

Sump simulations

150 1363 AP 1.4

Greg Cartland Glover

March 2011

Gefördert durch:

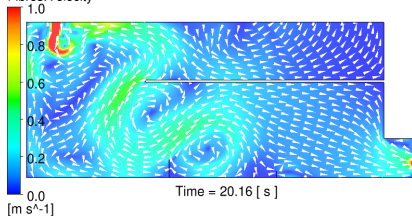


HZDR

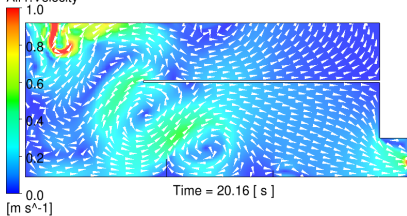
 **HELMHOLTZ**
ZENTRUM DRESDEN
ROSSENDORF

Contours for jet at 1.5 m s^{-1} and 20 s

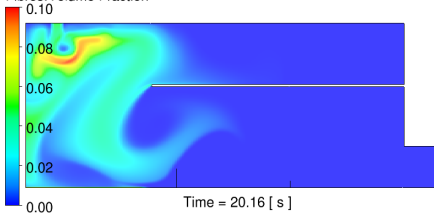
Fibres.Velocity



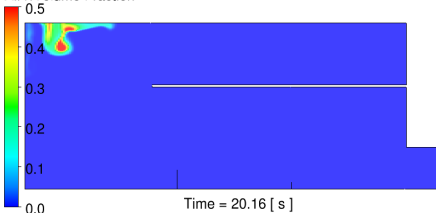
Air1.Velocity



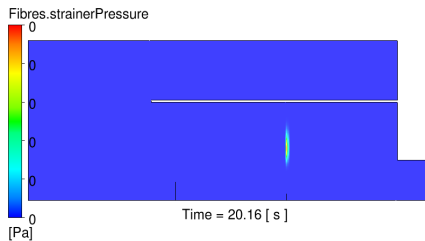
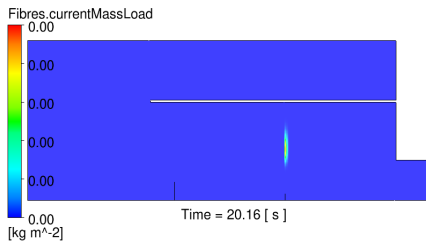
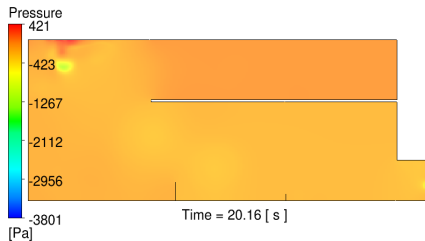
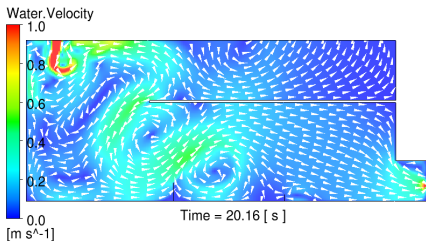
Fibres.Volume Fraction



