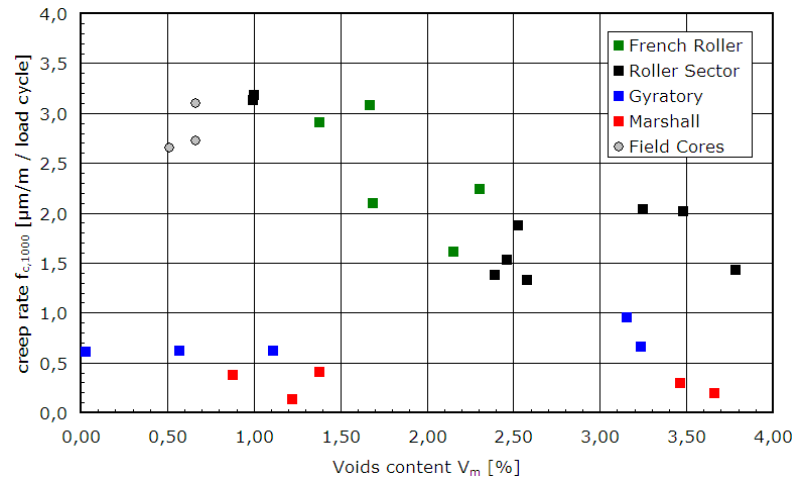
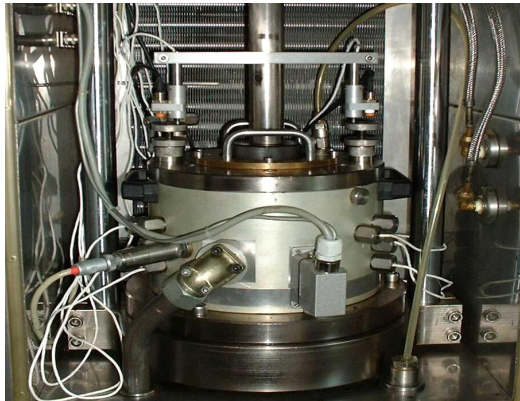




Impact of internal aggregate structure on deformation resistance: Triaxial compression tests (EN 12697-25)



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Dr.-Ing.



ISBS-contribution in TG2

Contents

- Compaction methods
- Comparative performance testing by Cyclic Compression Test (EN 12697-25)
 - Equipment
 - Test conditions
 - Target parameters
- Results
- Conclusions



