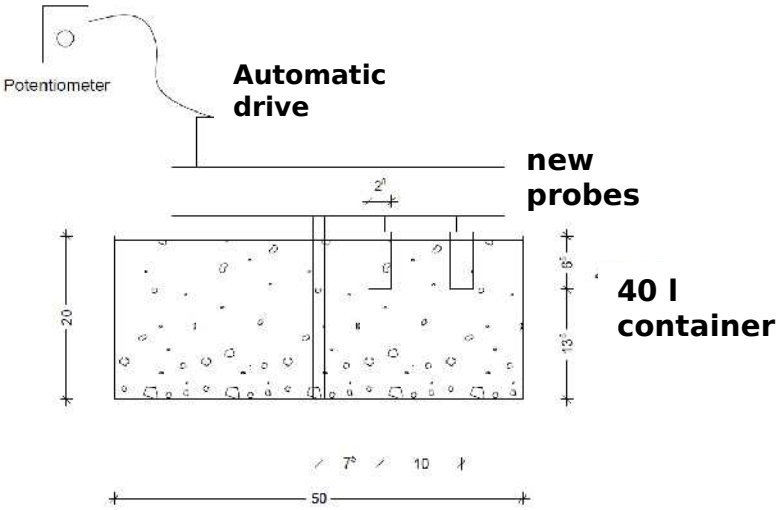


RheoCT - Die Beurteilung und Steuerung der Konsistenz von Selbstverdichtenden Betonen im Mischer

RheoCT - The assessment and control of the rheological properties of Self-Compacting Concrete in a concrete mixer

Florian Fleischmann
Wolfgang Kusterle

Development of the eBT2



Measurements with new eBT2

■ Measurement profiles

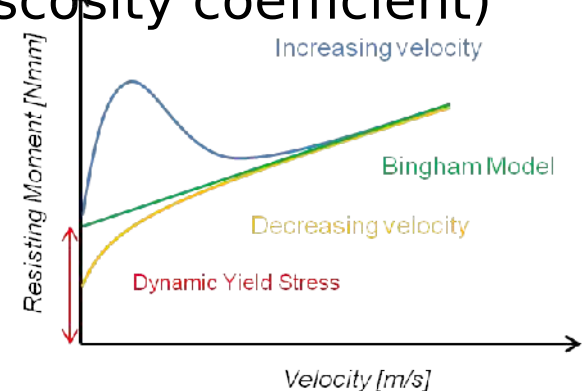
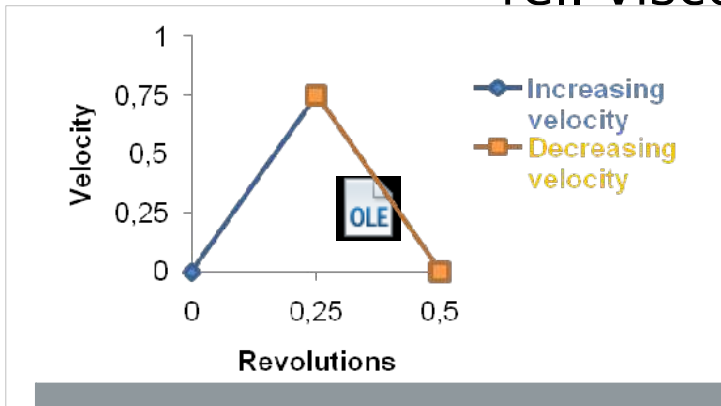
■ Profile a

