



Investigation of **DE**bris-flow impact **F**orces on bridge **SUP**erstructures (**DEFSUP**) – laboratory experiments on the influence of bridge profiles

Caroline Friedl¹, Christian Scheidl¹, Susanna Wernhart¹ and
Dirk Proske²

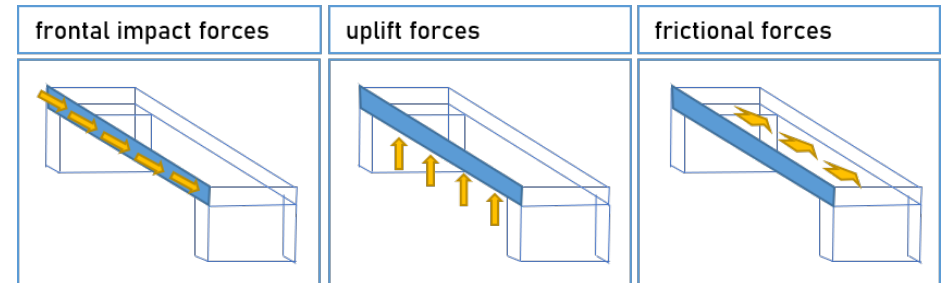
¹Institute of Mountain Risk Engineering, University of Natural Resources and Life Sciences, Vienna, Austria

²School of Architecture, Wood and Civil Engineering, Bern University of Applied Sciences, Burgdorf, Switzerland



