

Contents

1	Historical perspective	6
2	Causes and impacts of cracking	7
3	Hydration of Portland cement and consequences	10
3.1	Microcrack evolution due to autogenous shrinkage	11
3.2	Effect of drying shrinkage	13
3.3	Stability of crack growth	13
4	Multiscale model for strength scaling	15
5	Crack-resistant road cements	17
5.1	Restrained ring test	19
5.2	Hygro-mechanical simulations	22
5.3	Pilot highway project	23
5.3.1	Long-term monitoring	25
5.3.2	Characteristic summer slab performance	31
5.3.3	Static load test	32
6	Conclusions and outlook	33
7	References	33
8	Author's main achievements	37
9	Curriculum vitae	40