

İREM ŞANAL, Ph.D.

EDUCATION

2010-2015 : Boğaziçi University, Civil Engineering Department, PhD

2008-2010 : Boğaziçi University, Civil Engineering Department, MSc

2004-2008 : Boğaziçi University, Civil Engineering Department, BSc (**Graduated Ranking 2nd**)

2001- 2004 : Ankara Atatürk Anatolian High School

1993- 2001 : TED Ankara College

RESEARCH INTERESTS

Materials Science, Composite Materials, Fiber-Reinforced Concrete, Self-Compacting Concrete, Fiber Orientation, Rheology, Crack Monitoring, Digital Image Correlation (DIC), Environmental Life Cycle Assessment, CO₂ Emission Reduction in Materials, Sustainable Materials

WORK EXPERIENCE

2019 May: FH Aachen University of Applied Sciences, Germany- Visiting Lecturer

2017 Aug-Present: Bahcesehir University- Graduate School of Natural and Applied Sciences- Vice Director

2017 Jan-2017 Aug: Bahcesehir University- School of Civil and Mechanical Engineering- Associate Head

2016 Sep-Present: Bahcesehir University- Civil Engineering Department- Assistant Professor

2015 Sep-2017 Sep: OYAK Ready-Mix Concrete A.S.- R&D Academic Consultant

2017 Jan: Action Rapporteur-COST Scientific Committee

2015 Sep-2016 Sep: Atilim University- Department of Civil Engineering- Assistant Professor

2015 Sep-2016 Jan: MEF University- Faculty of Arts, Design and Architecture- Adjunct Faculty

2014 July-2015 Sep: MARSH and McLennan Companies- Project Risk Advisory and Account Executive

2010 May-2010 Sep: Visiting Researcher: Politecnico di Milano, Lecco, Italy

2008 Aug-2014 Jun: Graduate Research and Teaching Assistant: Bogazici University, Istanbul, Turkey

2006 Dec-2006 Mar: ARUP Consultants, Istanbul Office

2005 Sep-2008 June: Undergraduate Department Assistant: Bogazici University (Dr.Osman Börekçi)

TEACHING EXPERIENCE

September 2016- Present: Assistant Professor, Bahcesehir University, Istanbul, Turkey

- CEN 2004 Materials of Construction

- CEN 2005 Materials Science

- CEN 4112 Innovative Construction Materials and Technologies

- CEN 4015 Reinforced Concrete

- RSK 5002 Innovations in Insurance and Risk Management

Fall & Spring 2015-2016: Assistant Professor, Atilim University, Ankara, Turkey

- CE 210 Civil Engineering Materials
- CE 543 Advanced Concrete Materials (Graduate Course)
- CE 203 Materials Science

Fall 2015-2016: Assistant Adjunct Professor, MEF University, Istanbul, Turkey

- ARC 231 Architectural Technology II

August 2008 – June 2014: Teaching Assistant, Bogazici University, Istanbul, Turkey

- CE 211 Materials Science
- CE 212 Engineering Materials
- CE 245 Mechanics
- CE 421 Environmental Engineering
- CE 222 Introduction to Environmental Pollution Control

PUBLICATIONS

Papers in Refereed Journals

- **Sanal, I.**, Yalcin, B., Yalcin, I. E., Arda, L. “Application of Poly (Vinyl Acetate) and Poly (1,4-Butylene Adipate) Hydrophobic Surface Coatings on Cementitious Mortar Specimens” Under Review, 2020.
- Aryanfar, A., **Sanal, I.**, Marian, J. “Novel Percolation-based Measure for Fiber Efficacy in Fiber Reinforced Concrete (FRC) Beams” Structural Concrete, <https://doi.org/10.1002/suco.201900362>, March, 2020.
- **Sanal, I.** “The Relationship Between Rheology and Fresh-State Performance of Cement Based Mortars (CBM’s)” Under Review, 2020.
- **Sanal, I.** “Effect of Shear Span-to-Depth Ratio on Mechanical Performance and Cracking Behavior of High Strength Steel Fiber-Reinforced Concrete Beams without Conventional Reinforcement” Mechanics of Advanced Materials and Structures, doi:10.1080/15376494.2018.1527963, 2019.
- **Sanal, I.** “Fresh State Performance Design of Green Concrete Mixes With Reduced Carbon Dioxide (CO₂) Emissions”, Greenhouse Gases: Science and Technology, doi: 10.1002/ghg.1826, 8 (6), 2018.
- **Sanal, I.**, Hosseini, A. “Determination of Mid-Span Deflection by means of Crack Opening in Steel Fiber-Reinforced Cementitious Composite (SFRCC) Beams” Mechanics of Advanced Materials and Structures, doi: 10.1080/15376494.2018.1444230, 26 (19), pp. 1636-1643, 2018.
- **Sanal, I.** “Understanding Global Mechanical Response of Fiber Reinforced Cementitious Composite Beams from Local Fracture Process” Structural Control and Health Monitoring, doi: 10.1002/stc.2202, Vol. 25(8), 2018.

