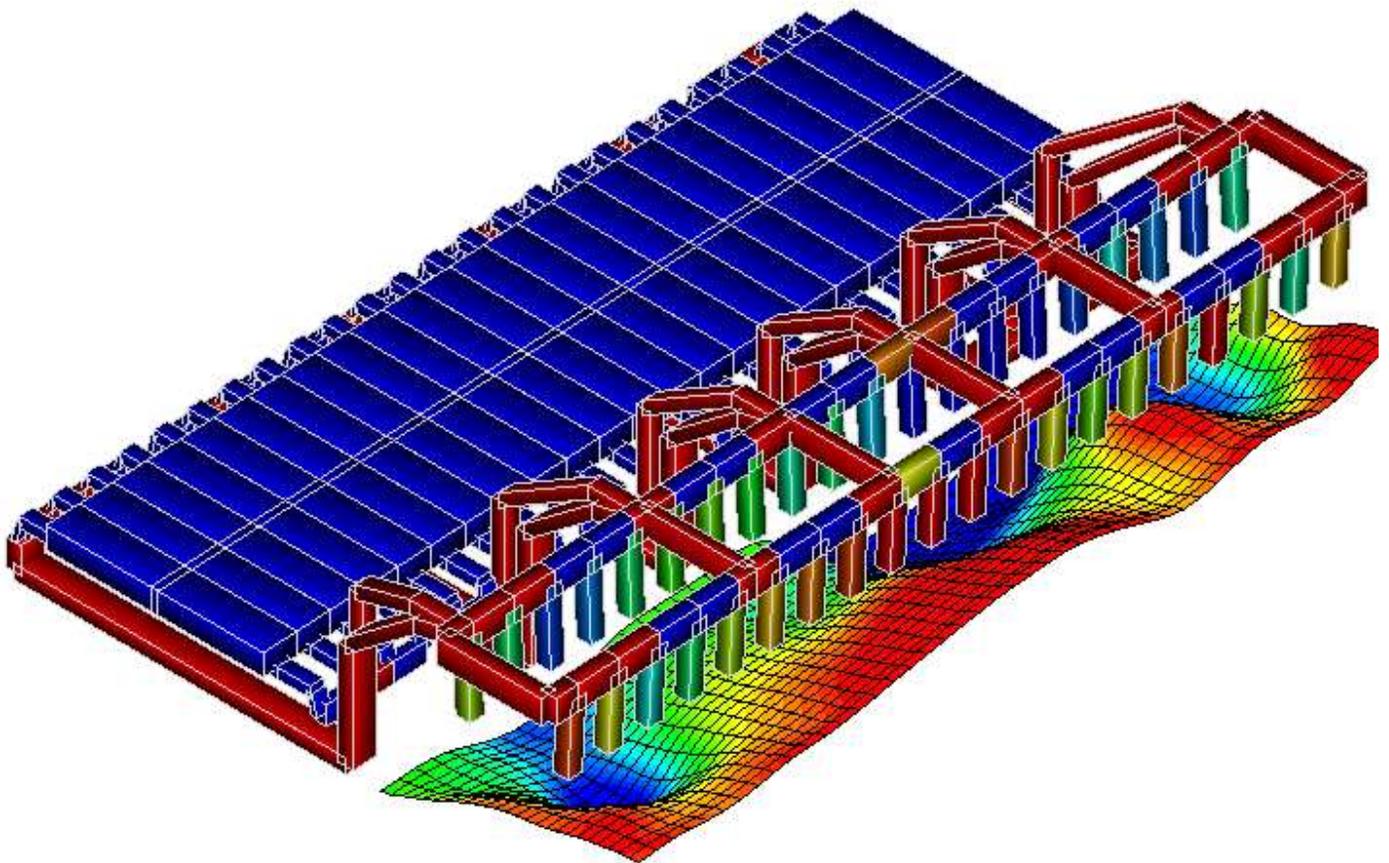


MHD-VALDIS

Magneto-Hydro-Dynamic

Versatile

ALuminium pad Displacement
Instability Solver



the
UNIVERSITY
of
GREENWICH

GENISIM

MHD-VALDIS 2021

Highlights list

- User oriented package to design MHD stable aluminium reduction cells
- Allows interactively to construct busbar network for optimum (magnetic and thermal) electric current distribution and add steel construction elements
- Allows the metal pad bottom surface shape to be defined as an input
- The model couples the electromagnetic field distribution and the waves at aluminum-bath interface; both, electric and magnetic fields are recalculated continuously as the wave shape changes
- The electric current distribution in the busbars is calculated by coupling the electric current in the fluid zone to the complete resistance network representing individual anodes and cathode collector bars as well as the whole bus-bar circuit between the cells
- The non-linear calculation of the magnetic field from steel is done for the average steady state current distribution in order to save computation time
- The model calculates turbulent flows in the two liquid layers and their effects on the non-linear waves; the flow turbulent energy distribution identifies mixing rates and the ledge/lining risk zones
- The fluid flow and wave model is transient and effectively three-dimensional, using for the metal and bath flow the shallow-layer approximation.
- An alumina dissolution module is available as an option, that module use the MHD bath flow to compute alumina particles motion plus a dissolution law to convert those alumina particles in dissolved alumina.

