



Study of mix design parameters for self-compacting concrete based on the rheological characterization of cement based mortars

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Initial Comments

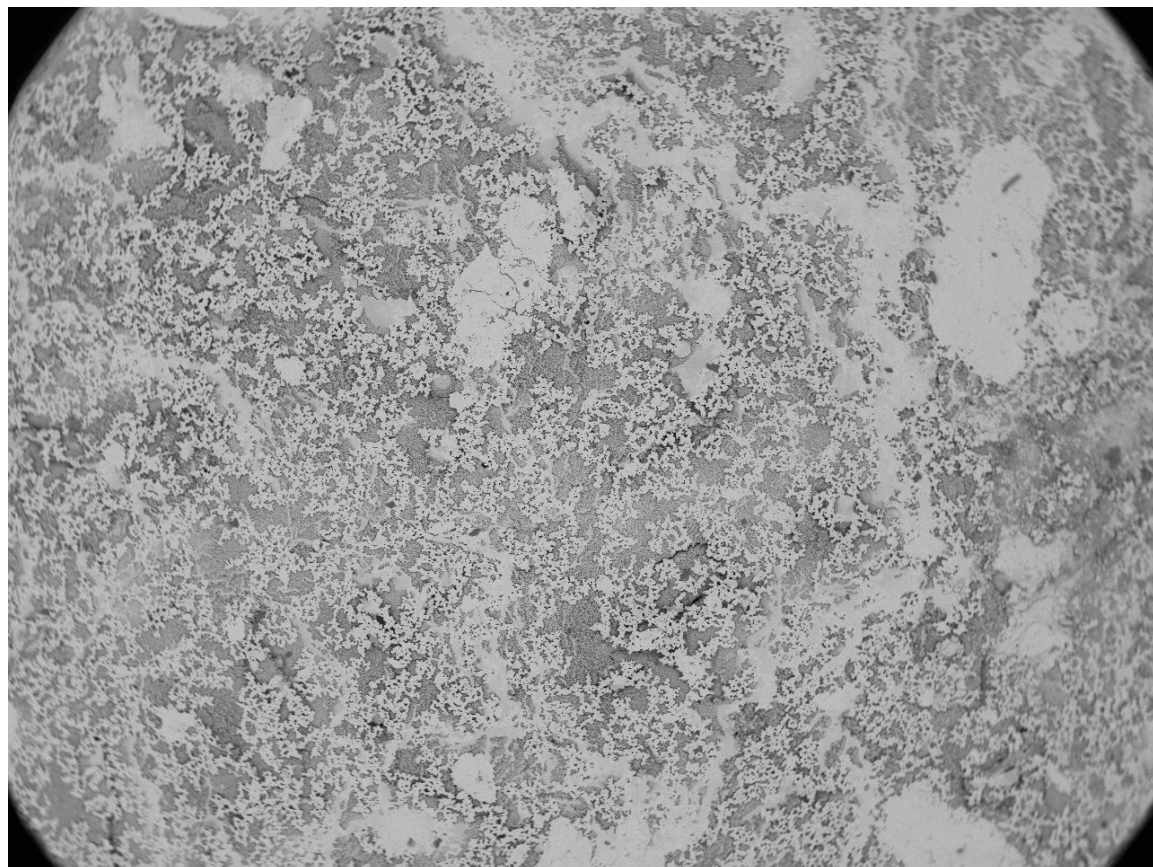
- Partial results from the conclusion project for the Bachelor Degree;
- Analyze the relations between the rheological behavior of pastes and mortars aiming the mix design and production of SCC;
- **Assessment of the flowing behavior of mortars.**