- **Sanal, I.** “Discussion on the Effectiveness of Cement Replacement for Carbon Dioxide (CO₂) Emission Reduction in Concrete” *Greenhouse Gases: Science and Technology*, Vol. 8 (2), doi: 10.1002/ghg.1748, 2018.
- **Sanal, I.** “Performance of Macro-Synthetic and Steel-Fiber Reinforced Concretes with Emphasis on Mineral Admixture Addition” *J.of Mat. in Civil Eng.*, Vol. 30(6), doi: 10.1061/(ASCE)MT.1943-5533.0002292, 2018.
- **Sanal, I.** “Beton Basınç Dayanım Testlerinde Küçük Ebatlı Küp Beton Numunelerin Yaygın Kullanımı İçin Şekil-Boyut Etkisinin Detaylı İncelenmesi” *Dokuz Eylül Üniversitesi DEÜ Mühendislik Fakültesi Fen ve Mühendislik Dergisi*, V. 20 (58), pp. 103-120, 2018.
- **Sanal, I.** “Error Estimations for Flow Characterization with Numerical and Analytical Solutions” *International Journal of Measurement Technologies and Instrumentation Engineering*, 6 (2), pp.16-28, 2017.
- **Sanal, I.,** Ozyurt Zihnioglu, N., Hosseini, A. “Characterization of Hardened State Behavior of Self Compacting Fiber-Reinforced Cementitious Composites (SC-FRCC's) with Different Beam Sizes and Fiber Types”, *Journal of Composites Part B: Engineering*, Vol.105, pp.35-45, 2016.
- **Sanal, I.,** Ozyurt Zihnioglu, N., Hosseini, A. “Particle image velocimetry (PIV) to evaluate fresh and hardened state properties of self compacting fiber-reinforced cementitious composites (SC-FRCCs)”, *Construction and Building Materials*, Vol. 78. pp. 450-463, 2015.
- **Sanal, I.,** Ozyurt Zihnioglu, N., “To what extent does the fiber orientation affect mechanical performance?”, *Construction and Building Materials*, Vol. 44. pp. 671-681, 2013.
- Ferrara, L., Bamonte, P., Caverzan, A., Musa, A., **Sanal, I.**, “A comprehensive methodology to test the performance of Steel Fibre Reinforced Self-Compacting Concrete (SFR-SCC)”, *Construction and Building Materials*, Vol. 37. pp. 406-424, 2012.
- Ferrara, L., Bamonte, P., Caverzan, A., Musa, A.M. and **Sanal, I.**: “An Experimental Methodology to Assess the Performance of Steel Fiber-Reinforced Self-Compacting Concrete (FR-SCC)”, *Scarica il Vol. 29 di Studies and Researches Annual Review of Structural Concrete*, Politecnico di Milano and Italcementi, pp. 155-184, 2011.

Papers in Conference Proceedings

- **Sanal, I.** “Evaluation of Ultra High Strength Concrete (UHSC) Containing Micro-Silica with Emphasis on Water/Cement Ratio Reduction”, *International Congress on Engineering and Technology Management*, December 2018, Istanbul, Turkey.
- Bektaş, Z., **Sanal, I.** “Research and Analysis on Mass Transport Systems”, *TRANSIST 2018 International Istanbul Transport Congress*, 4I: Innovation, Integration, Information, Intelligence , November 2018, Istanbul, Turkey.