- Setting: Speed -controlled mode with increasing and decreasing velocity

- Result: flow curve with

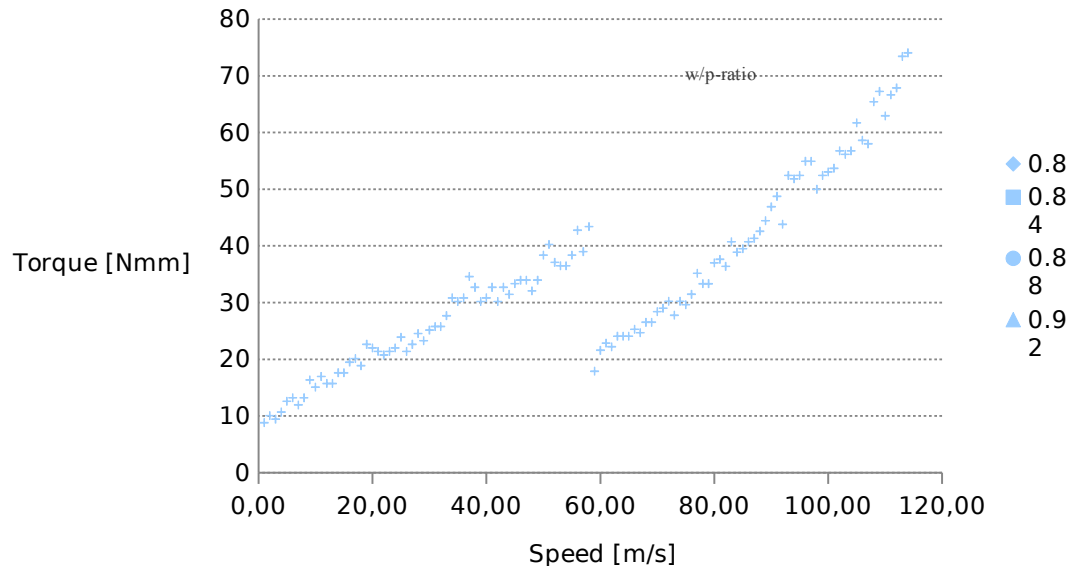
- - rel. yield stress (Bingham-yield coefficient)

- - rel. viscosity (Bingham-viscosity coefficient)



