State Bridge Office
Bureau of Design

Kansas Department of Transportation
VirtisOpis Users Guide

- New Bridge - Your Responsibilities
- Reporting a Virtis Opis Troublelog
- Helpful Hints
- Bridge Description Information
- Structure Definition Naming
- Virtis Opis Tutorial Examples
- Request to have Virtis Opis installed
- Ask a Virtis Opis related question
- Ask a BRASS related question

New Bridge - Your Responsibilities

1. Bridge Special Assignments will initiate and create the bridge in the database. The data marked in RED in the "Bridge Description Information" will be populated in advance. The designer will be responsible for any data fields left blank except Year Built, this will be populated at a later date. Contact Bridge Special Assignments with any questions regarding pre-entered data.

2. The assigned designer will have to notify the Virtis Opis Administrator so access privileges can be assigned. Following that, the bridge may be checked out. The designer will have three options here. A structure definition may be created from scratch, copied from an existing structure or copied from a template structure. Copied structures always carry along the library items from the original structure. The first item in the tree will be your Bridge Description Information. The structure definition must be named in accordance with the Bridge Office Superstructure Definition Naming conventions. The last thing the designer will do is select "Bridge Completely Designed". If you want to save this structure for fast bridge creation in the future select the Template box. When the Template box is checked the structure will be excluded from batch ratings. Any designs or studies that do not have a County/Serial identification should have the Template box checked.

3. Shortly before office check the design squad leader will provide Bridge Management with a complete set of bridge plans plus a title sheet. Bridge Management will compare the plans to the input data and perform a brief superstructure review followed by a rating review. A report for this review will be sent to the squad leader.

4. After letting Bridge Special Assignments notifies the Administrator so the bridge can be placed in the "Let/Under Construction" folder. The designer will retain access privileges during the construction phase. If any changes to the original design occurred during construction an additional superstructure definition must be created and named in accordance with the Bridge Office Superstructure Definition Naming conventions. Bridge Management will be notified and plans will be provided by the squad leader. The new As-Built structure definition will be marked as current so batch ratings will include the correct structure.

5. After the bridge is constructed and accepted Bridge Management will enter the Year Built and place the bridge in the State System folder. At this time all access privileges will be removed.

Reporting a Virtis Opis Troublelog

- Indicate the BID number (far left column in Explorer Window)
- Written problem description
- Supporting documentation
    - Portion of an output file
    - Screen shot (bmp or jpeg)

Supporting calculations
- Send troublelog to the Virtis Opis Administrator

Helpful Hints

Folders Explanation

The "All Bridges" folder contains all the bridges in the database. When you drag or copy a bridge to your folder, all you have is a shortcut pointing to the All Bridges folder. When you create a new bridge in your folder, you created a shortcut which points to the All Bridges folder where the bridge actually lives. There can be more than one shortcut to the same bridge.

File System

Manila Folder:	BID's must be placed in this list, no filtering
Red Folder:	BID's are placed in folders automatically by the filtering/sorting criteria
Folder with Head:	Denotes a personal folder that only the owner can delete or add too

Folder Structure

All Bridges	- All bridges in the database
Tutorial Bridges	- Tutorial Example Bridges
PE Design Phase	- Any study or design
Template Bridges	- Saved templates for fast bridge creation
Design	- Each designer has a personal folder
Let/Under Construction	- Any bridge that has been let or is currently under construction.
To Be Load Rated	- "As-Built", load rated and ready to be placed in the State System Folder
On State System	- NBI inspected, Load Rated "As-Built" bridge and currently under traffic

User's Manual and Help

- Reviewing the User's Manual will be helpful.
- There is a help file called "Getting Started" it will explain general navigation and terminology.
- Press F1 in any screen to bring up help pertinent to the active window. Use F1 every time you open a new window until you are comfortable with the program.
- You will also find engine related help that will define optional and required data. The engine will have to be selected from the pull down menu, Help/Engine Help Configuration.

Progression
- Always start at the top and work down - don't jump around.
- Navigate with tab and shift tab key instead of the mouse.

Save
- Save Often
- Read the messages on the Validation Window.
- Warnings are NOT errors, may be just data that BRASS will either calculate or provide a default for.

Copy an existing Bridge to use as a template
- In the "All Bridges" folder, highlight the bridge you want.
- Edit - Copy then Edit - Paste (you can rename at this time or wait till later).

- Select your new "Copy of" bridge and Edit - Copy then highlight your own folder (destination) Edit - Paste or drag and drop.

Check-In/Out
- When you copy an existing structure or create a new one, you become the owner and may check this bridge in/out at will. Once the structure is constructed and accepted you will no longer have permission to change any of this structures data. Check out privileges may only be obtained from the system Administrator.

Wizards
- After filling in data from the Bridge Descriptions thru the Factors in the Bridge Workspace, highlight "Structure Definition" and select Wizard from the Tools pull-down menu or select the New Design Wizard button from the tool bar. Follow the prompts.
- There is also a PS Design Tool (Wizard) button available when a Member Alternative is selected.

