MCBEND® Radiation Shielding and Dosimetry Software

MCBEND® is a powerful Monte Carlo software tool for general radiation transport analysis for shielding and dosimetry analysis.

The Software

MCBEND® is a general purpose radiation transport code that can calculate neutron, gamma-ray and charged particle transport in sub-critical systems; coupling of the different radiation types is also possible.

MCBEND® models the transport of individual particles accurately by using a continuous energy representation of nuclear data. A powerful and flexible geometry modelling package allows exact representation of any geometry and includes the ability to import geometry from CAD files in the form of tetrahedral or polygon surface mesh from IGES format files.

In addition MCBEND® provides a range of advanced stochastic geometry features. In effect the code simulates what happens in practice, and performs a numerical experiment of the system under study. This is known as the Monte Carlo Method.

In addition to its powerful geometry modelling package, MCBEND® has versatile source description options including a gamma-ray source library of over 1800 actinides, fission and activation products with options to decay source inventories. Powerful automatic acceleration options are available for maximum productivity.

Nuclear data libraries at temperatures from 200K are available for MCBEND® from a variety of sources including UKNDL, JEFF, ENDF/B-VI and JENDL. MCBEND® is validated for an extensive range of applications.

The validation database covers many of the materials and geometries that are encountered in the nuclear industry and is subject to ongoing review and enhancement.

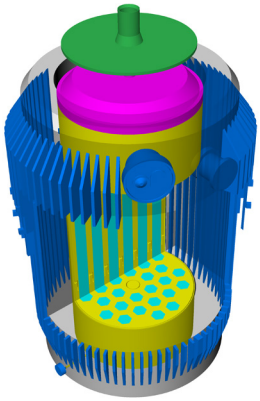
Support in the use of the code and its application is available from our dedicated help-desk, providing direct access to our shielding and dosimetry expertise.

Strong Customer Focus

ANSWERS® has a strong global customer base, with clients in more than 30 countries around the world, including the USA, China, Japan and across Europe.

Interaction with our customers, understanding their requirements and listening to their feedback, is an important part of our mission to continuously develop and improve our software.

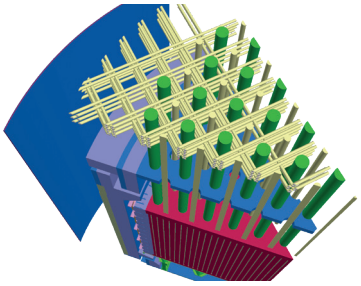
Customers have access to dedicated hotline support, by telephone and e-mail, and also have access to regular training courses, with bespoke/on-site training available.



3D ray trace view of a spent fuel transport cask.

Benefits

- MCBEND® offers unrivalled geometry modelling and acceleration options for cost effective and accurate analysis.
- MCBEND® is recognised as an effective and reliable analysis tool in safety case submissions to regulators.
- MCBEND® is continually maintained and developed to meet our customers' operational needs.



3D ray trace display of a reactor with upper concrete removed.

Model Verification Code

Visual Workshop is a tool for the MCBEND® analyst to display and verify model geometry, create and modify input data, run calculations and view results.

The ray trace views are generated using the same routines that simulate the particles giving the assessor a high degree of confidence the model visualised is the one simulated. This is an important quality and verification feature.

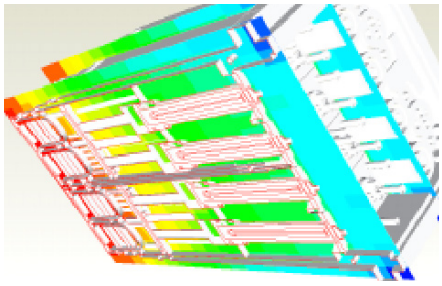
The 2D and 3D ray trace displays are interactive and ray traced in real time allowing the analyst to easily navigate the model. The display can automatically detect and indicate errors in the model such as undefined or multiply defined volumes. Moving the mouse pointer over the model provides feedback on model co-ordinates and creation of measurement lines enables production of images with dimensions for inclusion in reports.

Additional MCBEND® features can be displayed using overlays; these include Source bodies, Importance mesh, Scoring mesh, Forced Flight interfaces and particle tracks.

Visual Workshop provides a run monitor for running calculations, optimisation and goal seeking tools and features to support distributed and shared memory parallel calculations on workstations and HPCs.

