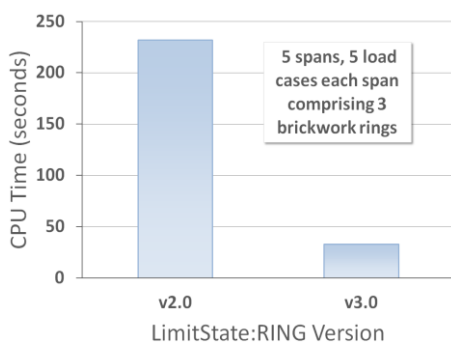
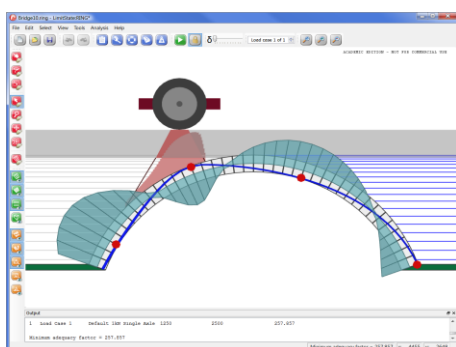


New profile options allow real-world arch shapes to be defined quickly and easily



Comparison of benchmark CPU times for LimitState:RING versions 2.0 & 3.0 (shorter is better)



View post-analysis moment, normal and shear force diagrams

## What's new in LimitState:RING 3.0?

### More flexible

- The addition of several new profile types allows users to more closely model the true shape of an arch:
  - **Segmental** - The arch profile is formed from a single segment of a circle using the crown rise and span measurements.
  - **Multi-segment** (user-defined) - The arch profile is formed from multiple segments of circles, based on user-entered intrados and/or extrados points.
  - **Interpolated** (user-defined) - The arch profile is formed from an interpolated 'best-fit' shape based on a series of user-entered intrados and/or extrados points.
  - **Three-centered** (pseudo-elliptic) - The arch profile is elliptical and is formed from segments of three circles using the crown rise and span measurements.
  - **Pointed** - The arch profile is pointed and is formed from segments of two circles using the quarterspan rise, crown rise and span measurements.

### Enhanced analysis engine

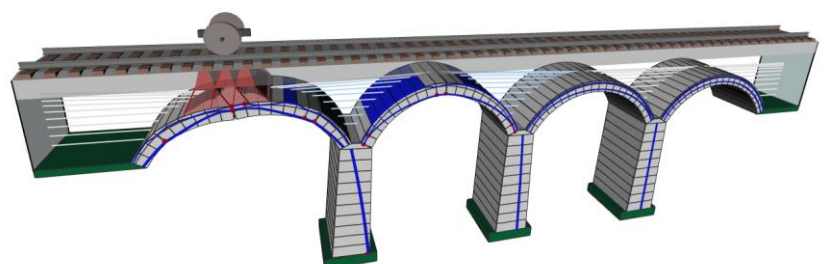
- LimitState:RING now uses the world renowned MOSEK optimization solver to obtain solutions:
  - **More robust** – the MOSEK solver is very robust, so that LimitState:RING can obtain solutions for an even wider range of problem geometries.
  - **More efficient** - the MOSEK solver is designed to solve large-scale optimization problems in a highly efficient manner, bringing significant performance benefits to LimitState:RING (see graph, left).



### More informative

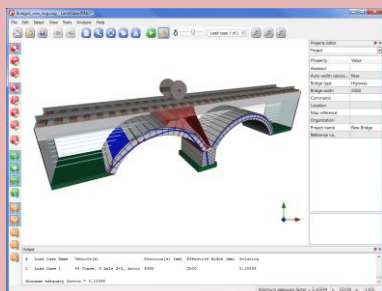
Quickly access useful and relevant information:

- Users can now gain an even better understanding of the mode of response with the ability to display moment, normal and shear force diagrams for the analysed model.
- The report output has been updated and contains new sections, additional data and an easier to read layout.
- More analysis data is provided in the output window - load case data, vehicle position, effective bridge width and solution information are now all shown by default.



## Visual improvements

- The user interface is modern and incorporates colour-coded buttons to promote quick, effortless modelling.