Experimental analysis of debris-flow impact forces on bridge superstructures

- What forces do occur? →



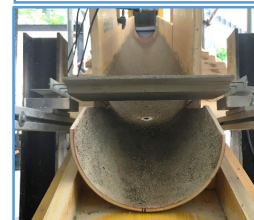
- Influence of profiles? →

bridge profile examples

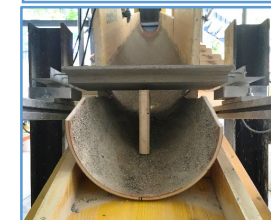


- Influence of pier? →

without pier



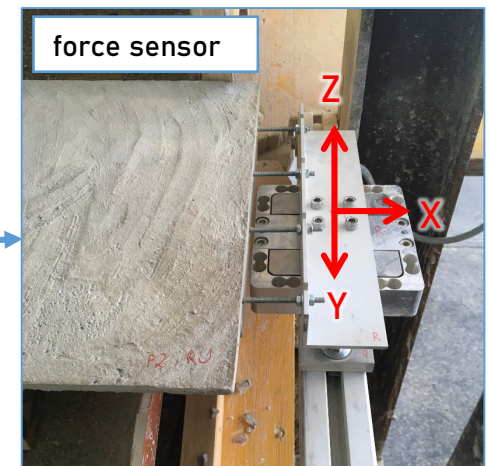
with pier





Setup

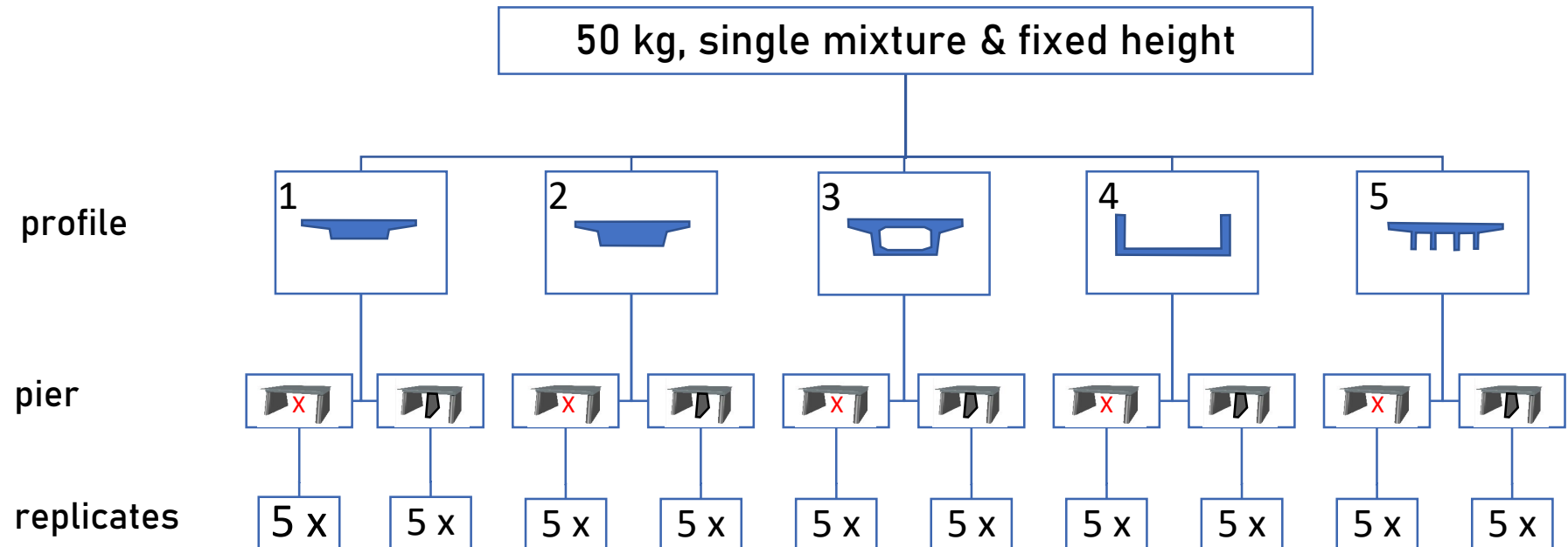
- $\lambda = 1:30$
- $L = 4 \text{ m}$
- $\alpha = 20^\circ$
- $\emptyset = 0.3 \text{ m}$, semicircular
- Sensors:
 - 2 x 3 - axis force sensors
 - 3 x laser: h and v
 - (3 x pore water pressure)
 - (1 x normal stress)





Experiments

n = 50





First results



P4

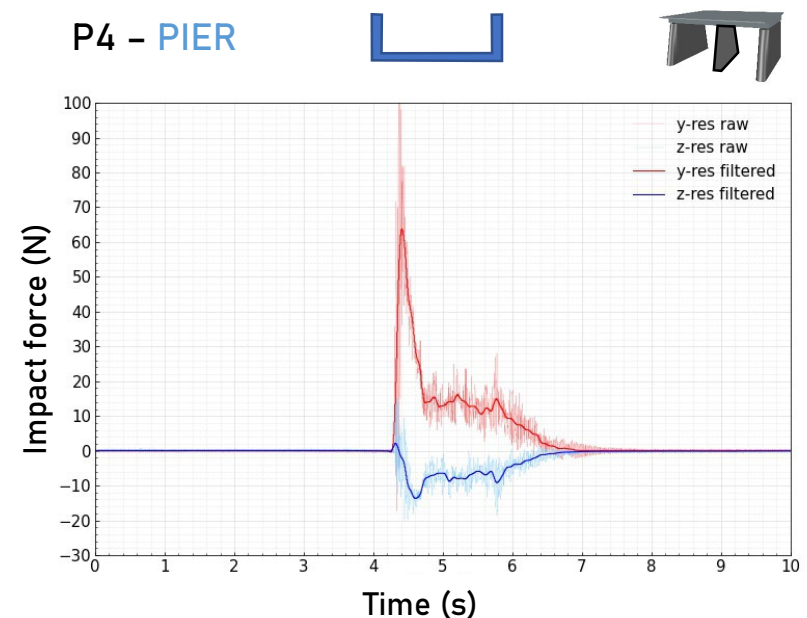
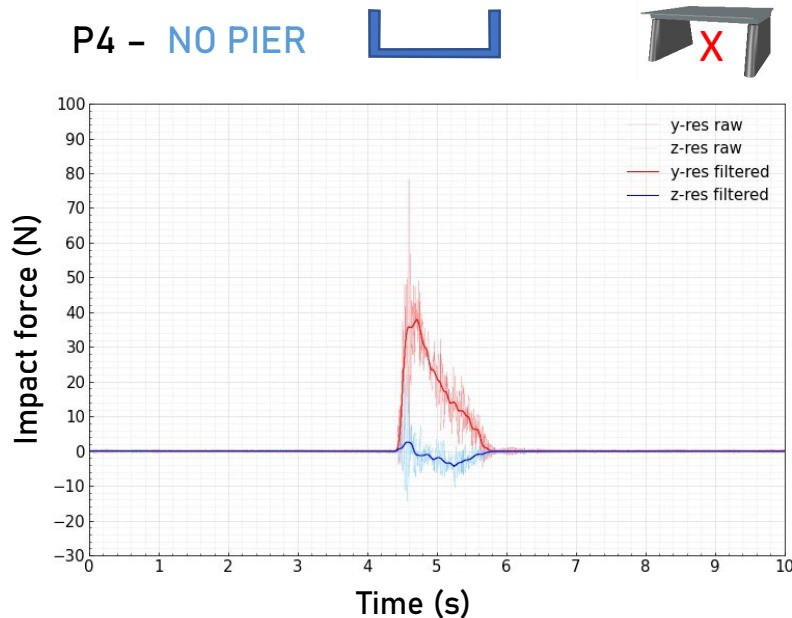