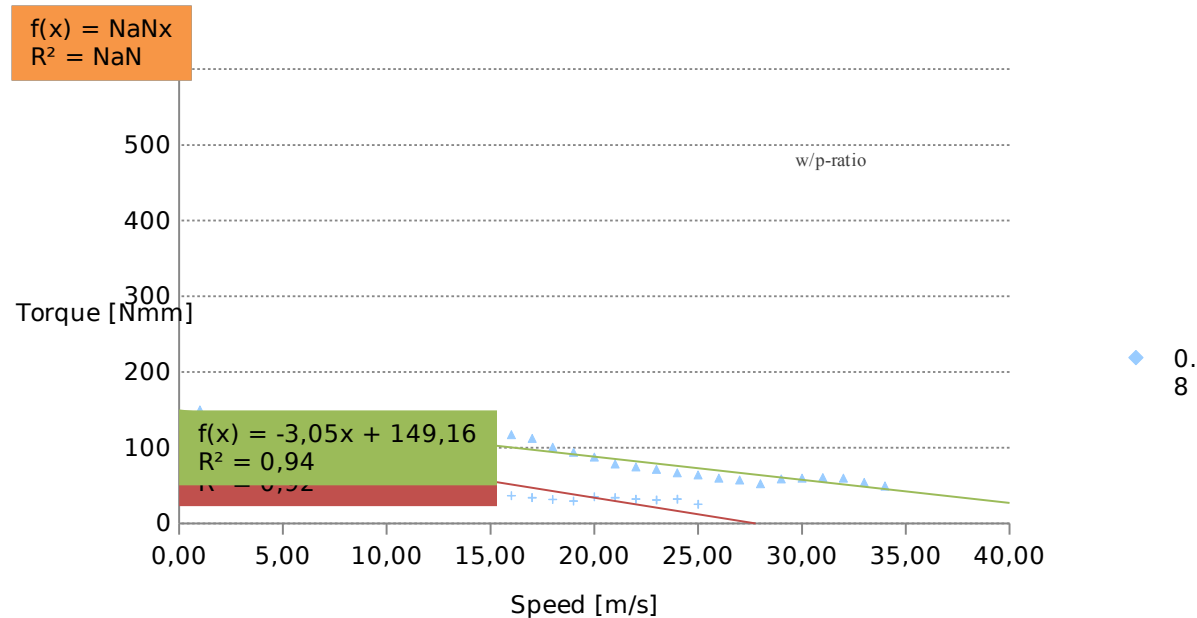
Measurements with new eBT2

- Measurement profiles
 - Profile a

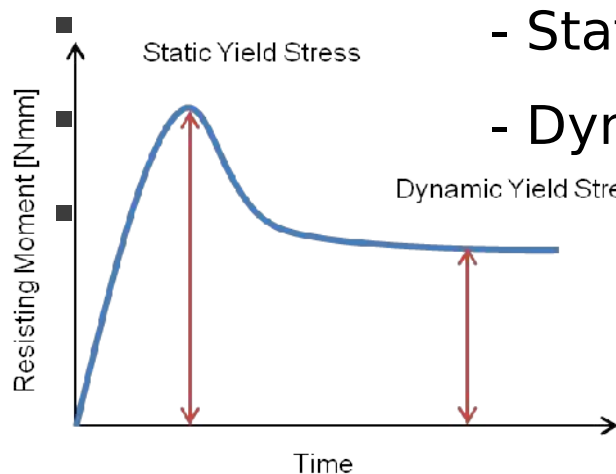


Measurements with new eBT2

- Measurement profiles
 - Profile a



- Measurement profiles
 - Profile b
 - Setting: continual low speed (to avoid transient effects)
 - Result: time-dependent torque curve

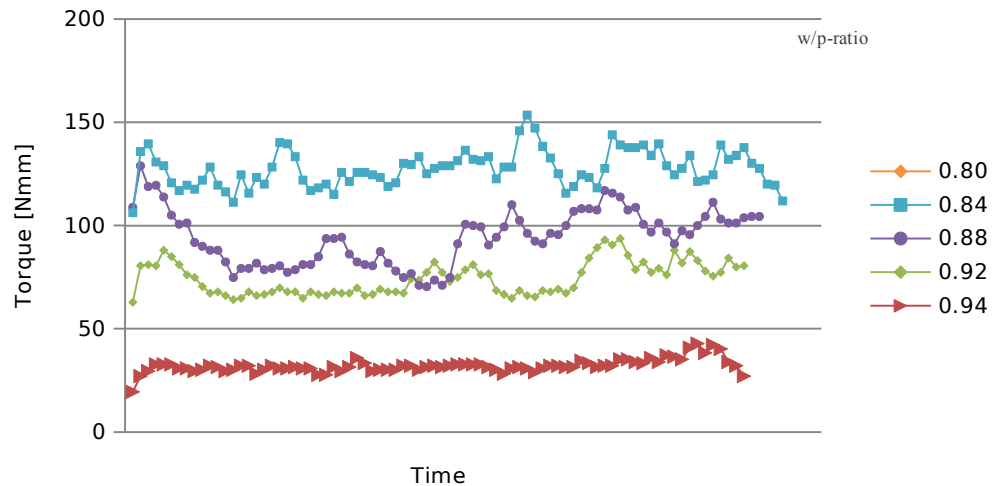


- Static Yield Stress (relative static yield coefficient)

- Dynamic Yield Stress (rel. dynamic yield coefficient)

Measurements with new eBT2

- Measurement profiles
 - Profile b
 -



Measurements with new eBT2

- Relative Measurement System (only relative values)
- Flow curves with
 - relative Yield Stress and relative Plastic Viscosity
- Time-dependent torque curve with
 - Relative dynamic Yield Stress
 - Relative static Yield Stress
- Only Control of water and superplasticizer content
- Use in laboratory and on the construction site
- Quality control