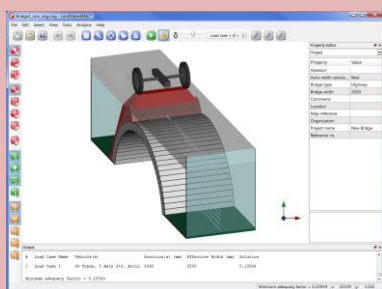


The LimitState:RING 3.0 user interface has a modern style

- The renderer engine has been enhanced to provide a crisper model view.

## Effective width calculations

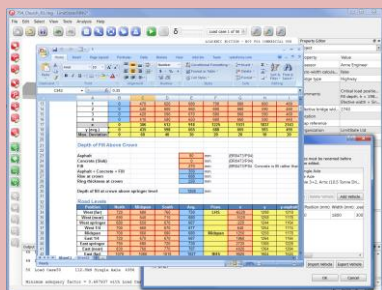
- The auto-computed effective width can now be overridden with a user-defined 'maximum bridge width'.



Set a maximum effective bridge width

## Cut and paste

- LimitState:RING 3.0 adds the ability to cut and paste span profile and surface fill level data to and from external applications.



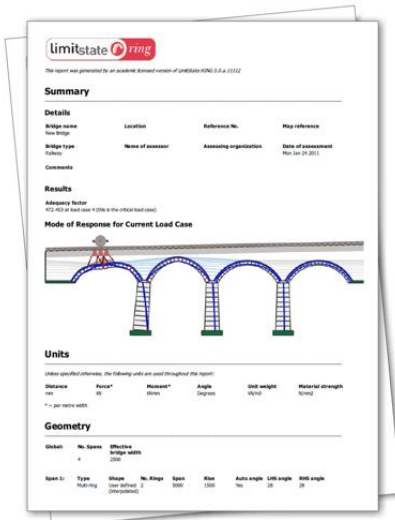
Cut and paste between LimitState:RING and external applications

## Model reinforcement

- Reinforcement can be included in LimitState:RING 3.0 bridge models.
- A new selection tool can be used to quickly add reinforcement to any arch ring.
- Top and/or bottom reinforcement can be included at any cross-section.

## Improved report output

- New sections and additional project data adds value.
- Updated styling promotes readability.



The scope of the report output in LimitState:RING 3.0 has been broadened and readability improved

## Streamlined documentation

All supporting document documentation has been merged into a single comprehensive User Manual, which is available to view through the built-in help system in the software or separately in pdf form.

Existing sections have been expanded and / or updated to make the document more informative.

## Fully supported

Whether you are in need of technical advice or assistance with your model, our support team are on hand to offer expert advice on all aspects of the software.

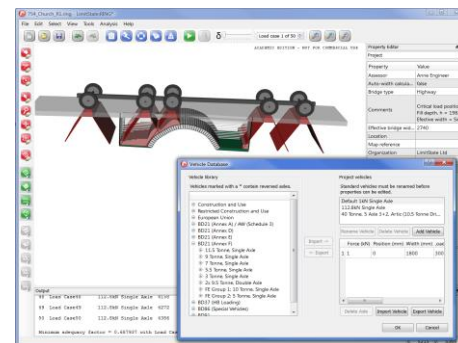
## Try LimitState:RING 3.0 for yourself

Visit [www.limitstate.com/download](http://www.limitstate.com/download) to obtain your copy of the latest version of LimitState:RING then try it free for 30 days.

## Enhanced load management

In LimitState:RING 3.0 improvements have been made to the way in which load cases are added and deleted and the process of applying dynamic load factors to axles has been simplified.

The vehicle library is also more comprehensive than before, with the addition of many new standard rail and road load vehicles.



LimitState:RING 3.0 includes an even wider range of loading vehicles

## Many more changes

In addition to those listed, many other changes and enhancements have been made, such as:

- The size of symbols in the user interface has been increased to aid readability.
- The process of editing the bridge geometry has been made more robust.
- For multiple load case problems all solutions are shown, even following a case where the iteration limit has been exceeded.
- It is now possible to add more than 99 load cases at a time.
- Both load case name and load case number are now shown in the output.