Compaction methods

devices of ISBS

Roller Compactors



LVPC

Gyratory

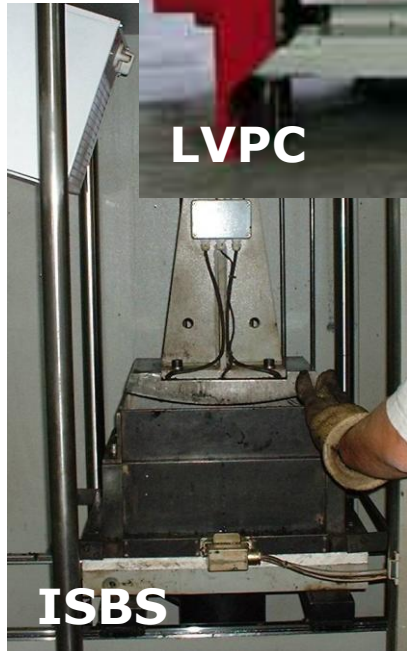


ISBS

Marshall



ISBS



ISBS

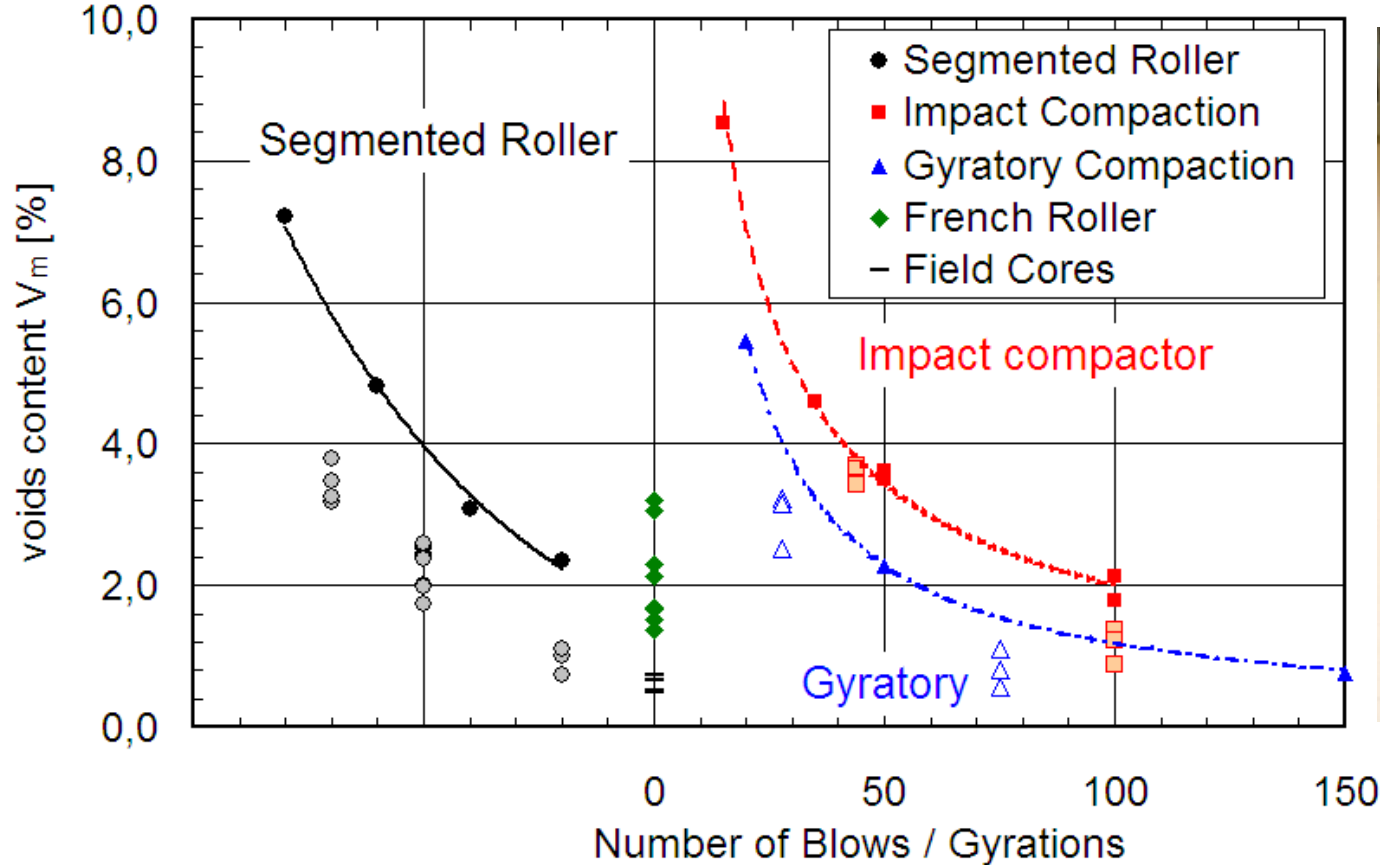


Compaction methods

Compaction results: voids content