NO PIER





First results – resulting impact force over time

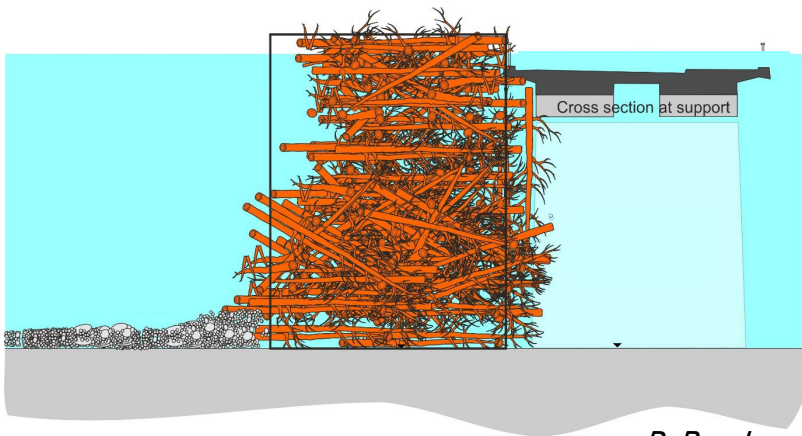


- The pier influences the magnitude of the impact forces
– but is the influence the same for all profiles?

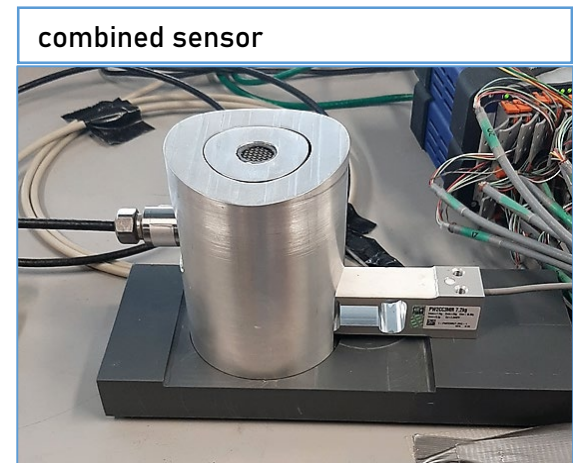


Outlook

- Finish experiments
 ➔ analyze data and assess influence of pier and profiles
- Log jam and debris-flow interaction
- Combined sensor - debris-flow compression under bridges



D. Proske





Thank you!