

RELEASE NOTES



RM Bridge V8*i*
(SELECTseries 1)
February 2011

RM Bridge Professional Engineering Software for Bridges of all Types

1 Important notes

1.1 RM Bridge applications require a RM Bridge Prerequisite Pack(BaseWin) installation

The basic part of RM Bridge applications is separated from the application (e.g. RM Bridge V8i). The RM Bridge Prerequisite Pack contains the common files for all RM program systems and additionally Microsoft Windows Prerequisites. Therefore you must first install the Prerequisites package and afterwards any application.

Updates of the basic installations will support also older program applications of the TDV2000 series (RM2006, MISES3,PL8,...)!

It's not recommended to uninstall the old basic installation, before updating with the new one.

New application installations will not disable the old program releases. They can be used together with the new ones. But the file extensions in the operating system are set to last installed application release.

1.2 Project file handling of old RM projects with RM Bridge V8i

Since RM Bridge merged Modeler (former GP), Analyzer (RM) and the Cantilever tool into one application, all the data is required to reside in one single directory. If you have split your project data into several folders (e.g. one for GP (*.gp9) and Cantilever (*.cl9) and one for RM (*.rm9), there are two ways to proceed.

1. Copy (move) all database files (*.gp9, *.cl9, *.rm9) into one directory, preferably the one which contains the *.rm9 files (this directory normally is in the list of recent projects). When you start RM Bridge you can work on the project as usual.
2. RM Bridge V8i will always start up with the Analyzer and the most recent project you worked on with RM2006. You can still access the list of recent projects to choose another project. If your Modeler data (*.gp9) is in a different directory and you did not copy the data as described in 1. , you will be prompted to create a new Modeler data set or copy the data set from an existing project, when you try to start the Modeler. If you choose "Copy", you will get a dialog where you can select the directory of the GP data (*.gp9). After confirming the dialog, the Modeler data is copied to the working directory and you can continue your work as usual.

REMARK: If you use any additional files (like TCL files) and you want them reside in the one project directory, you'll have to move them there manually.

1.3 Data compatibility inside of RM Bridge V8i applications

Both, database and Tcl syntax of RM Bridge V8i(including Selectseries 1) are in general fully compatible. That means, that you can open old projects with new releases without data conversion.

Be aware that RM Bridge V8i requires all project data in one directory (see above!).

[Important note for using project data created with RM Bridge V8i between v08.09.69.02 - v08.09.72.07:](#)

In the version 08.09.69.02 of RM Bridge V8i the storage of attribute sets in modeler cross sections was corrupted. This problem was recognized in version 08.09.72.07 and fixed in version 08.09.73.01.

As a consequence of this correction, a project created with one of those malicious versions and containing attribute sets can't be read correctly by the new versions. The only correct way to transfer the project data cleanly is to export the modeler project with the old version to a TCL file and import this file in the new version.

1.4 Data conversion from RM2004 to RM2006 and RM Bridge V8i

Both, database and Tcl syntax of RM2004, RM2006 and RM Bridge V8i are currently fully compatible. No special data conversion is therefore required.

Be aware that RM Bridge V8i requires all project data in one directory (see above!).

See also important note 1.3 above:

1.5 Data conversion from RM2000 to RM2004/RM2006/RM Bridge V8i

This is done in RM2000 (Version 8.63.3 or higher) with using TCL Script files. The TCL export in RM2000 is accessed via $\hat{\uparrow}$ File \Rightarrow Export. To write a RM2004 compatible TCL-file with RM2000, the option *RM9 Export* has to be set in the pad displayed with the button \downarrow Settings. The created RM9 output file can then be imported in RM2004 or RM2006.

The import of the TCL file in RM Bridge V8i creates a new project in the current directory. RM Bridge V8i import is accessed via $\hat{\uparrow}$ File \Rightarrow Import TCL Project Data. In general there are no major conversion restrictions.

Some details in the cross-section reference geometry have to be mentioned: Changes in the geometry definition have to be considered for shear checks and reinforcement design calculations. The perimeter and web-definitions are new in GP2004/GP2006 and existing RM2000 cross-sections may not give the desired results for shear reinforcement. Stress points are always referenced by their names now (and not by a number as in RM2000). Shear design is now fully database oriented with results directly available for post processing. RM2000 plots that used CSV-files will lead to empty plots and have to be changed manually.