Number of passes in segmented roller compactor

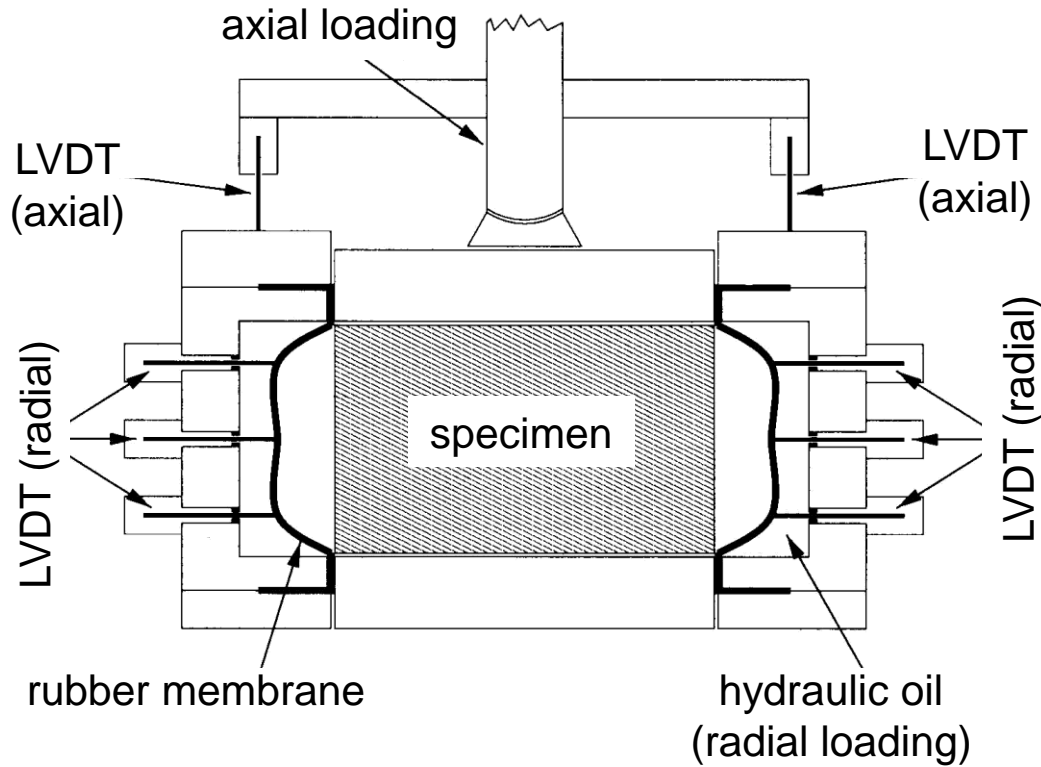
0 10 20





Comparative performance test

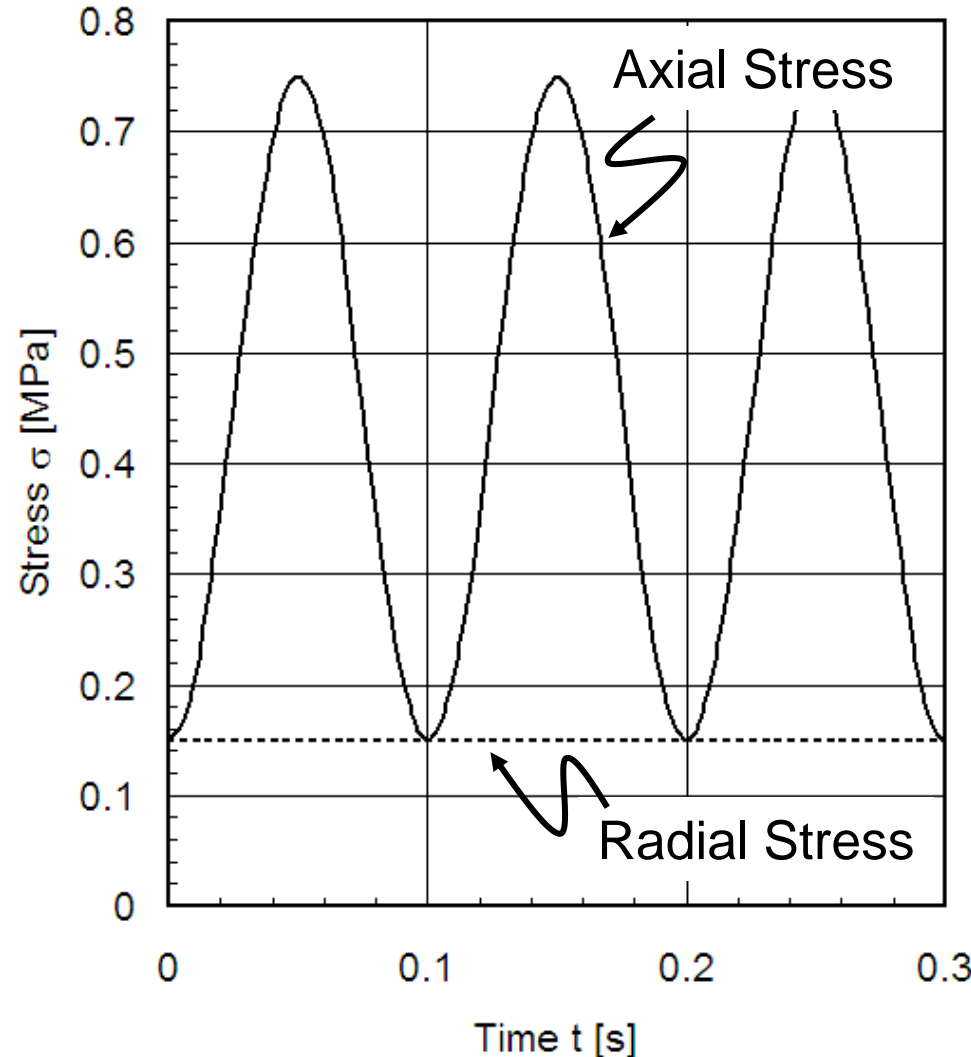
Cyclic Compression Test (EN 12697-25)