Structure Definition
- Know the difference between a Girder System and a Girder Line. (Girder Lines require you to calculate distribution factors and dead loads). Know the difference between Schedule Based and Cross Section Based.
- Some input items can be ignored and populated with default values from the analysis engine. Read your engine help to find out which items have defaults. Be sure you know what that default is before you use it!

Shear Studs, Diaphragms and Stiffener Ranges
- There is a Ranges Example available from the help within Virtis or Opis.
  This will fully explain the proper way to enter the selected item.   Remember, you never get a (stud, diaphragm or stiffener) at the start but you always get one at the end of a range.
- Studs – Enter your ranges continuously from left to right letting Opis compute the next start distance. This will avoid input problems over the piers.

~~Decks~~
- ~~Be careful not to double up on the dead load from the deck SFO. Deck and overlay information is found in 5 places.~~
    1. ~~Load Case Description – SFO, Stage 2, D,DC~~
    2. ~~Structural Typical Section - Deck Cont'd Tab – Total Deck Thickness~~
    3. ~~Wearing Surface Tab of the Structure Typical Section – for FWS Only (DW)~~
    4. ~~Member Loads – SFO, for each member over all spans in Kip/ft~~
    5. ~~Deck Profile - Concrete Tab – Structural Thickness for Properties~~

    -

~~Examples with and without overlays:~~
~~(Reference both your top and bottom rebar from the bottom of the slab)~~

~~SI~~	-	~~USC~~
~~210 mm Deck No Overlay, 25 mm Sacrificial Wear~~		~~8" Deck No Overlay, 1" Sacrificial Wear~~
~~Total Thickness = 210 mm~~		~~Total Thickness = 8"~~
~~Structural Thickness = 210 - 25 = 185 mm~~		~~Structural Thickness = 8" - 1" = 7"~~
~~220 mm Deck with 40 mm SFO, 15 mm Sacrificial Wear~~		~~8 1/2" Deck with 1 1/2" SFO, 1/2" Sacrificial Wear~~
~~Total Thickness = 220 - 40 = 180 mm (DC1, Stage 1)~~	-	~~Total Thickness = 8 1/2" - 1 1/2" = 7" (DC1, Stage 1)~~
~~Wearing Surface = 40 mm SFO (DC2, Stage 2)~~		~~Wearing Surface = 1 1/2" SFO (DC2, Stage 2)~~
~~Structural Thickness = 220 - 15 = 205 mm~~		~~Structural Thickness = 8 1/2" - 1/2" = 8"~~
-		-

Decks

Examples with and without overlays

No Overlay
8" Deck, 1" Sacrificial Wear
Total Thickness = 8"
Structural Thickness = 8"- 1" = 7"

1½" SFO
8½" Deck with, ½" Sacrificial Wear
Total Thickness = 8½" – 1 ½" = 7"
Structural Thickness = 8½" – ½" = 8"
SFO not entered on the Wearing Surface Tab
Load Case Description – Enter a load case for SFO, Stage 2, D,DC
Member Loads - 1½" SFO for each member over all spans in Kip/Ft

8½" One Course Deck, ½" Sacrificial Wear
With or without a Polymer Overlay
Total Thickness = 8½"
Structural Thickness = 8½" – ½" = 8"
Add a 15 psf FWS on the Wearing Surface tab
Polymer Deck Protection load is ignored

Dead Load

Read the Help Index item called "DEAD LOADS". It contains a table summarizing which dead load components are computed automatically by the engine (BRASS) and which must be entered by the user. Also see page 3-6 of your AASHTO Spec. for Load Designations. Keep this list handy.

Prestressed Guide

Review the help topic for "Prestressed Member Modeling Methods" and our 📄 help sheet.

PS Strand Extensions in Opis

You can enter PS strand extensions in Opis as continuity steel by the following process. In the Opis library of materials under Agency Reinforcing Steel there is a material called Continuity Steel. This pseudo continuity steel MUST appear after your grade 60 steel in your materials list. Then on the Continuity Diaphragm tab of the Span Details window you can enter the material from the library called "Continuity Steel". This mild steel material is to be used in place of extended PS strands. You as the designer must come up with correct combination of number of bars and bar size equivalency.

NOTE: the BRASS analysis engine will only use one yield strength, so in this case BRASS will convert the continuity steel you entered into an equivalent number of grade 60 bars.

Library Item

Whenever you have the "Copy From Library" button displayed, please check it out for Agency Defined items.

   VirtisOpis KDOT Agency Library: Request the VirtisOpis - KDOT Agency Library

Analysis Settings

Use the Engine tab in the Analysis Settings window to specify which strength and service limit state checks are appropriate. Refer to AASHTO 3.4.1

Users Manual & Tutorial Examples

- A shortcut to the User's Manual was placed on your desktop during program installation.

- From the Windows Start Button you can navigate to the AASHTOWare Group and find both live tutorials and PDF tutorial examples.