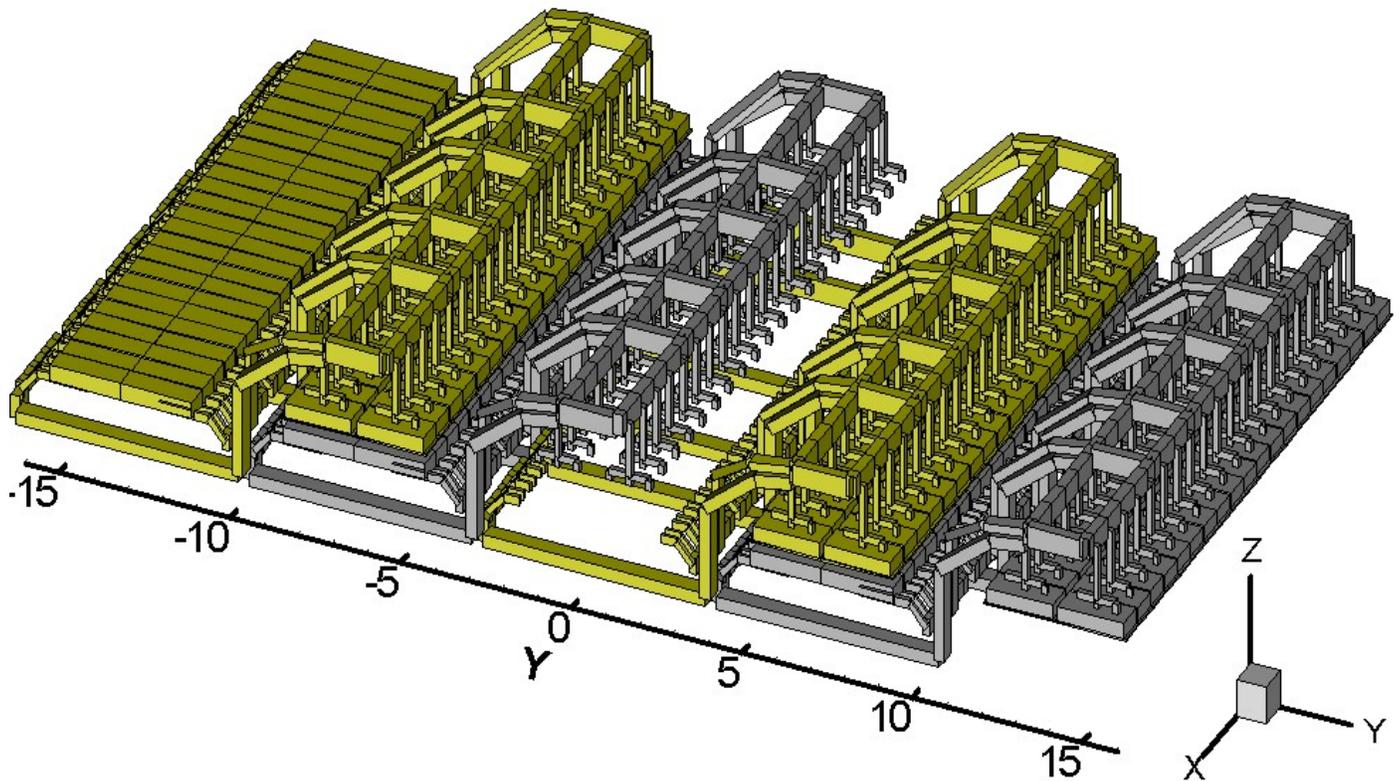
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