- **Sanal, I.** “Performance Based Study on Co-Polymer Based Macro Synthetic Fiber Reinforced Concretes” 2nd International Fiber and Polymer Research Symposium, March 2018, Bursa, Turkey.
- **Sanal, I.** “Use of Construction Waste Materials as Fine Aggregates for Concrete Production” IREMCON 2018, International Environmental Conference, March 2018, Istanbul, Turkey.
- Tansu, A., **Sanal, I.**, “Urban Transportation Management Models”, TRANSIST 2017 International Istanbul Transport Congress, 4I: Innovation, Integration, Information, Intelligence , November 2017, Istanbul, Turkey.
- **Sanal, I.**, “Detection of Early Crack Initiation and Crack Patterns” 2nd International Workshop on Seismic Loss, Rehabilitation and Post-Earthquake Crisis Management of Critical Infrastructure, November 2017, Istanbul, Turkey.
- **Sanal, I.**, Sarıalioglu, D., “Beton basınç dayanımında küçük ebatlı küp beton numunelerin yaygın kullanımı için şekil-boyut etkisinin detaylı incelenmesi”, THBB Concrete Congress, 2017.
- **Sanal, I.**, Ozyurt Zihnioglu, N., Hosseini, A., “Monitoring Fresh State Behavior of Fiber Reinforced Cementitious Composites (FRCCs): A Non Destructive Non Intrusive And Full Field Image Based Technique” 12th International Conference on ACE, September 21-23, 2016, Istanbul, Turkey.
- **Sanal, I.**, Hosseini, A., Ozyurt Zihnioglu, N., “An Alternative to Conventional Measurement Techniques for Evaluating Crack Propagations And Crack Width Openings” 12th International Conference on ACE, September 21-23, 2016, Istanbul, Turkey.
- **Sanal, I.**, Sarıalioglu, D., Pılgır, V., Turgut, T., Akkaya, Y. “Identification and Evaluation of CO₂ Emissions of Various Concretes Produced in Different Ready-Mix Concrete Plants” 12th International Conference on ACE, September 21-23, 2016, Istanbul, Turkey.
- **Sanal, I.**, Ozyurt Zihnioglu, N., Hosseini, A., “Particle Image Velocimetry as a Method to Evaluate Fresh and Hardened State Performances of HPFRC’s”, 3rd International RILEM Conference on Strain Hardening Cementitious Composites (SHCC3-Delft), 3-5 November 2014, Dordrecht, Netherlands.
- Özyurt Zihnioglu, N., **Sanal, I.**, "Flexural performance of HPFRCs and the role of fiber orientation", R.N. Raikar Memorial International Conference and Dr. Suru Shah Symposium on Advances in Science & Technology of Concrete, December 20-21, 2013, Technical papers, Vol. II, p. 164-171., Mumbai, India.
- Ferrara, L., Bamonte, P., Caverzan, A., Musa, A.M. and Sanal, I.: “Testing The Performance of Steel Fibre Reinforced Self-Compacting Concrete”, 8th RILEM International Symposium on Fiber Reinforced Concrete: challenges and opportunities, BEFIB, September 2012, Guimaraes, Portugal,

- **Sanal, I.**, Ozyurt, N., “Effects of Formwork Dimensions on the Mechanical Performance of Fiber-Reinforced Cement Based Materials”, 9th International Conference on ACE, September 27-30 2010, Trabon, Turkey.
- Ozyurt, N., Tregger, N., Ferrara, L., **Sanal, I.**, Shah, Surendra, “Adapting fresh state properties of fiber-reinforced cementitious material for high performance thin-section elements”, Proceedings of the 3rd International Rilem Symposium, Rheology of cement suspensions such as fresh concrete, Eds. Wallevik, O.H., Kubens, S., Oesterheld, S., August 19-21, 2009, Reykjavik, Iceland.

Book Chapters

- **Sanal, I.**, Verma, D. “Natural Fibre Reinforced Polymer Composites: Feasibility Study For Sustainable Automotive Industries” *Biomass, Biopolymer-Based Materials and Bioenergy: Construction, Biomedical and other Industrial Applications*, <https://doi.org/10.1016/B978-0-08-102426-3.00006-0>, Elsevier, 2019.
- Verma, D., **Sanal, I.**, “Construction Materials Reinforced with Natural Products”, *Handbook of Ecomaterials*, doi:10.1007/978-3-319-48281-1_75-1, Springer, 2018.
- **Sanal, I.**, “Coir Fiber-Reinforced Composites”, *Green Approaches to Biocomposite Materials Science and Engineering*, IGI Global, International Publisher of Prog. Info. Science and Technology Research, USA, 2016.
- **Sanal, I.**, “Bamboo Fiber-Reinforced Composites”, *Green Approaches to Biocomposite Materials Science and Engineering*, IGI Global, International Publisher of Prog. Info. Science and Technology Research, USA, 2016.

Other Papers

- **Sanal, I.**, “Public Private Partnership Model (PPP) for Construction Projects of Turkish Integrated Health Campuses” MARSH Netherlands, Infrastructure News & Views, June 2015.
- **Sanal, I.**, “Contractors’ Risks in Construction Projects and Requirement for Professional Indemnity”, MARSH Online Journal, January 2015.