In such cases, it is recommended to convert existing GP2000 files and update reference geometries of the cross sections in GP2004/GP2006, before migrating the project to RM2004/RM2006/RM V8i.

As additional remark on conversion, it may be stated, that the definition of composite cross-sections is in RM2004/RM2006 different to RM2000 (refer to the User Guide) but always transformed automatically with conversion.

1.6 Data conversion from RM7 to RM2004/RM2006/RM Bridge V8i

TCL from RM7 to RM2000 (as described in 1.7) and then to RM2004/RM2006/RM Bridge V8i (as described in 1.5)

1.7 Data conversion from RM7 to RM2000

It is possible to export most of the important input data prepared for a project using RM7 into the RM2000 database directly.

The RM7 project directory must be opened before starting the data transfer and a SYSAK file run that will activate the whole structural system. Only the materials and cross-sections used in the project will be transferred.

Attention:	For exporting data from RM7 use at least release 7.52.02. If it was not delivered with RM2000, order it at your support office! Please refer to the manual "RM2000 User Guide" for further details!
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1.8 Plug-In for importing RM Bridge V8i geometry into AutoCad¹

1.8.1 General

A plug-in as a general interface may be used to import geometry data from RM Bridge structural models into AutoCad. Once the Plug-In is installed in AutoCad, 3D models may be easily built up from the current RM Bridge database. Different structural objects such as structural elements, cables, tendons etc. are grouped for selection and placed in group layers for easier processing.

The 3D model is read into AutoCad from an RM Bridge project path and may then be used for further CAD tasks.

1.8.2 Installing the ARX - Plug-In into Autocad 2008/2009

RM Bridge V8i has to be installed and activated. The Select license for RM Bridge Professional must exist.

To load the interface into the current AutoCad application:

- Select \hat{u} Extras \Rightarrow Application/Anwendung from the AutoCad 2002 main menu.
- Select the file ***rmacad2008.arx*** (Autocad2008/2009) from the RM V8i installation path of your current release (e.g. C:\Program Files\Bentley\RmBridge\rmv8i.08.09.73.01). Click the *Load*-Button to load the add-on.

To permanently install the Plug-In in AutoCad :

- Select \hat{u} Extras \Rightarrow Application/Anwendung from the main AutoCad menu. The Plug-In may then be added to the *start group* folder. This is done by clicking on the folder and adding the filer ***rmacad2008.arx*** as given in Figure 1. The plug-in is then automatically loaded at every AutoCad start up.

¹ Version 2008,2009 of AutoCad © 1982-2009 by AutoDesc Inc.

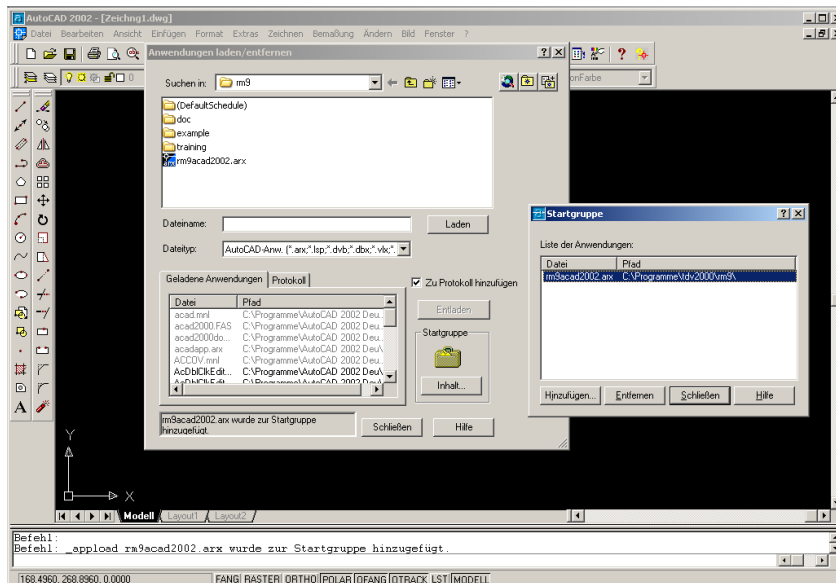


Figure 1: Adding the Plug-In to the start group of AutoCad

1.8.3 Importing RM BridgeV8i projects into AutoCad

The Plug-In has to be loaded into AutoCad as described above.

