summarized for the file. Then, any writing errors and their disposition, if applicable, are added. Problem free numbering is reported as well.

For title block information writing, the report only mentions whether or not all fields were written. Any errors that arose in accessing the file, cell, or text elements are also reported.

There is no capability to print the report in mvba. One may, however, use the "Save to File" button to save the report as a text file. Word-processing software may then be used to print the contents of the saved file.

Some Tips for Working with the Program

- *Creating a file list:* Since files can only be repositioned in the list one file and one position at a time, it may be simpler to add the files in pretty much the order in which you need them to be, even if that entails skipping back and forth between sheet subdirectories.

- *Saved file lists are directory specific:* The information in a saved file list includes the full path to each file; the list cannot be used if any file's directory location has been changed.

- *Manual editing of text fields:* When editing a title block or bridge numbering field in MicroStation, it is possible to inadvertently convert the text elements to text nodes – usually be introducing a carriage return in the edit. The "Text Editor" tool 🅐 is prefered over the "Fill in Single

Enter_data Field" since in some older versionos of MicroStation the latter may turn any edited text element into a node.

- *Intact Sheet Border Cells:* The cell that contains the border and title block portions for ODOT bridge sheets must not be broken. For the ODOT standard cells for bridge site plans, this cell is a sub-element of the overall sheet cell. Am ODOT site plan sheet cell is meant to be broken, with the border sub-cell remaining intact. When developing a site plan sheet, then, the designer must take care that the overall sheet cell is broken and the border cell remains unbroken as a stand-alone, un-nested, element.

- *Reserved Colors:* Do not ever use any of the reserved sheet title block colors – numbers 240 through 251 – except when creating a non-ODOT standard sheet cell.

Caveats

Fatal Errors

As stated earlier, there are conditions that will give rise to fatal errors during program execution.

At this time, it is believed that the application is subject to such errors only during the writing phase of the processing.

The only known cause is when a pertinent text element has been converted to a text node via the user's previous manual edits.

Consequently, it is extremely important that the user take care during manual edits that title block and numbering fields are not changed to text nodes.

Non-Fatal Errors

The most typical causes of non-fatal errors are inability to find/open a file (or use it for write purposes), problems with "finding" a file's sheet model, and/or not being able to locate the necessary cells or cell sub-element text fields in the sheet model.

File issues are fairly straight-forward. The inability to find/open a file is typically due to using an out-of-date stored file list. Inability to open the file for writing means that either the user does not have the necessary permissions or the file is currently being used by another.

When the sheet model cannot be found, the cause is that the sheet model name is not in conformance with ODOT CADD standards.

Problems with finding the needed cell/text sub-elements have a variety of sources. The program will inform the user only when no text elements of the required sort have been found in the sheet model. Typical causes are:
- All sheet number text elements have been changed to text nodes
- The sheet is in the Design rather than the Sheet model
- The sheet cell is not an ODOT standard bridge sheet cell and is not named such that the program can recognize it or the pertinent sub-elements are not color coded as per ODOT standards.
- The ODOT standard sheet cell for a bridge site plan has not been broken such that the border sub-element cell stands alone.
- The cell containing the title block fields has been broken

Text Nodes, Text Elements and Data Entry Fields

The program recognizes only text elements for title block and bridge sheet numbering fields as there is no reason for any of these fields to be other than a simple, single line text element.

As described in the fatal errors section above, text nodes in place of text elements will cause fatal errors. The user is therefore cautioned to be diligent in ensuring that the title block and bridge sheet numbering fields remain text elements, as originally designed, rather than text nodes. The best approach is to minimize the amount of manual editing these fields receive.

The ODOT standard bridge sheet cells are designed with data entry fields for all text elements that users are to fill in. The primary purpose of the data entry fields is for the user to be able to actually *see* that they do exist and that some sort of entry is required.

A data field is eliminated, the text element is still there, even if it is now blank and you can't see it!

The user should keep in mind that data entry fields are *not* necessary for the program to correctly identify the text fields it needs to edit. It does create a new data entry field for the text element when it edits it, though, so even if you took one out, the program will put it back.

Blank Title Block Fields

If you have title block information is included in the selected processing option, the program will check to see if there are any blank fields in the main form's text controls for such. If one or more is found, a message is sent to the user to see if he/she wants to continue with the processing.
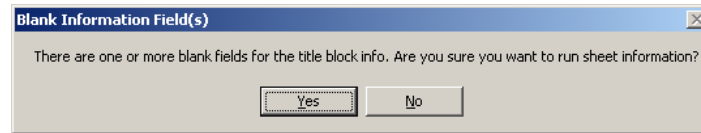
This provision is made to help protect against inadvertently blanking out any title block text in the actual design files.

Future development

Program Enhancements

There are two enhancements that may be considered at some future date depending upon user demand and the resources available for implementing them.

First, the type of control used in the current program for the "to process" list box is better suited to mouse operations than the control employed by the previous version. Therefore, it should be possible to implement "drag and drop" operations, even for multiple selections, for ordering the file list.

Second, coding for adequately handling all text node situations is not impossible, but it can be extremely complex. At this time, there is little likelihood that there is any true user need for text node handling, but, should it become useful at some future time, provisions can be made for such.

Title Sheet Index Automation

The bridge sheet numbering and information program may provide input to such a program, and, if so, will most likely require adjustments to its data structures, search routines and processing algorithms.

There is, as yet, no time table for developing the program. It is expected, however, that investigation into the possibility of creating an effective algorithm for generating the desired index will occur before the end of the year.

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