BRIDGE DESCRIPTION & TRAFFIC INFORMATION

- **Bridge ID:** CCC-SSS

CCC	County Number (3 digits)
SSS	Serial Number (3 digits)

  Example: 057-061

- **NBI Structure ID (8)* :** 9999RRR0CCCSSS1

State System	Route	Subclass	County	Serial	Jurisdiction
9999	077	0	005	706	1

Subclass Valid Coding
0 = No Suffix (Default)
A = Alternate
B = Business
C = Connector
S = Spur
Y = Bypass

Jurisdiction Valid Coding
1 = State (Default)
2 = Federal
3 = KTA
4 = Kansas Wildlife & Parks

  Example: 99990770057061

- **Template - Bridge Completely Defined:**
  Select the appropriate box. When the Template box is selected the structure will be excluded from any batch ratings.
  Any designs or studies that do not have a County/Serial identification should have the Template box checked.
- **Name:** AAAA Sk00 Cu00 Description
  (Max of 50 characters)

AAAA	Bridge Type Code (Bridge Log)
Sk00	Skew Degrees
Cu00	Curve Degrees
Description	Descriptive Name - from the Title Block of the plans

  Example: WWCC Sk30 Cu00 SB US-77 over Nasty Cr.

- **Year Built: YYYY**

Example: 2004

- **Description**

EXAMPLE

Replaces County-Serial   Replaces 057-026
Descriptive Name - from the Title Block of the plans SB US-77 over Nasty Cr.
Project Number   77-57 K-1234-01
Activities enabled to charge time to   117,171,329
Description as shown on the contour map   Construct Note

- **Location:** (Location from Bridge Display Sheet)   0.55 MI S US-50
  (Max. of 25 characters)
- **Facility Carried (7)*:** (Max. of 18 characters)   SB US-77
- **Feat. Intersected (6)*:** (Feature Crossed, From Bridge Nasty Creek
  Display Sheet)
  (Max. of 24 characters)
- **Default Units:**   SI/Metric
- **Length:**   159.625
- **Route Number:** (Route, from Bridge Display Sheet) 77
  (Max. of 5 characters)
- **Km Post:** (County Mile Post, from Bridge Display Sheet) 17.848
  (Max. of 9 characters)
  Special treatment is required here. At the top of the window
  toggle the units to US Customary, enter the county mile post,
  then toggle back to SI/Metric.

- **BridgeWare Association:** Select the BridgeWare Association
  button, if this is a new LRFD structure check the Virtis and
  Opis box's. If this is an existing NOT designed with the LRFD
  Spec. then select the Virtis box only.

On the Description (cont'd) Tab, all items are selected from a pulldown pick list:

- **District (2):**   District 1-6
- **County:**   Marion
- **Owner (22):**   State HWY Agency
- **Maintainer:**   State HWY Agency
- **Admin. Area:**   Area 1-6
- **NHS Indicator:**   On NHS
- **Functional Class:**   Rural Princ. Arterial

* See item number (2,6,7,8,22) in the Federal Highway Administration's Recording and Coding Guide for the
Structure Inventory and Appraisal of the Nation's Bridges (December 1988 and December 1995 Editions).

On the Traffic Tab, use the help (F1 then Bridge Description: Maintenance Projects use present AADT
Traffic)

                   Major Modifications use projected AADT

The traffic data fields are not being filled out correctly by most users. This traffic data provides the values to calculate fatigue. If they are left blank the design ADTT will default to AASHTO's maximum of 20,000.

Below you will find a worked out example.

Typical traffic data found on the Title Sheet of the plans: (this is what you have to work with)

Design Designation

AADT (2005)   4700   Annual Average Daily Truck Traffic (current)

AADT (2026)   6000   Annual Average Daily Truck Traffic (future)

DHV   10%   Design Hourly Volume

D   55/45%   Directional Traffic - traffic proceeding in one direction only

T   30%   Percent Trucks

Screen shot of the Traffic Tab of your bridge description window with the above values entered:

Explanations from the Help within Virtis/Opis:

Truck PCT
Enter the truck percentage value used to compute the ADTT. This value comes from Pontis if the bridge is associated with Pontis.

ADT
Enter the average daily traffic on the bridge. This value comes from Pontis if the bridge is associated with

Pontis.

Directional PCT
Enter the percentage value used to compute the traffic in one direction on the bridge.

Recent ADTT
Enter a recent value for the average daily truck traffic (ADTT) in one direction on the bridge. Virtis/Opis computes this value as the Truck PCT * ADT * Directional PCT.

Design ADTT
Enter the design average daily truck traffic (ADTT) in one direction on the bridge.

This value must be computed by the engineer

Structure Definition Naming

The Structure Definition Name is to follow a predetermined naming convention. A typical bridge should only have 3 structure definitions. They are as follows:

Design KFH.

Design Check GMC, Let Oct. 2002.

As Built Nov. 2003 KFH, As Rated Jan. 2004 NLW.

The Design Structure Definition may contain several options or trials. For this reason the Design Check Structure Definition which only contains the one design will be used for Letting, As Build and As Rated.

PRINTABLE PDF (Click this button for a printable .pdf of this page.)

Questions and comments regarding this page or VirtisOpis can be sent to: Dean Teal

Changes to this page are noted in yellow.

This page last updated: November 28, 2007

Last updated : October 10, 2008