Component Materials

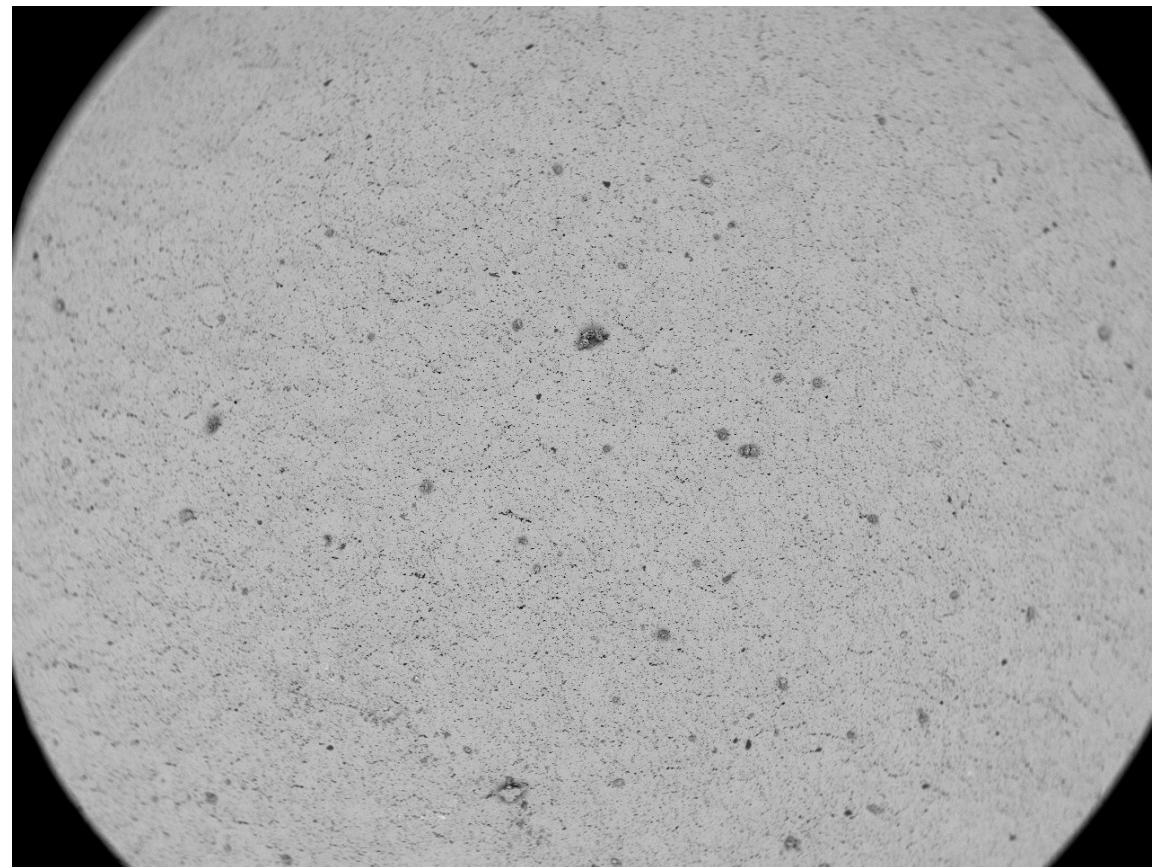
- Cement type CP II F 32 (according to Brazilian Standard NBR 11578);
- Sand with maximal size of 2,4 mm;
- Polycarboxylate superplasticizer (30% of solids);
- Waste of marble and granite (RBMG):
 - $\text{SiO}_2 = 56,89\%$
 - $\text{Fe}_2\text{O}_3 = 9,58\%$
 - $\text{Al}_2\text{O}_3 = 15,08\%$
 - $\text{CaO} = 5,88\%$





TM3000_0384

F D6.2 x30 2 mm



TM3000_0396

F D5.3 x30 2 mm



Mix Design and Testing

Composition of the mortars

Mortar	Cement	RBMG	Sand	Sp	Water
MA01	1,00	0,43	2,00	0,35%	0,50
MA02	1,00	0,67	2,00	0,35%	0,50