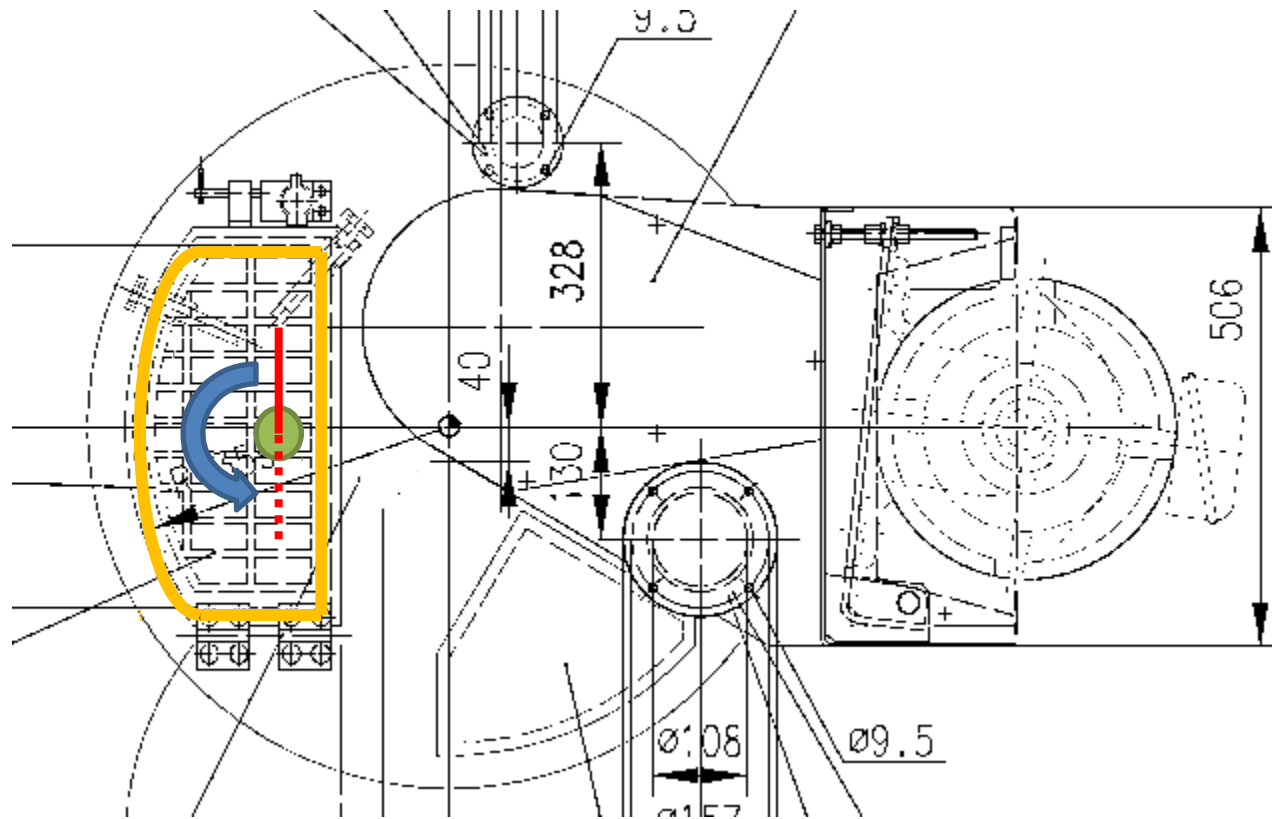
The concrete rheometer RheoCT



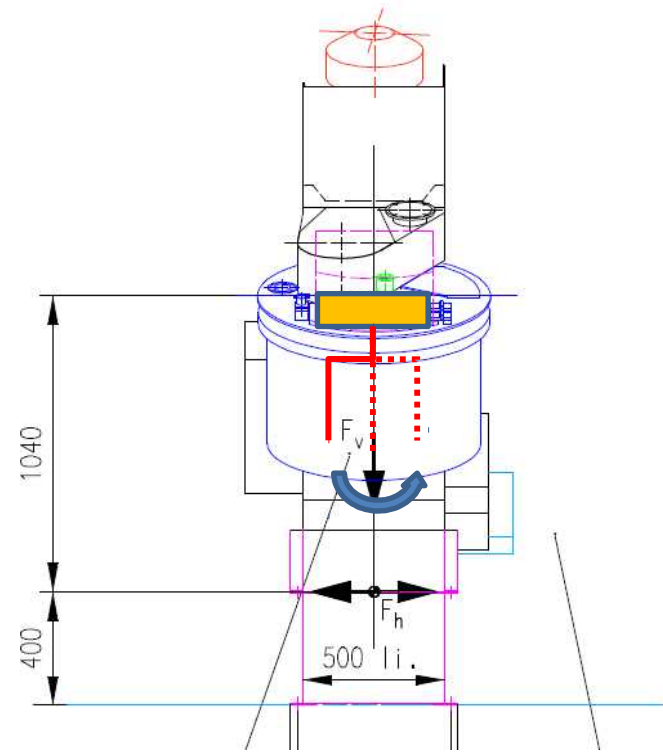
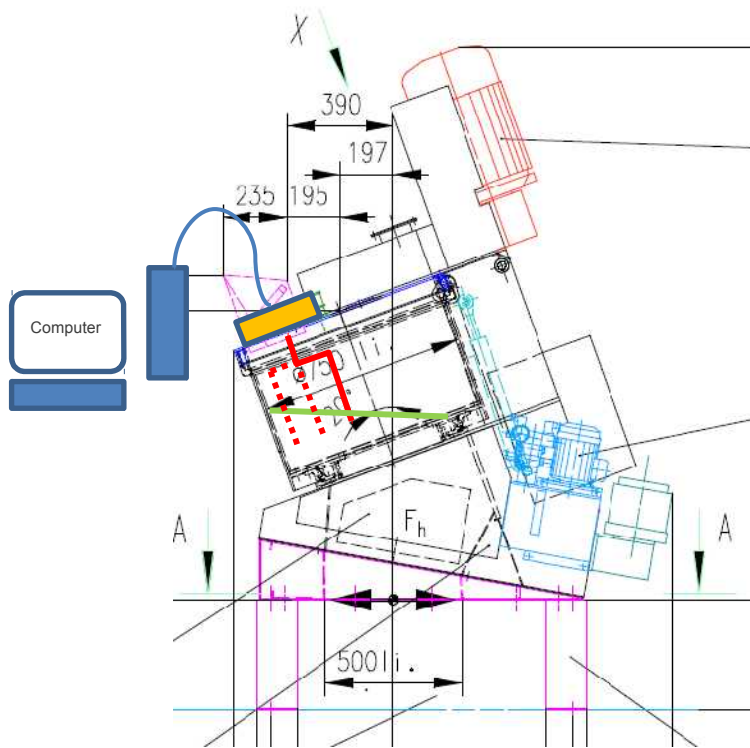
- „Ball Measuring System“
 - One probe (cylinder geometry)
 - Half a Revolution
 - Same profiles as eBT2
 - Control-software ViskomatNT
-