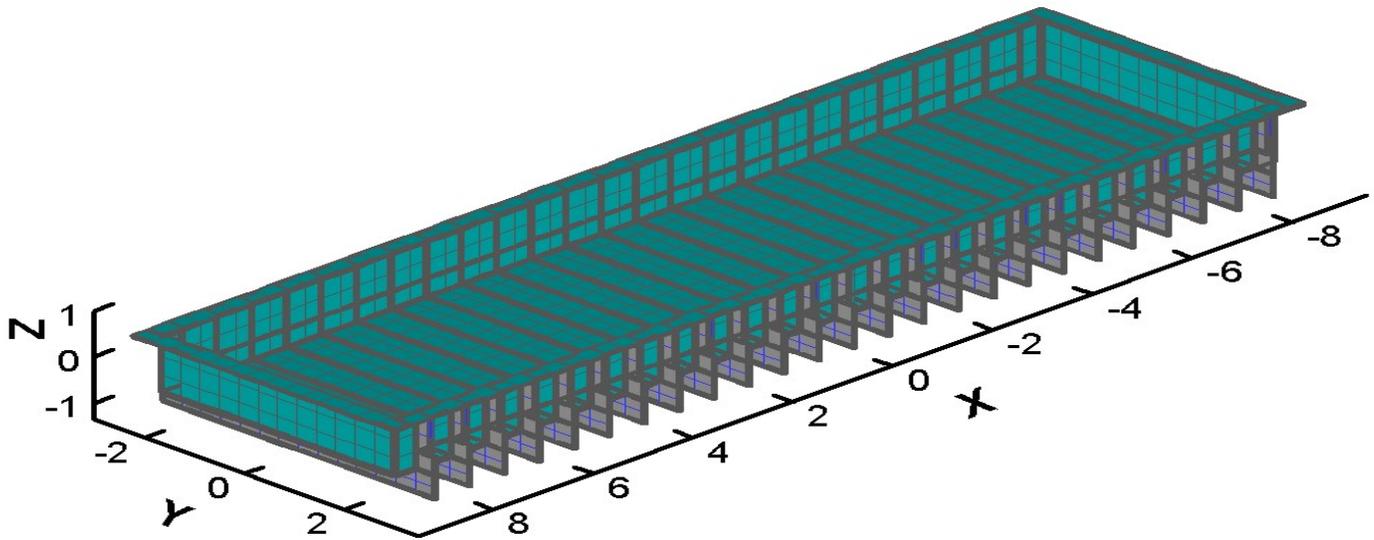
MHD-VALDIS 2021