Type the command **rmv8iimport** into the AutoCad command line to import data from RM Bridge V8i projects. The project path has to be selected from the path browser window as input. After clicking OK, the RM database is imported into the current AutoCad drawing.

2 Licensing

RM Bridge is licensed under the Bentley SELECT licensing system. The detailed license description can be found in the [RM Bridge V8i Product FAQ](#) and in the [RE-ADME](#) file.

Older RM products(RM2004,..) and other TDV2000 software will require a hardware device (hardlock) and a license key for the proper usage. The hardlock must be connected to a parallel or an USB port, while using these applications. See detailed description for these hardlock licensed packages in the [Tdv2000 installation description](#):

3 RM Bridge V8i (SELECTseries 1) Release history

Please see also in [RM Bridge V8i news](#) for a detailed description of the news in the V8i version.

The detailed description of frequently asked questions can be found in the [RM Bridge V8i Product FAQ](#) and in the [README](#) file.

See also [history archive of previous releases](#) for changes of RM Bridge V8i.

[See also important note for project data compatibility of RM Bridge V8i between v08.09.69.02 - v08.09.72.07](#)

3.1 RM Bridge V8i (SELECTseries 1) 08.09.86.01

- SELECT licensing activation as administrator under Windows Vista/7 improved.
- Template for IRC Load Trains available under “Extras > Loading and Stages”
- Templates for Canadian Load Combination Table and Load Trains available under “Extras > Loading and Stages”, Live Load Macro under “Extras > Traffic Load Macros”. Canadian materials in default database.
- Activated FEM time history calculation and modal damping factors.
- Improved TCL import/export:
 - Modeler data can be exported without objects which were created from Wizard Data, and stand-alone Wizard data can be exported.
 - Informational texts can contain double quotes
 - Improved checking of allowed names for variables
- Additional warnings if time history is performed without proper definition of Rayleigh coefficients.
- Several Bug-Fixes:
 - If tendon is defined in negative element direction, spurious oscillations were shown in plot created by “PITndGm”
 - If a cross section contains too much Reference Sets, the TCL command “RMCPART part REFSET GETALL” resulted in a program crash. This affected also Shear Check calculation.
 - LoadSet factors and Loadcase/Envelope name for load type “DEMO” were not properly copied in GUI.
 - GUI was not properly updated if lines in a variable table were added/deleted.
 - Overflow of results was reported when Tendon area was 0.
 - Influence line results for integral results of type line in FEM model contained wrong results for forces.
 - Module “DoRep” reported meaningless error messages if “CALC” actions for non-defined loadcases were present in schedule.

- For pier dimensioning moments were increased sometimes, even if no according PIERDIMY/Z keyword was present in the RMSet
- TDF reports contained wrong formatted data for load type "T"
- Conversion of acceleration into displacement time histories with option "calibrate" failed in some cases.
- Program crashed if variables of type table with more than approx. 4000 lines were plotted.
- Sometimes the macro "Cable Length Under Loading" did not produce any output.
- Cantilever tool crashed for very large projects.

3.2 RM Bridge V8i (SELECTseries 1) 08.09.84.02

- Displaying the version number in SELECT license configuration dialogue. Read only mode visualisation for select.ini added.
- Bentley Licensing client updated to 08.11.07.40
- Added dependency on normal force for non-linear springs (internal variable `_spr_Nx`)
- New internal variables for plot container: `_OMEGA`, `_FREQU`, `_SUMX`, `_SUMY`, `_SUMZ`, `_MASSX`, `_MASSY`, `_MASSZ`, `_INFO` to obtain Loadcase data for circular frequency, frequency, load sums, mass participation and description. The variable name must be followed by the name of the Loadcase to query (within the inequality signs). The Loadcase name can also refer to a variable.