Small-Scale Rheometer



Vane Sensor



RV Sensor



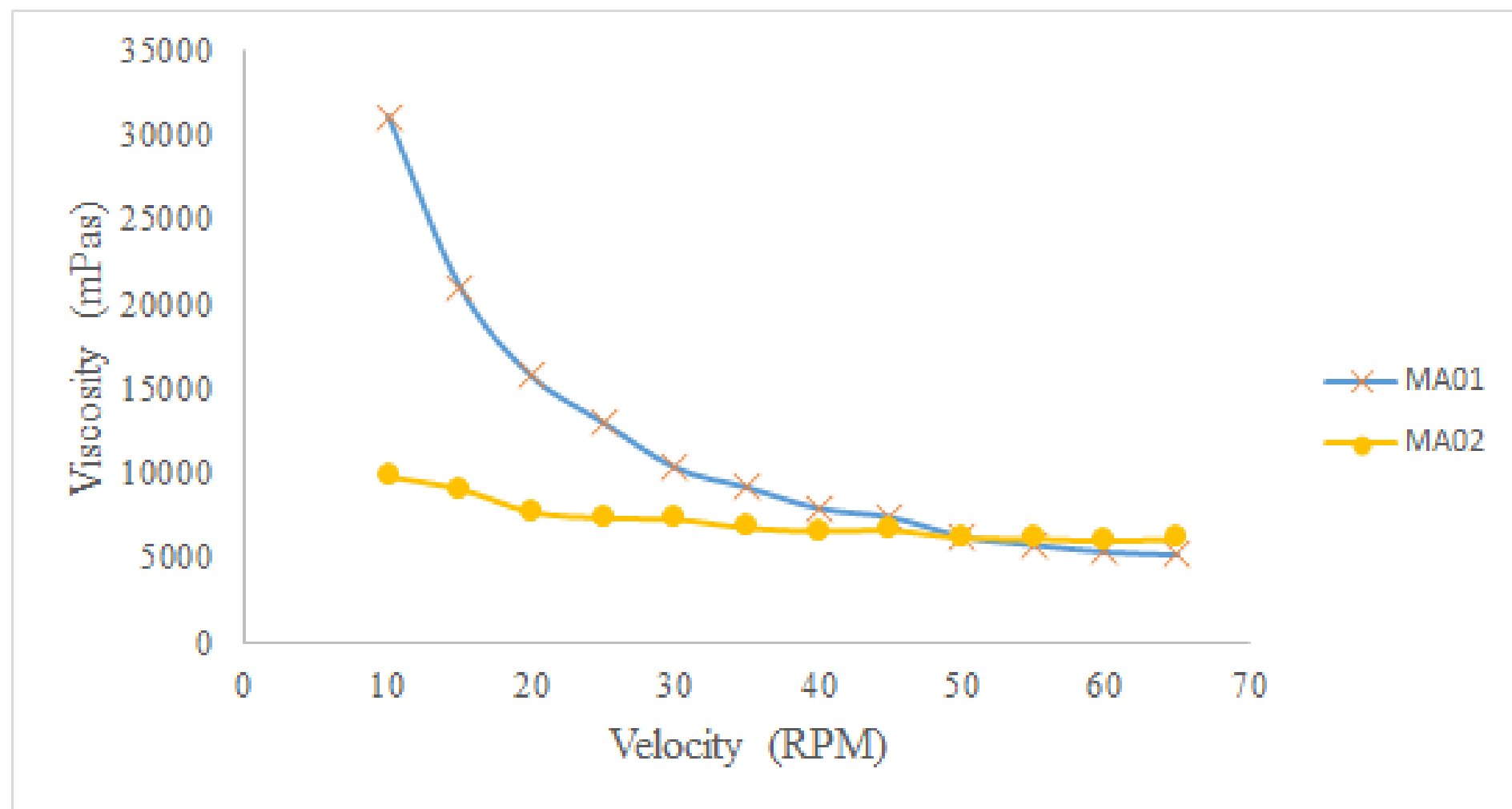
Mix Design and Testing

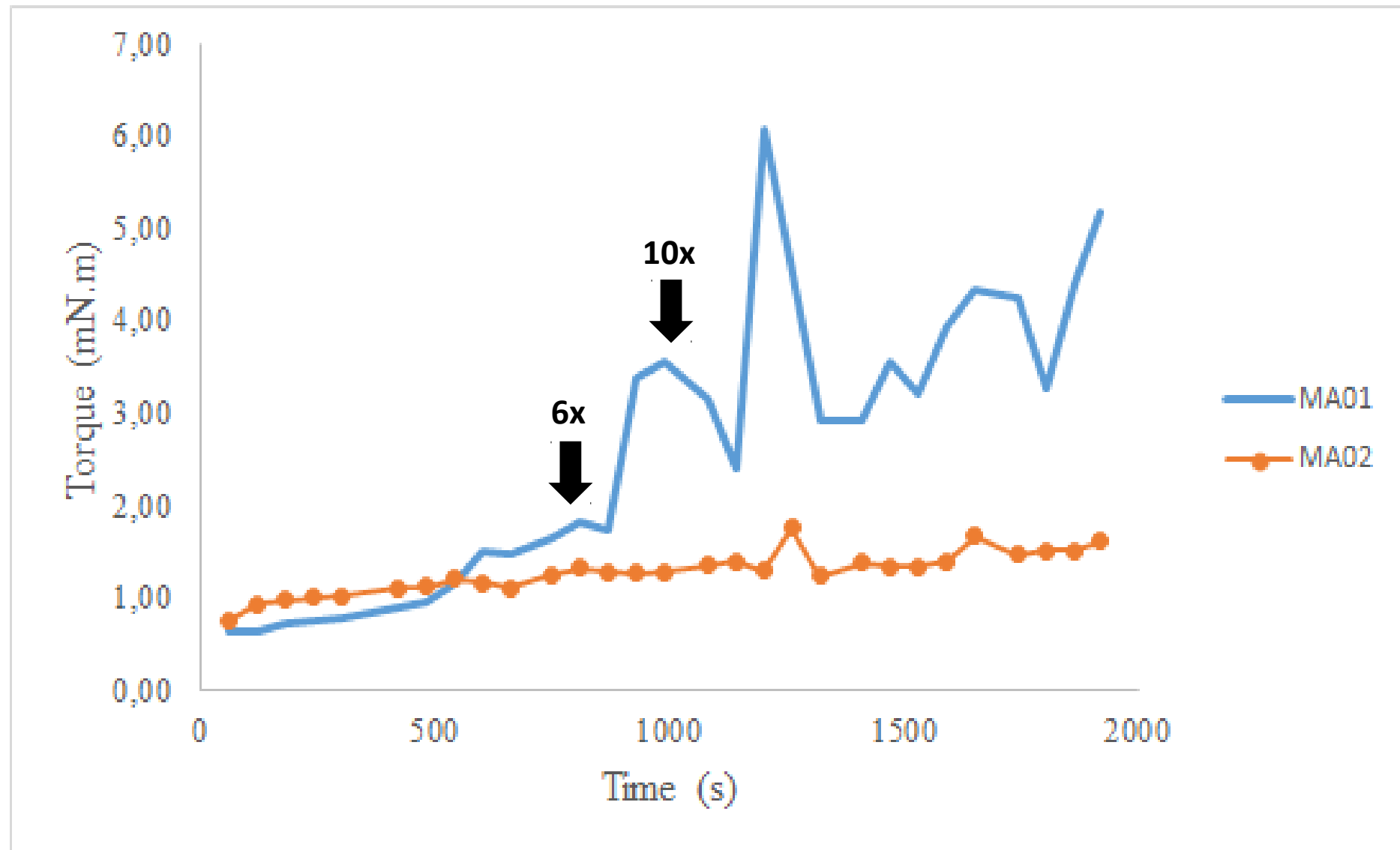
Testing with Vane Sensor:

- pre-shearing with the velocity of 70 RPM for 70 seconds;
- increasing of shear rate with the velocity going from 0 to 65 RPM;
- decreasing of shear rate with the velocity going from 65 to 0 RPM.

Testing with RV Sensor:

- sample submitted to a constant velocity profile of 45 RPM during 5 minutes;
- velocity goes down to zero for 30 seconds;
- sample once again submitted to the same velocity profile (6 cycles in total)







Conclusions

- Considerable differences in the behavior of the mortars:
 - viscosity;
 - stability;
 - applications.
- Moving forward:
 - test mortars with higher content of RBMG;
 - further assessment of the effects of RBMG;
 - production of concretes.



Acknowledgements

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