Looping calculations can be run in parallel on multi-core machines. Output files can be viewed and graphs and plots of results generated.

The 3D wire view shows the geometry bodies used to construct the model. The 3D ray and wires views support meshed results display in the form cell, contour and iso-surface plot.



Visual Workshop Cell plot of gamma flux penetrating a shield with pipework. Model imported from CAD.

Export Control Rating: Not Controlled - No Licence Required

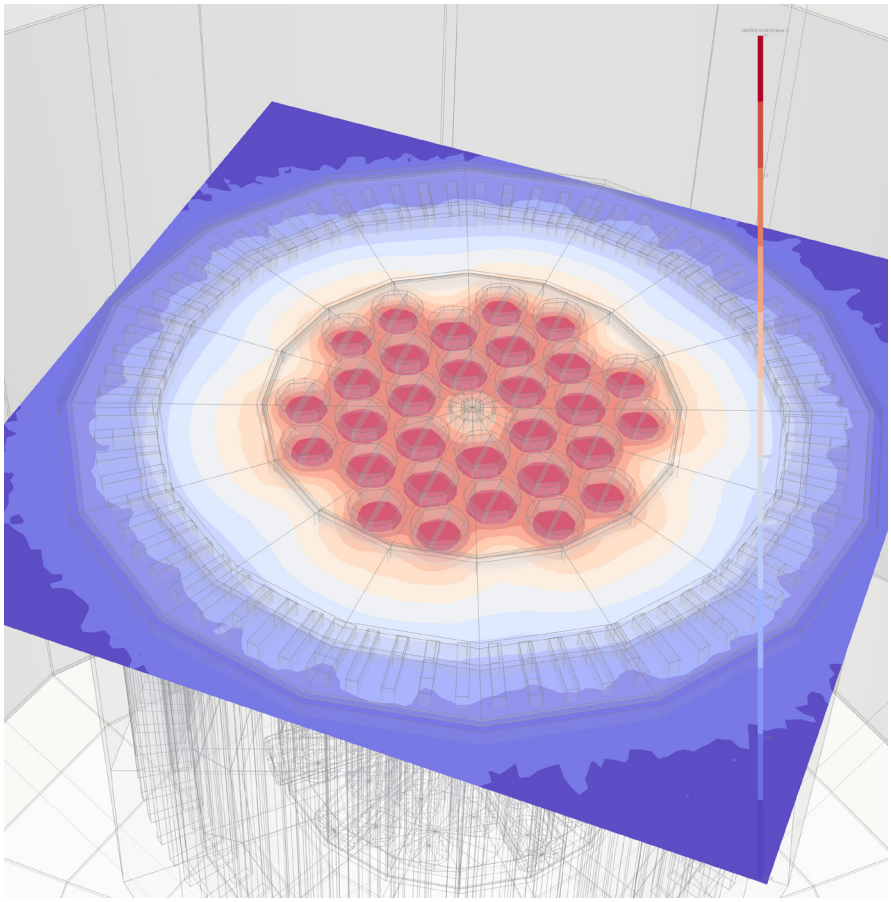
www.amentum.com | © Copyright 2024, Amentum. All Rights Reserved.

MCBEND® Radiation Shielding and Dosimetry Software

MCBEND® Applications

MCBEND® has been successfully applied to such problems as:

- Shield design and optimisation for reactor plant.
- Interpretation and analysis of measurements on operating plant and in experimental facilities.
- New and spent fuel transportation both within countries and between countries.
- Neutron damage to reactor pressure vessels and other reactor components.
- Design studies for fissile material transport containers.
- Decommissioning preparation and planning.
- Shield design for waste storage facilities.
- Reprocessing facilities.
- Fusion devices.
- Fuel storage facilities support.
- Prediction and calibration of nuclear instruments.
- Geophysical logging tool analysis and operations support.
- Prediction of personnel dose levels.
- Calculation of radiation-induced material changes.
- Shield design for irradiation plant.
- Sterilisation of products by irradiation.
- Medical physics treatment planning.



Visual Workshop wire view contour plot of neutron dose.

Contact

If you would like more information about Amentum's ANSWERS® Software Service, please contact:

e: answers@global.amentum.com
w: www.answerssoftwareservice.com

Export Control Rating: Not Controlled - No Licence Required

www.amentum.com | © Copyright 2024, Amentum. All Rights Reserved.