Air1.Volume Fraction

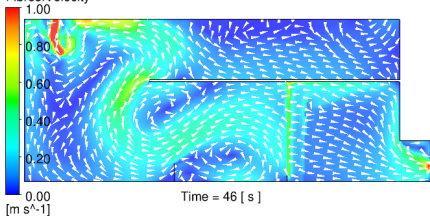


Contours for jet at 1.5 m s^{-1} and 20 s

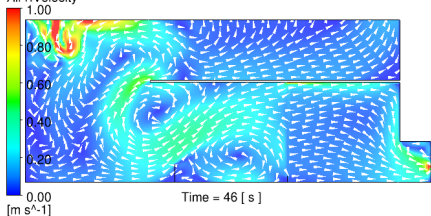


Contours for jet at 1.5 m s^{-1} and 46 s

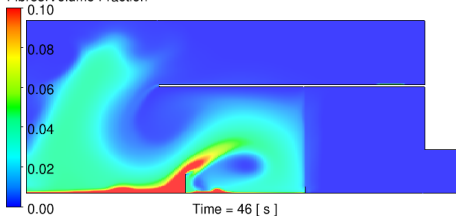
Fibres.Velocity



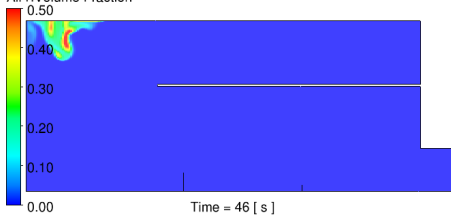
Air1.Velocity



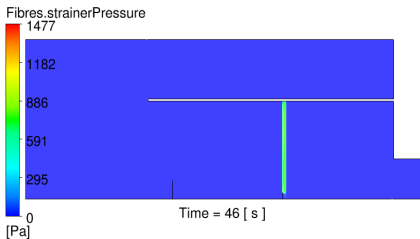
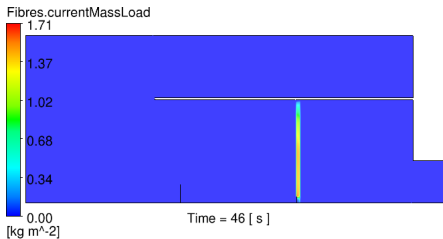
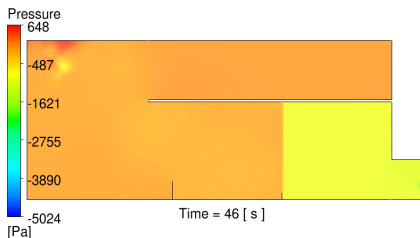
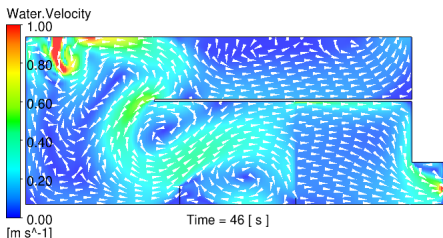
Fibres.Volume Fraction



Air1.Volume Fraction

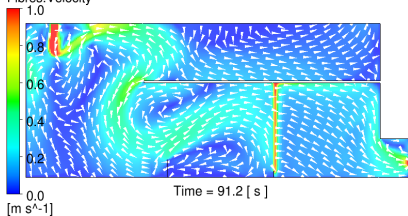


Contours for jet at 1.5 m s^{-1} and 46 s

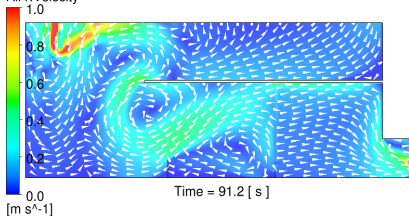


Contours for jet at 1.5 m s^{-1} and 91 s

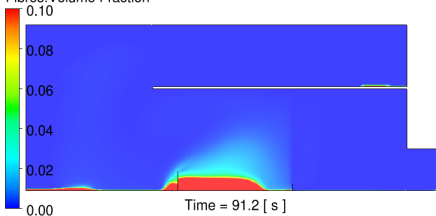
Fibres.Velocity



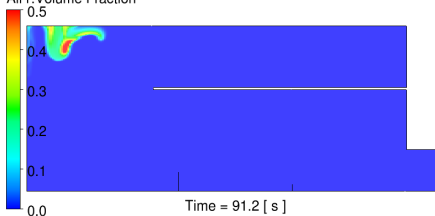
Air1.Velocity



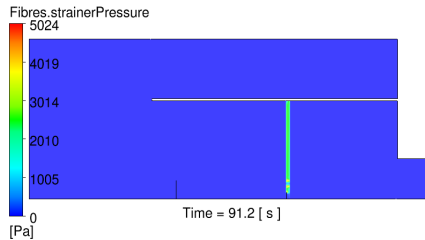
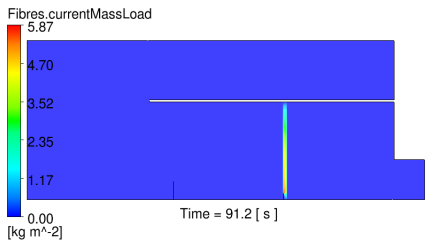
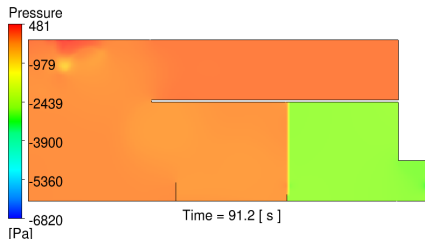
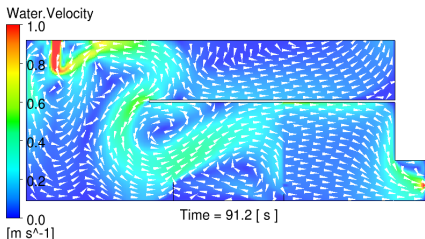
Fibres.Volume Fraction