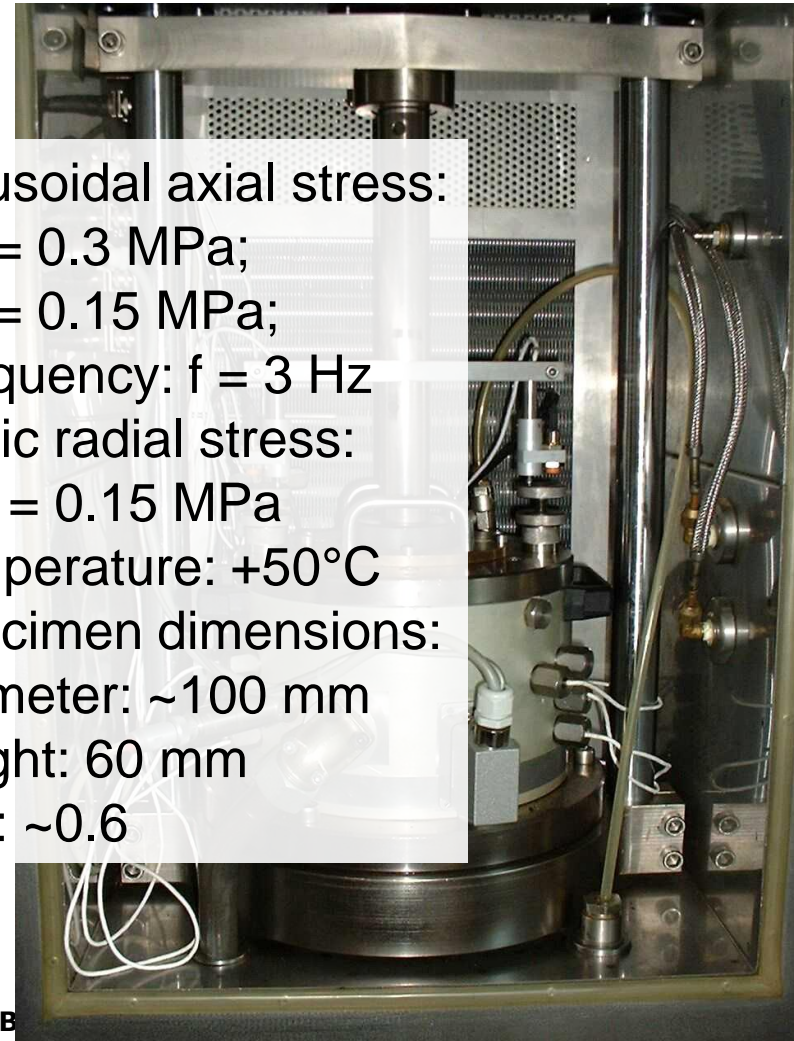


Comparative performance test

Cyclic Compression Test (EN 12697-25)



- sinusoidal axial stress:
 $\sigma_a = 0.3$ MPa;
 $\sigma_b = 0.15$ MPa;
frequency: $f = 3$ Hz
- static radial stress:
 $\sigma_{rad} = 0.15$ MPa
- temperature: $+50^\circ\text{C}$
- specimen dimensions:
diameter: ~ 100 mm
height: 60 mm
 $d/H: \sim 0.6$