- Note:
 - RheoCT installed askew (due to the construction of the Eirich mixer)
 - Measurement in different depth
 - Impact of gravity
-

- Measurement Process



■ Measurement Process



Test results RheoCT

■ Variation of water content

Concrete				C.1	C.2	C.3	C.4
cement	c	CEM II/A-S 42,5 R	kg/m ³	398.0	398.0	398.0	398.0
additions	f	fly ash	kg/m ³	207.8	207.8	207.8	207.8
water	w		kg/m ³	192.7	197.2	201.5	205.8
additional water			kg/m ³		4.5	4.3	4.3
sand	s	0/4 mm	kg/m ³	747.4	747.4	747.4	747.4
coarse aggregate	g	4/16 mm	kg/m ³	779.2	779.2	779.2	779.2
superplasticizer	SP	PCE-typ	M.-% of c.	2.40	2.40	2.40	2.40
water-cement-ratio	w/c			0.48	0.50	0.51	0.52
water-binder-ratio	w/(c+0.4f)	max f = 0.33c		0.40	0.41	0.42	0.43
water-powder-ratio	V _w /V _p			0.88	0.92	0.96	1.0

Test results RheoCT

- Variation of water content
 - First results
 - Measurements possible
 - Improvement of profiles and measuring process
 - Still inaccurate results due to the position of the measuring device (influence of gravity, variable depth of the measuring)
-

Test results RheoCT

- Variation of water content
 - Idea
 - Measurement in horizontal position
 - Temporary experimental set-up: measuring in a bucket