Price list

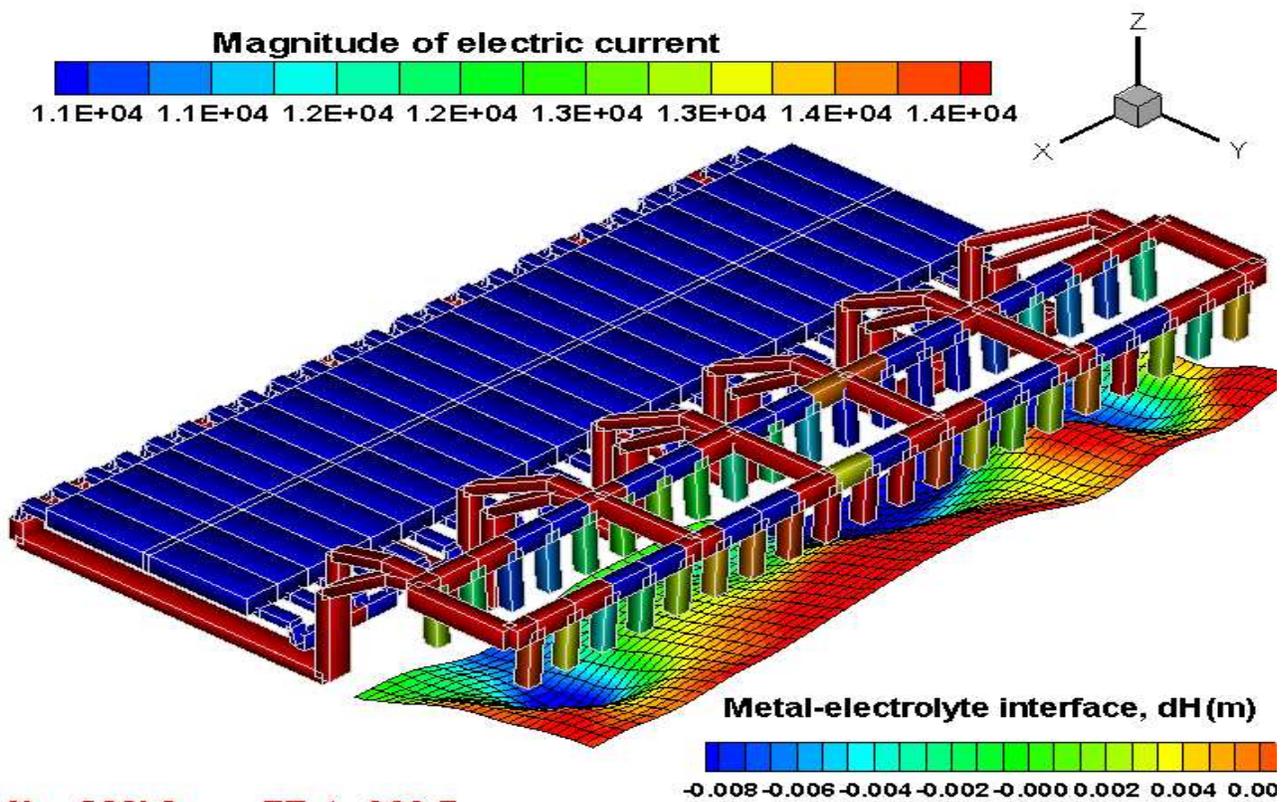
1. Company wide unlimited number of users, unlimited number of sites permanent license of MHD/Valdis 2021 executable with 3 months support: \$36,000 US with alumina dissolution module \$32,000 US without alumina dissolution module.
2. Annual support including hot line support (one contact person) and code release updates: \$9,000 US with alumina dissolution module \$8,000 US without alumina dissolution module
3. The MHD/Valdis runs under Windows, outputs are ready for postprocessing using the graphical tool Tecplot (version 9 or later); the Licensee must acquire a Tecplot license from Tecplot, Inc. (<http://www.tecplot.com>) independently of the MHD/Valdis license.



Example of busbars geometry construction (6 risers, side by side cells)



Example of cathode shell geometry construction



New500kA FE t= 999.7s

Example of bath-metal interface correlation to electric currents

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