Examples:

`<_FREQU eigen#2> ...` get frequency of Loadcase eigen#2

`<_MASSX <LC>>` with `<LC> = eigen#4 ...` get mass participation in x direction of load case stored in `<LC>` (in this case eigen#4)

- Variables for module "DoPlot" can now also be assigned to integer series with curly braces: `variable={from to}` or `variable={from to step}`. The effect is the same as if DoPlot would be called for each of the elements in the series.
ATTENTION: To obtain different result files, the output must always be "*" in this case
- Tendons were not properly exported to dwg. Replaced poly line with single line elements to fix accuracy issue
- Cross sections could not be imported from DGN because tolerance was too high. Added input field for tolerance in GUI.
- AS 5100 shear check: In prestressed, cracked section only `vuc(a)` is considered - `vuc(b)` is ignored.
- Macro "WINDM" reported "Wind not found"
- Program crashed if C&S was calculated for composite with 8 children

3.3 RM Bridge V8i (SELECTseries 1) 08.09.84.01

- The new product for Precast Segmental Bridges “RM Bridge Cast” was added to the installation set. It is a standalone application and is started in the start menu :

-> All Programs->Bentley\RMBridge\RM Bridge V8i (SELECTseries 1) V08.09.xx.xx ->RMCast V08.09.xx.xx

It requires the new SELECT license product “RM Bridge Cast”. The detailed description can be found in the RMCast main menu ->Help->User Guide.

3.4 RM Bridge V8i (SELECTseries 1) 08.09.83.01

- When performing time integration with module “TInt” a video of the time history can now be created.
- End user license stored in RMV8i installation directory

3.5 RM Bridge V8i (SELECTseries 1) 08.09.82.01

- Solved problems with wind loads in Wizard for AASHTO.
- Updated Training examples.
- Solved problem with ultimate capacity check in Wizards.
- Improved pre-processor for Cable Stay Bridges.
- Solved problem with module “CabSag”.
- Solved problem with automatic schedule generation via “Fill Form” in schedule module of pre-processor for cantilever bridges.
- Training documentation updated
- AASHTO training examples added
- FEM Application documentation added

3.6 RM Bridge V8i (SELECTseries 1) 08.09.81.02

- Gust factor according to EC available for wind load calculation.
- Steel resistance calculation for AASHTO composite wizard.
- Fixed problem with application of line loads to composite FEM.
- Fixed problem with report generation for Rolling Stock tool: damping constant was not printed properly.
- Improved wind profile for Swedish Wind and Kaimal Messina spectrum.
- Training example for FEM for 2 Span pre-stressed plate bridge(EC material) added
- License problem fixed: When on the SELECT server side a check out restriction was defined and RM products were not marked with check out availability. The application reported : “Error 21: Nodes out of range from 101....xx”.

3.7 RM Bridge V8i (SELECTseries 1) 08.09.81.01

- Module ElemK now supports modification of Ay, Az and Ix for beams.
- Improved geometry calculation for LoadLane Macro 4.
- Adapted Swedish Classification Loadtrain Macro.
- Steel resistance calculation for Euro code composite wizard
- Superposition files contained wrong results if more than 80 tendons pass through an element.
- Activated load type PDFLC.
- Improved LiveLoad calculation for load trains with two constant Q loads.
- Solved problem for module Restart and destination load case with direct load input.
- Updated automatic conversion of plot files into DGN/DWG.
- With the previous release the license client was incorrectly displaying the disconnected notification dialog on the first launch of the application.
Fixed : Bentley Licensing client updated to v8.11.07.39.
- Spanish shear capacity check revised according to EHE 2008.

3.8 RM Bridge V8i (SELECTseries 1) 08.09.79.01

- Minor adaptation in Chinese Crack Check implementation.
- Norwegian shear capacity check is now also available for concrete-concrete composite sections.
- Improved consideration of external tendon contribution in deviator blocks for shear check.
- Improved input and diagram output of FEM integral results.
- Improved input for springs in modeller.
- Minor bug fixes for cross section editing in modeller.
- Corrected problems for shear stud offset other than 10000.
- Corrected problem of DGN import for poly lines in modeller.
- Bentley Licensing client updated to 08.11.07.38
- Problems with offline SELECT licenses solved
- Select configuration option added in start menu
- RM Bridge news over RSS feeds are available on default.
Administrate it or check manually by main menu : Help->RSS Feeds for RM Bridge

3.9 RM Bridge V8i (SELECTseries 1) 08.09.78.04

- Corrected calculation problem for local hinges
- Solved several issues for TDOT drawings.
- SELECT Licensing updated to version v8.11.07.38

3.10 RM Bridge V8i (SELECTseries 1) 08.09.78.03

- Removed error message if calculating plastic cross section values for composite part with only material values.
- Solved several issues for TDOT drawings.