Air1.Volume Fraction

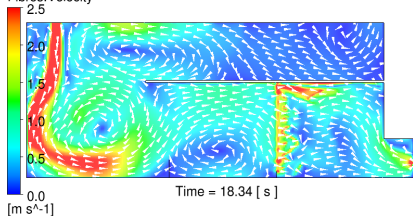


Contours for jet at 1.5 m s^{-1} and 91 s

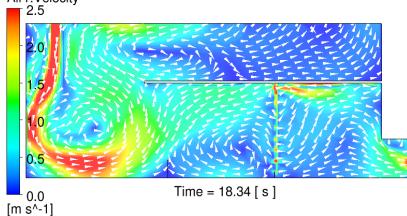


Contours for jet at 5 m s^{-1} and 18 s

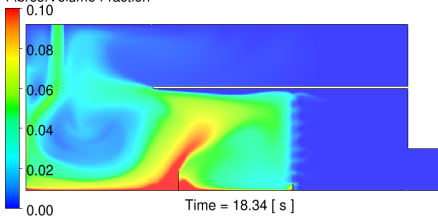
Fibres.Velocity



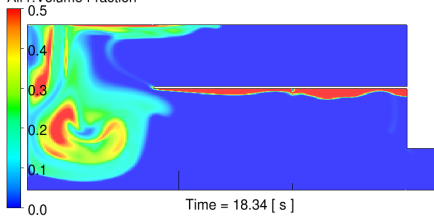
Air1.Velocity



Fibres.Volume Fraction

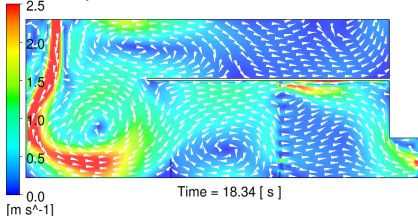


Air1.Volume Fraction

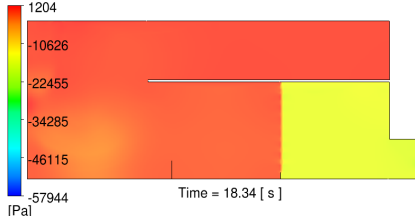


Contours for jet at 5 m s^{-1} and 18 s

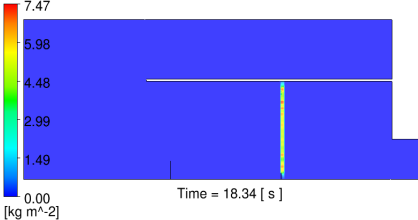
Water.Velocity



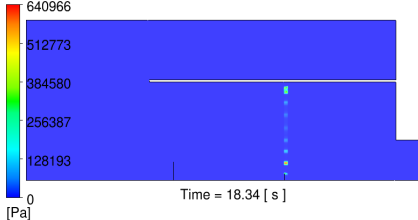
Pressure



Fibres.currentMassLoad



Fibres.strainerPressure



Conclusions

- Two-dimensional examples of a sump with internal structures has been modelled
- Cases considered are at very high velocities
- Fibre agglomerates accumulate at the strainers resulting in a small increase of the pressure drop
- At higher velocities air penetrates the strainers

Acknowledgments

- Project partners:
 - + Institut für Prozeßtechnik, Prozeßautomatisierung und Meßtechnik
Hochschule Zittau/Görlitz
S. Alt, T. Gocht, W. Kästner, A. Kratzsch, S. Renger, A. Seeliger
and F. Zacharias
 - + Institut für Sicherheitsforschung
Helmholtz-Zentrum Dresden-Rossendorf
A. Grahn, W. Hoffmann, E. Krepper, H. Kryk, and M. Wiezorek
- German Federal Ministry of Economy and Labor Contracts No.
1501270, 1501307, 1501360 and 1501363
- This project is not part of the oversight process and does not intend to
deliver safety guidelines