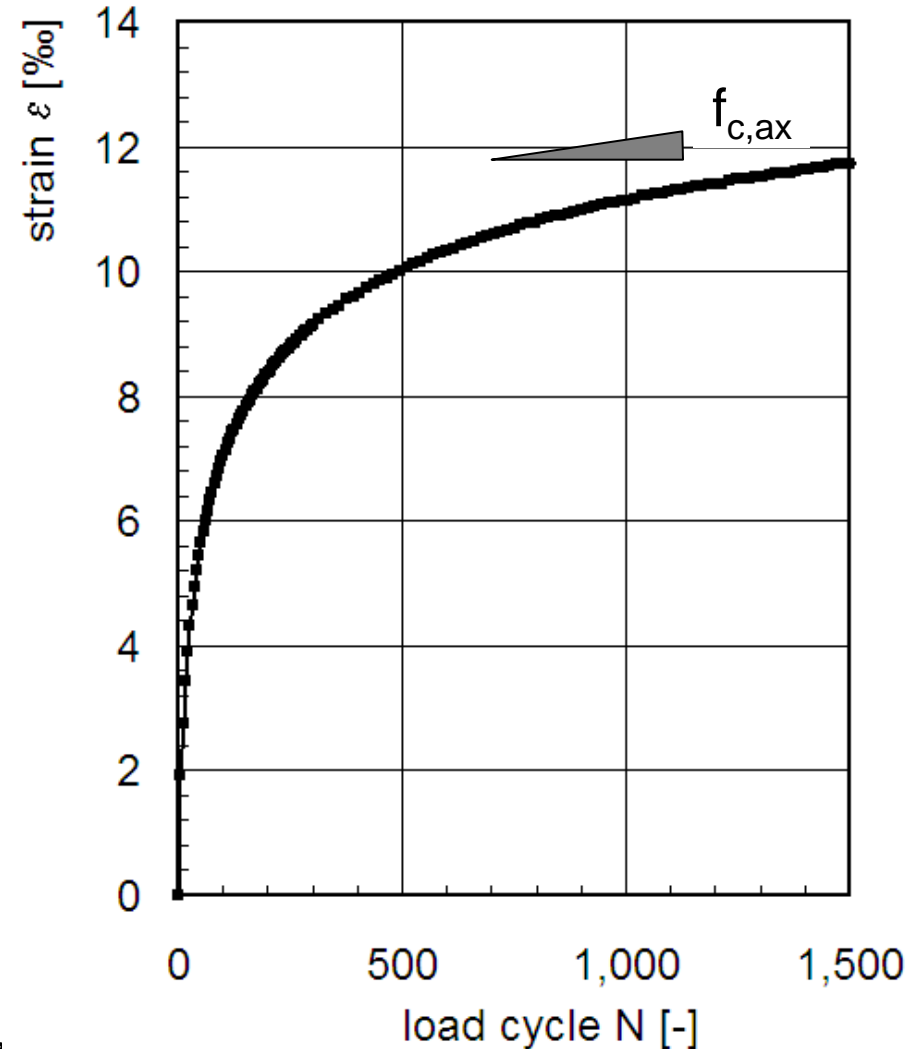




Triaxial Cyclic Compression Test

Parameters

- Course of cumulated axial strain $\varepsilon_{ax}(N)$:
creep rate
 $f_{c,ax}(N=1,000)$

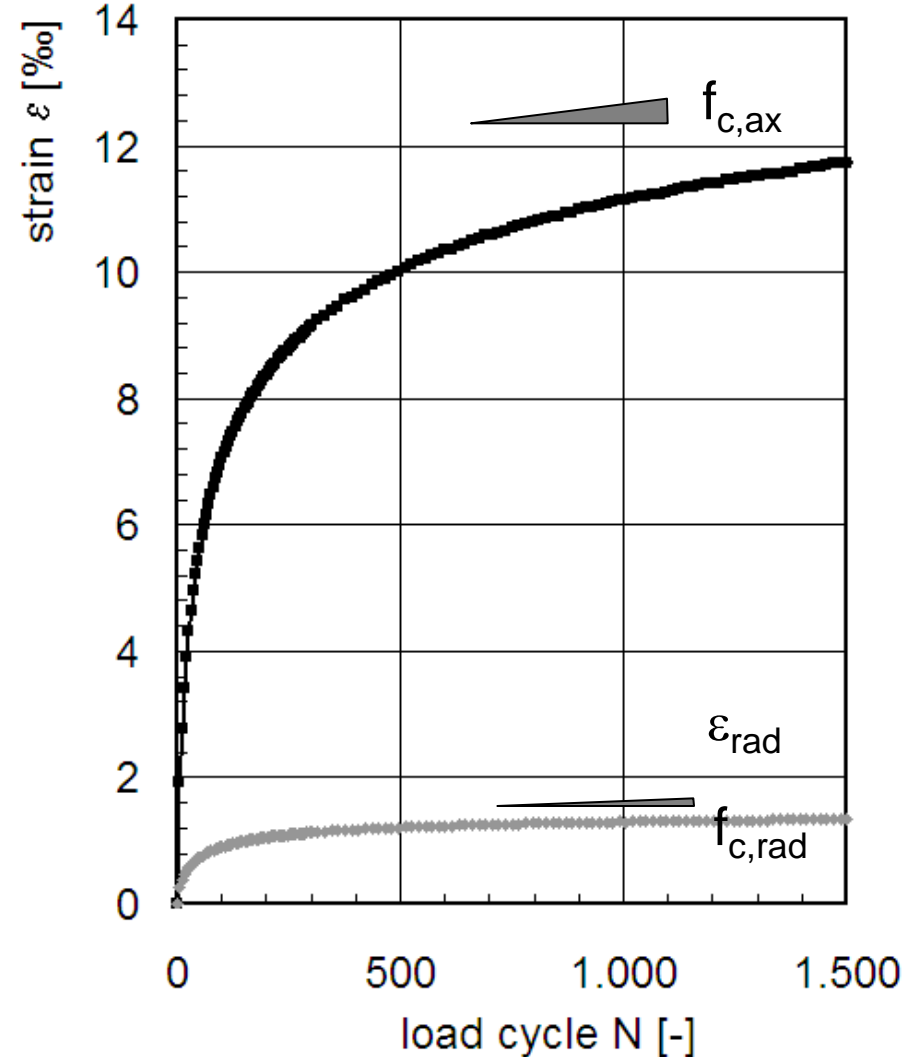




Triaxial Cyclic Compression Test

Parameters

- Course of cumulated axial strain $\varepsilon_{ax}(N)$
creep rate
 $f_{c,ax}(N=1,000)$
- Course of cumulated radial strain $\varepsilon_{rad}(N)$:
 $f_{c,rad}(N=1,000)$





