Contribution ID: **1094** Type: **Poster Presentation**

Numerical Modeling of Two-Phase Flow in the Porous Pavement Drainage Structure

Thursday, 25 May 2023 15:30 (1h 30m)

A numerical model is developed to simulate the drainage process of porous pavements. The aim of this work is to gain a deeper understanding of the underlying processes and the relevant influencing parameters.
Porous pavements, such as porous asphalt (PA), are characterised by their high void content and are increasingly used in Germany and many other countries on highly congested roads outside urban areas due to their ability to reduce and absorb traffic noise. PA can achieve almost complete infiltration of all rainfall, with the water draining along the underlying dense layer. As a result, it increases road safety significantly (prevention of aquaplaning, splash and spray and glare by reflecting light), reduces and delays peak runoff during heavy rainfall events, and additionally traps pollutants to a certain extent.
The model is developed in the open-source simulation environment DuMuX and validated with measurement data and a simpler numerical model for the coupled drainage behaviour of porous asphalt available in the literature.
A parameter study with the model investigates the influence of road parameters (e.g. transverse/longitudinal slope, roadway width, as well as porosity and its decrease in the life cycle of the roadway due to clogging) on the drainage process. Additionally, reduction or delay of peak runoff with the help of PA compared to conventional wearing courses is analysed.

Participation

In-Person

References

MDPI Energies Student Poster Award

Yes, I would like to submit this presentation into the student poster award.

Country

Germany

Acceptance of the Terms & Conditions

Click here to agree

Energy Transition Focused Abstracts

Primary author: JOHANSSON, Barbara (University of Stuttgart - Institute for Road and Transport Science)

Co-authors: HELMIG, Rainer (University of Stuttgart); Prof. RESSEL, Wolfram (University of Stuttgart - Institute for Road and Transport Science)

Presenter: JOHANSSON, Barbara (University of Stuttgart - Institute for Road and Transport Science)

Session Classification: Poster

Track Classification: (MS06-A) Physics of multiphase flow in diverse porous media