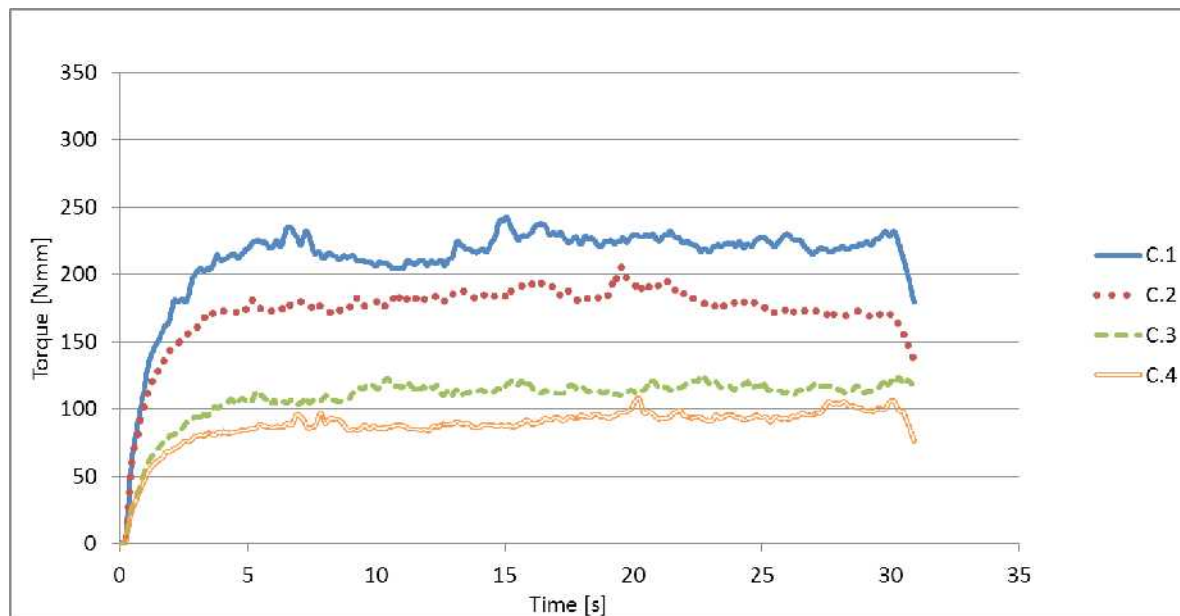
Test results RheoCT

- Variation of water content
 - Time-dependent torque curve – measurement in un-sheared material



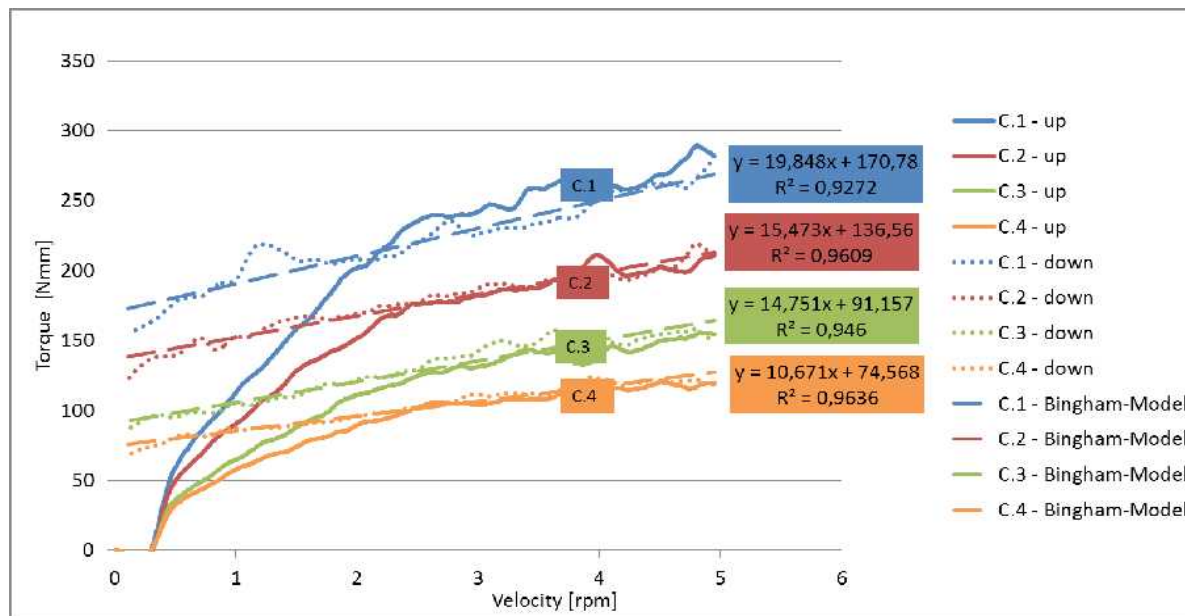
Test results RheoCT

- Variation of water content
 - Time-dependent torque curve – measurement in sheared material



Test results RheoCT

- Variation of water content
 - Flow curve with Bingham-Model – measurement in sheared material



- **eBT2**
 - Concrete rheometer for laboratory and construction site
 - Quality control
 - Research and Development
-

- RheoCT
 - Concrete rheometer for use in a concrete plant
 - Quality control
 - Better SCC
 - Less wastage
 - Financial success
-

KONSTROLL

Thank you !