3.11 RM Bridge V8i (SELECTseries 1) 08.09.78.02

- Solved problem with action “FibIIIc” where results were not stored properly into target envelope.
- Solved problem where AddCon reported violation of maximum recursion depth.
- Solved problem in action”PITndGm” where projection into plan failed if Tendon direction against Beam direction.
- Improved evaluation of aero class tables.
- Improved pre-processor for Moving Load available.
- Extended precast wizard with new column types for rectangular-chamfered, rectangular-filletted, hexagonal, and octagonal shape (requ. for TDOT)
- Improved issues for TDOT drawings

3.12 RM Bridge V8i (SELECTseries 1) 08.09.78.01

- Solved issues for TNDOT drawings
- Improved Live Load macro for AASHTO
- Improved weight calculation for load type FSY
- Fixed numbering of segments in Modeler

3.13 RM Bridge V8i (SELECTseries 1) 08.09.77.01

- Improvements for wizard geometry calculation for precast girders and Chinese Highway code.
- Improved geometry calculation for ILM pre-processor for composite bridges.
- New master types for substructure in RM Draw Manager (TNDOT project)

3.14 RM Bridge V8i (SELECTseries 1) 08.09.76.05

- Minor changes

3.15 RM Bridge V8i (SELECTseries 1) 08.09.76.04

- Fixed issues for TNDOT drawing generation for superstructure.
- Getting started documentation renamed – is now available

3.16 RM Bridge V8i (SELECTseries 1) 08.09.76.03

- If multiply with width/height is selected as load option for load types QL/QG with FEM elements, load is applied as distributed load, else as concentrated line load.
- More accurate calculation of geometric load position for influence line calculation with FEM
- Improved C&S calculation with FEM
- Improved tendon stressing calculation with FEM
- Improved slave part input in Modeler cross section
- Rigid connections can be created in series of parts on both sides
- Added JTG loading in wizards
- Plot file viewer description for German localisation available in the main menu Help/Hilfe.

3.17 RM Bridge V8i (SELECTseries 1) 08.09.75.01

- License type for “Academic” usage is supported. The output files will be water marked as “BENTLEY ACADEMIC LICENSE” with this type of license. The “Commercial” license type is working without restrictions.
- RM/3D Graphics: The constraint DOF of springs will be drawn, if element labelling has been set off (3D view dialogue). Meaning: Red-Green-Blue = Loc. X-Y-Z direction of spring.
- RM/Live Load: Train with 2 constant Q-loads and constant distance between them implemented. TCL Example of input sequence:

```
LTRAIN 200
  FMINMAX          1      1
  INFO      "2 x Q with constant length"
  EPS      1e-12 1e-12 1e-12 1e-12 1e-12 1e-12 1e-7 1e-7 1e-7 1e-7 1e-7 1e-7
  FACT      1  1  1  1  1  1  1  1  1  1  1  1
  ITEM     -50    0  20  0  0          FFIX
  ITEM      0    0   2  0  0          FFIX
  ITEM     -80    0  10  0  0          FFIX
  ITEM      0    0   0  0  0  FREELNGTH  FFIX
LTRAIN END
```

- RM/Load types: Primary results were not considered for "DEMO" of springs.
- RM/Shear Check LRFD2007 implemented
- RM/Standards: Change EHE default time function from CEB90 to EN1992
- Module “Eigen” stored incorrect results to mode-shape loadcases if calculation option “Large displacements” is selected.

3.18 RM Bridge V8i (SELECTseries 1) 08.09.74.03 - 08.09.74.05

- Improvements for TNDOT project.

3.19 RM Bridge V8i (SELECTseries 1) 08.09.74.01

- Improvement for TNDOT project.
- Select License “address” field is now available in plot files.
- Rolling stock: Company and address licensing print out corrected.

3.20 RM Bridge V8i (SELECTseries 1) 08.09.73.03

- Extensions for RM Draw Manager (TNDOT project).
- For project data issue see also 1.3

3.21 RM Bridge V8i (SELECTseries 1) 08.09.73.01

- SELECT licensing improved for checked out licenses.