Triaxial Cyclic Compression Test

Parameters

$$\mu = \frac{\sigma_{ax} \cdot \epsilon_{rad} - \sigma_{rad} \cdot \epsilon_{ax}}{\sigma_{rad} \cdot (2 \cdot \epsilon_{rad} - \epsilon_{ax}) - \sigma_{ax} \cdot \epsilon_{ax}}$$

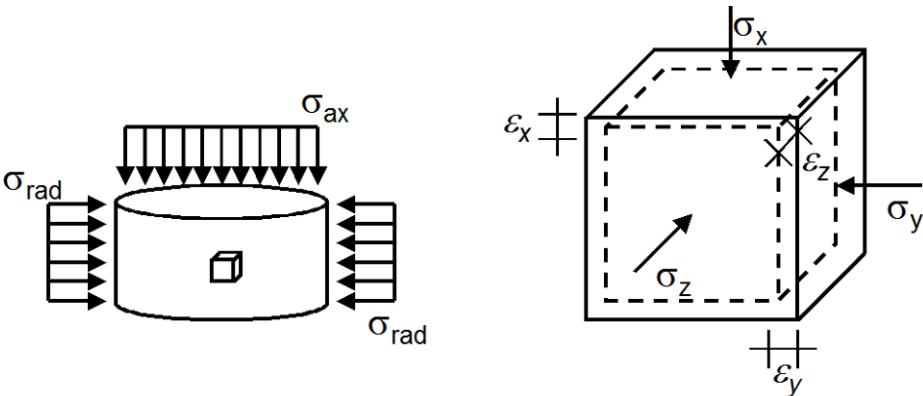
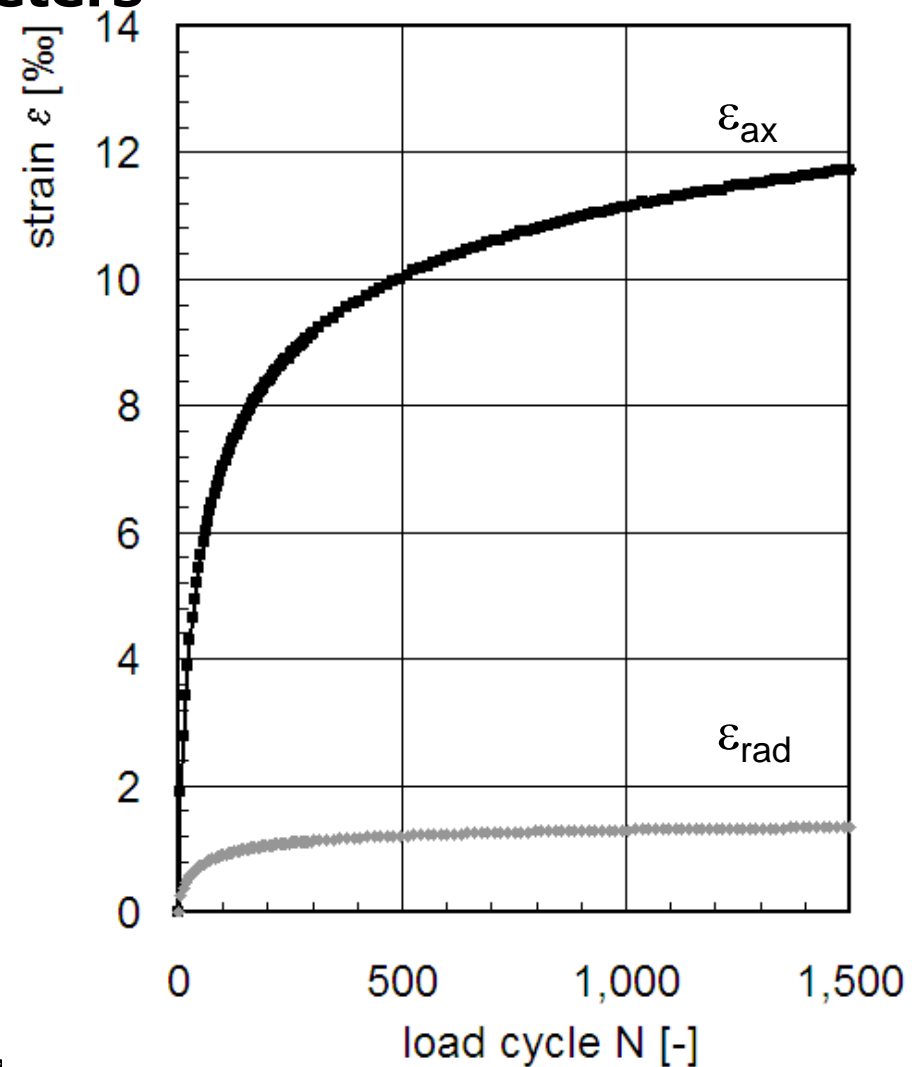
here:

