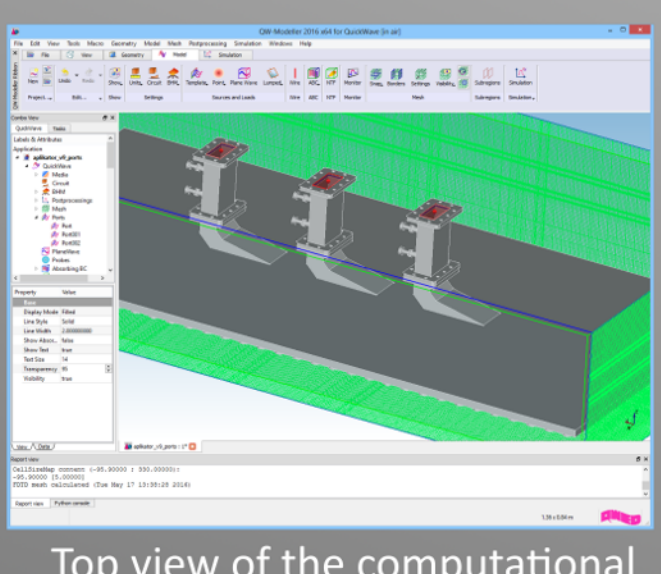
Instytut Badawczy Dróg i Mostów

QWED

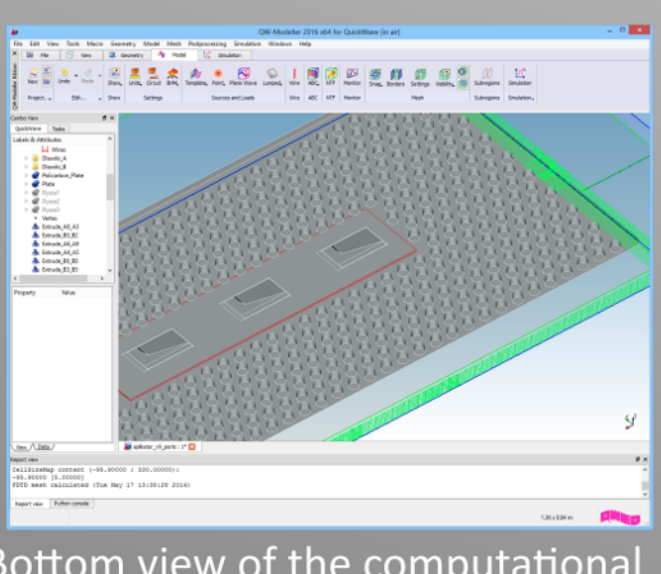
An Applicator for Microwave-Assisted Bituminous Surface Thermal Bonding

This work presents an alternative approach to eliminating longitudinal cracks occurring in bituminous surfaces, inherent to standard road processing cycles. The disadvantages of typical bonding process performed with the aid of gas-jet are mitigated by adopting microwave processing in the near vicinity of the technological gap. For that purpose an applicator for microwave-assisted bituminous surfaces thermal bonding is designed.

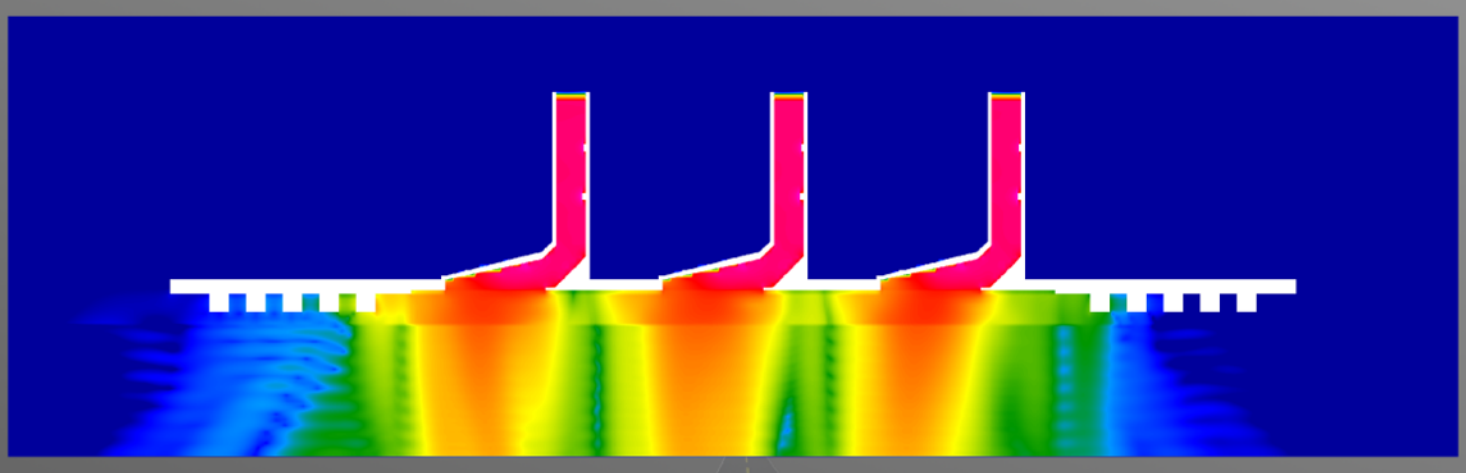
The applicator is equipped with a three waveguide nozzles and a hexagonal lattice of cylindrical metallic chokes preventing microwave leakage. The design is performed with the aid of electromagnetic simulations, based on a finite-difference time domain method implemented in commercial QuickWave software for electromagnetic design and simulations. The device is equipped with a set of radiation sensors cooperating with a remote control system that will turn off the microwave sources in case the safety limits for non-ionizing EM radiation are not satisfied.



Top view of the computational scenario of the applicator (view in QW-Modeller).



Bottom view of the computational scenario of the applicator (view in QW-Modeller).



Averaged power density (W/mm2) distribution at the cross-section of the applicator with cylindrical chokes.

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