3.22 RM Bridge V8i (SELECTseries 1) 08.09.72.07

- **Windows 7 operating system support added**
- Project Wise V8i(SELECTseries 1) support added
- The SELECT License configuration recognizes the also checked out licenses, when using the <AutoModule> option button in the configuration dialogue.

4 RM Bridge Wizards

A certain class of standardized bridges can be modelled with a comfortable tool.

Three design codes are available, EUROCODE, AASHTO and JTG. The basic geometrical ranges are

- 20 spans
- 20 girders (composite and precast bridges)
- Pier types abutment, drop cap, hammer head, wall, columns
- Pre-defined cross section types for deck, girders and sub-structures

The structural model and the construction schedule will be produced automatically. The user does not have to know the element and node numbering.

Presently, the following results are offered:

- Deformations for individual load cases
- Internal forces (Nx, Qy, Mz) for individual load cases
- Internal forces envelopes for typical combinations
- Longitudinal stresses in relevant stress points

You can start the new tool with the additional Desktop icon:



RMV8i(Wizard) V08.09.xx.xx

or with the above name in the start menu:

Start menu ⇒ All Programs ⇒ Bentley ⇒ RmBridge ⇒ RM Bridge V8i(SELECTseries 1) V08.09.x.x

The RM Bridge V8i standard application is started as before with the entry:



RMV8i V08.09.xx.xx

4.1 Wizard Reinforced Slab

This wizard creates a bridge calculation model and standard analysis procedures for **reinforced concrete plate bridges** (without prestressing).

- The deck cross section is a solid concrete plate with or without cantilever plates at both edges.
- The deck cross-section is constant over the whole length of the bridge.
- The plate is reinforced but has no prestressing or post-tensioning
- The bridge can have up to 20 spans.
- The bridge has “Abutments” or “Piers” at the ends and separating the different spans from each other
- Bearings and/or connection points of each Abutment or Pier are arranged along a straight line, which is basically normal to the bridge axis, but may also be skew.

4.2 Wizard Composite

This wizard creates a bridge calculation model and standard analysis procedures for **Composite Bridges** with individual steel girders and reinforced concrete deck.

Steel girders can either be standard rolled sections available on the market or welded I girders with user defined dimensions. In lateral direction, steel girders are straight and arranged parallel to each other with constant spacing. Certain girder dimensions such as web thickness, flange width and thickness and additional lamellas of the bottom flange can vary along the span length.

Cross-frames (different types) can be arranged over the piers and at selected points along the spans. Cross-frames are essentially continuous in lateral direction (not staggered).

Construction type can either be “continuous” or “non-continuous”. Type “non-continuous” means that the steel girder grid (steel girders and cross-frames) is constructed span by span without connection over the piers. The concrete slab is always continuous with the possibility of setting the stiffness of the connection between the span to a reduced value or even zero to model full single span situation.

4.3 Wizard Steel

This wizard creates a bridge calculation model and standard analysis procedures for **Steel bridges** with individual steel girders and orthotropic steel deck.

Main girder details are the same than for composite bridges (girder types, variation of dimensions and cross-frame arrangement).

The orthotropic deck definition is currently restricted to a slab with fictitious thickness simulating the actual deck with longitudinal ribs and floor beams in lateral direction.

4.4 Wizard Precast

This wizard creates a bridge calculation model and standard analysis procedures for composite bridges with individual precast concrete girders and reinforced concrete deck.

Several geometry types of precast girders are offered, with user defined dimensions. In lateral direction, all precast girders have identical cross-section, they are essentially straight and arranged parallel to each other with constant spacing.

Concrete diaphragms (rectangular cross-section) can be arranged over the piers.

Construction type can either be “non-continuous” or “staged”. Type “non-continuous” means that the precast girders remain disconnected over the piers throughout life time. “Staged” means that continuity between the girders is achieved after the construction phase by concreting a diaphragm over the piers. In construction stage, the individual girders are supported by temporary bearings. The final bearings are arranged below the cross-girders.

4.5 Wizard LandXML Axis

Axes from LandXML files can be imported into the RM/Modeler project. Note that the nature coordinate systems of the LandXML file and the existing RM/Modeler project may differ.