

Content

Foreword	5
1 Introduction.....	6
2 Main materials used in the grant.....	7
2.1 Concrete.....	7
2.2 Roving.....	8
2.2.1 Alkali resistant glass roving.....	8
2.2.2 Basalt roving	8
2.2.3 Carbon roving.....	9
2.2.4 Epoxy resin.....	9
2.3 Technical textiles	9
2.3.1 Nano fillers and other used fillers	10
3 Testing	11
3.1 Concrete testing	11
3.1.1 Compression test	11
3.1.2 Three point bending test.....	11
3.1.3 Young's modulus	11
3.1.4 Direct tensile test.....	12
3.2 Roving testing	12
3.2.1 Tensile test of pure roving.....	12
3.2.2 Tensile test of composite – penetrated roving.....	16
3.2.3 Tensile modulus of elasticity	20
3.2.4 Two approaches for the tensile test of single roving in polymer matrix	24
3.3 Textile reinforced concrete testing.....	28
3.3.1 Four point bending test.....	28
3.3.2 Cohesion test	30
3.3.3 Impact of Increased Temperature on Cohesiveness	34
3.3.4 Tests of White HPC Plates Reinforced by PVA Fibers and Textile Glass Reinforcement.....	38
3.4 I-profile Made from UHPC Reinforced with Textile Glass Fibers.....	44
4 Matrix Modifications	50
4.1 Nanoparticles	50
4.1.1 Carbon nanotubes (CNT) and their influence on HPC parameters	50
4.1.2 Silica nanoparticles and their influence on HPC parameters	52
4.1.3 Silica nanoparticles and their influence on composite reinforcement.....	55
4.1.4 Other particles and their influence on composite reinforcement.....	62



4.2	The Effect of Surface Treatments of Textile Reinforcement	67
4.3	Light weighting of structural elements made of TRHPC.....	69
4.3.1	Profiled façade elements.....	69
4.3.2	Polystyrene waffled facade panels	78
5	Durability	85
5.1	Frost resistance.....	85
5.2	Hot water test	89
5.3	Extent of corrosion damage of glass-fibre textile reinforcement during exposition in model concrete pore solution	92
6	Conclusion.....	105
	Acknowledgement	105
	References	106