σ_{ax} : axial mean stress

σ_{rad} : radial (confining) stress

ϵ_{ax} : $f_{c,ax}$

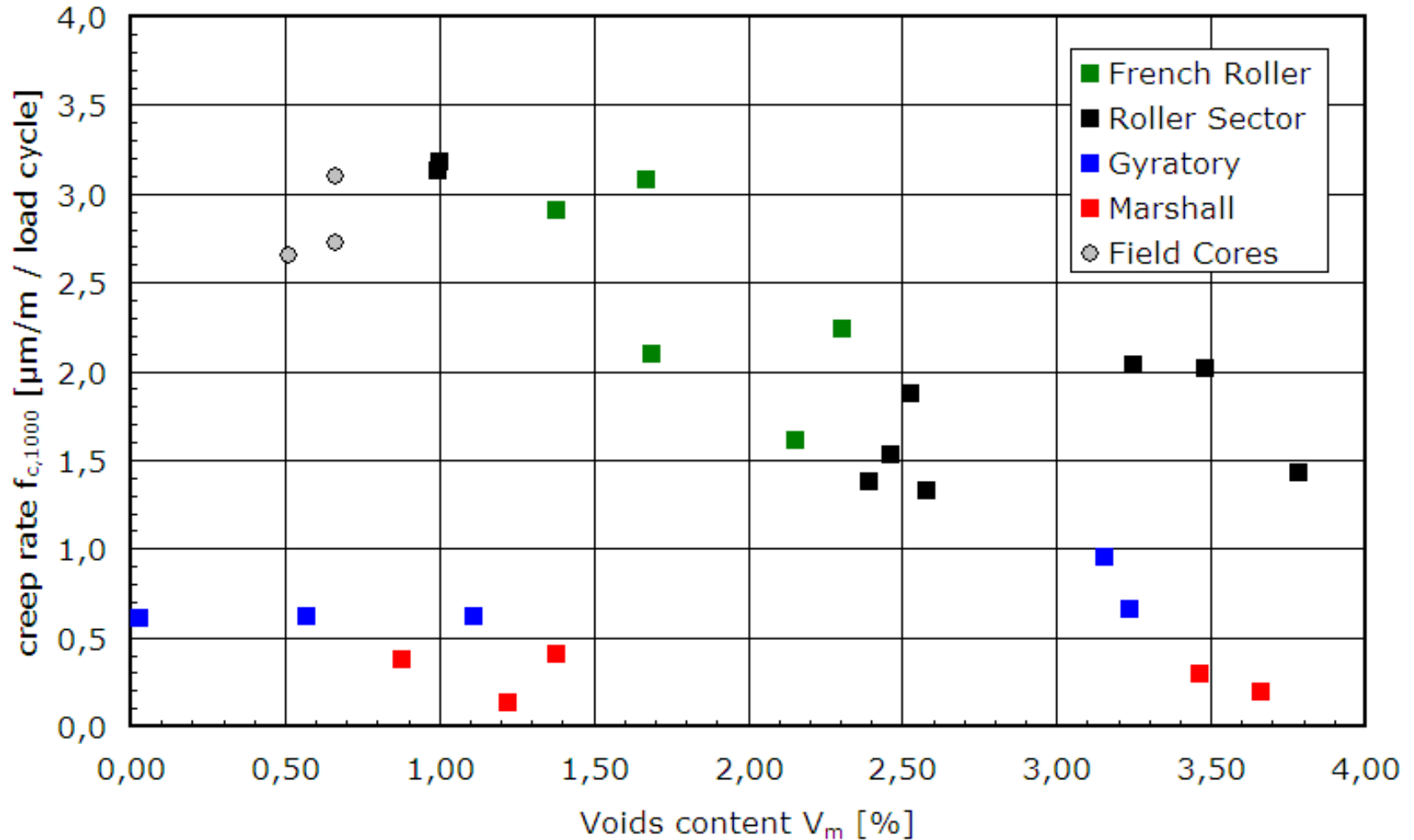
ϵ_{rad} : $f_{c,rad}$





Results

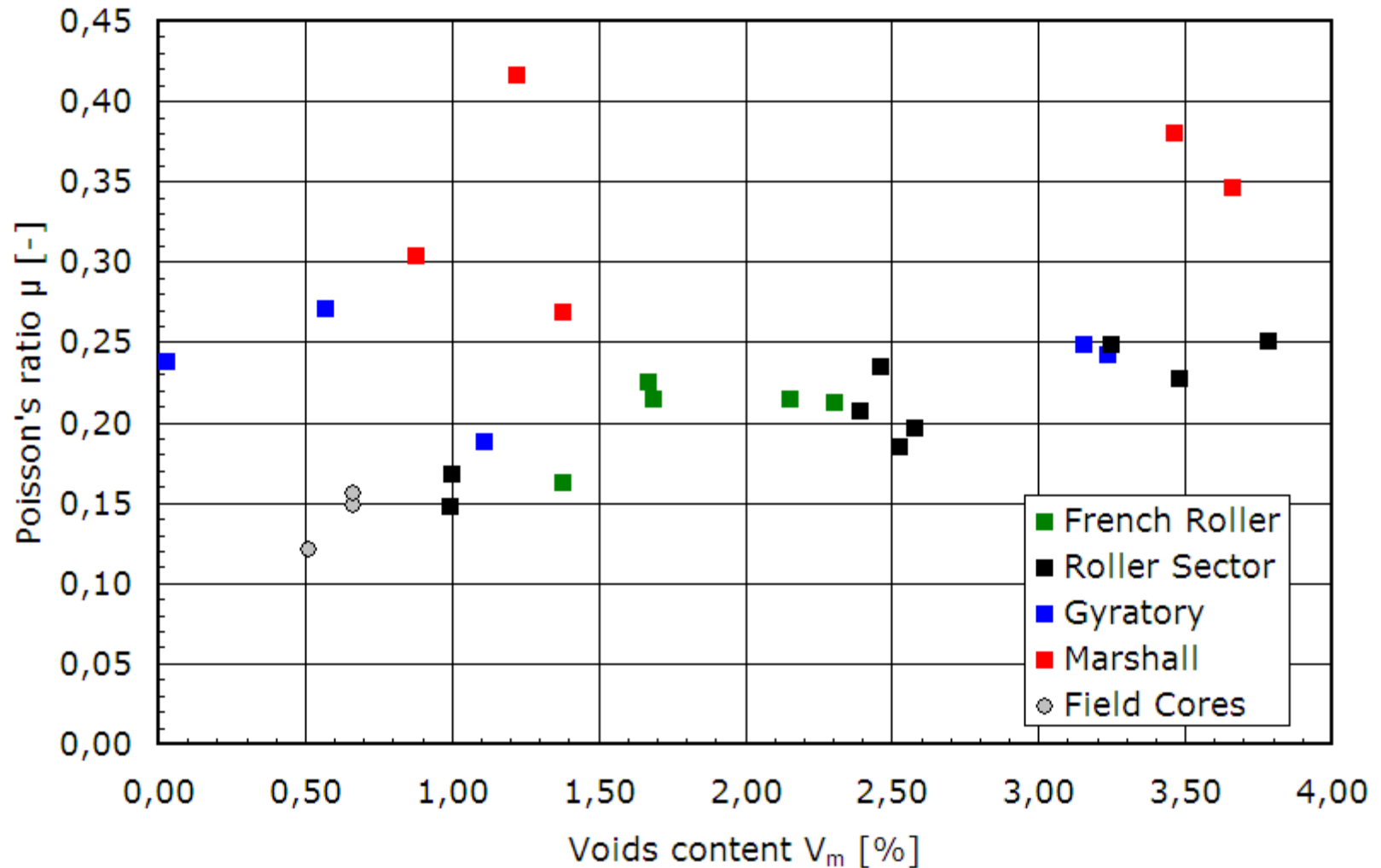
strain rate f_c at 1000 load cycles





Results

Poisson's Ratio μ





Next steps

Influence of voids content

- Comparison of test results to structure evaluation (2D / 3D) as analyzed by image analysis
- Data may be used for validation of models which consider internal structure (void content / aggregate orientation)