PROJECTS

- 2019-2020: BAU-BAP Project “Investigation of Hydrophobic Performance of Polymer Modified Concrete and Polymer Surface Coatings” (Project No:**BAP.2019-1.02**)
- 2017-2018: “Design and Performance Assessment of Sustainable Pervious Concretes for Storm Water Management”, Bahcesehir University- **AKCANSA** Cement Company- Joint Research Project.
- 2017-2018: TUBITAK 2209b “Sustainable Ultra High Performance Concrete Design with Different Chemical Admixture Types and Dosages”, Bahcesehir University- **CHRYSO** Ltd.-Joint Research Project.

- 2016- 2017: “The effect of Forta-Ferro macro synthetic fibers and steel fibers on fresh and hardened state performance of high-strength concrete with and without silica fume” Bahcesehir University- Joint Research Project with **FORTA Ferro** Company.
- 2016-2017: “Detailed Evaluation of Small-Sized Cube Samples for Usage in Concrete Quality Control” Joint Research Project with **OYAK Ready-Mix Concrete** Company A.S.
- 2016- Present: “A New Technique for Prediction of Fiber Orientations in Self-Compacting Fiber Reinforced Cement Based Composites: Particle Image Velocimetry (PIV) Technique”, Eser Tümen Research Award- Feyzi Akkaya Research Fund for Scientific Activities, **FABED 2016 Research Grant**.
- 2015-2016: “Environmental Impact Assesment of Conventional vs. High Performance Concretes in Ready Mixed Concrete Industry”, Joint Research Project with **OYAK Ready-Mix Concrete** Company A.S.
- 2015-2016: “Evaluation and Development of Hydrophobic Surface Coatings For Durable Concrete Applications”, Atilim University Research Fund (Joint Scientific Research project with Applied Chemistry Department).
- 2010-2010: “Experimental Methodologies to Assess the Performance of Steel Fiber-Reinforced Self-Compacting Concrete”, Politecnico di Milano, Structural Engineering Laboratory, European Research Fund Project.
- 2008-2010: “The effects of formwork size and geometry on the mechanical performance of self-compacting concrete”, Bogazici University Scientific Research Fund (Project Code: 09HA401P).
- 2006-2008: “Numerical Modeling of Non-Linear Waves” graduation research project, 2006- 2008

Honors & Awards

- BAU-Outstanding Researcher Award, 2018
- FABED- Eser Tümen Research Award- Feyzi Akkaya Research Fund for Scientific Activities, Sep 2016.
- Boğaziçi University, Graduation Ranking 2nd, 2008.

Academic Activities

- Action Rapporteur- COST Scientific Committe- Action TU1402
- External Expert- COST Scientific Committe- Action OC-2016-1-20901
- Editorial Advisory Board- Research Insights, IGI Global
- Editorial Review Board- Journal of Surface Engineering and Interdisciplinary Materials Science

PhD Thesis

“Evaluating the Effects of Various Factors on Mechanical Performance of Self Compacting Fiber Reinforced Cementitious Composites (SC-FRCCs)”, June, 2015.

MSc Thesis

“Effects of Formwork Dimensions on the Mechanical Performance of Fiber-Reinforced Cement Based Materials”, September, 2010.

Given Seminars

- Atilim University, Rönesans Holding Project Management Group, Joint Seminar, “Green Building Solutions”, March 2015.
- Istanbul Technical University, Construction Materials Seminar, "Evaluating Effects of Various Factors on Mechanical Performance of High Performance SFRCCs", April, 2014.

Workshops and Trainings

- Police Academy Presidency-Traffic Institute Academic Advisory Board, Traffic Research and Education Workshop, October 2018, Ankara.
- Smart Mobility Workshop, Joint Seminar of European Commission, European Union Delegation to Turkey and BAU Civil Engineering Department, September 21st, 2018, Istanbul.
- Project Based Construction Risk Evaluation and Risk Management Skills and Applications, Marsh Construction Risk Consulting Practice-Special Training by Harold Dorbin (Marsh USA, Senior Vice President, project advisory leader and senior managing consultant), November 2014.
- Workshop on “Financial Analysis Techniques”- October 24-25th, 2014, by Nurten Düzgün Sönmemiş, Certified on “Financial Analysis Techniques and Sectoral Criteria on Balance Sheet Evaluation”.

Supervised Graduate Students / MSc Thesis

- Gülden Bozbay, “The Effect of Vehicle Density on Pedestrian Mobility In Signalized Intersections”, May 2020.
- Fatma Cevizci, “Contribution of Underground Parking Lots to the Urban Sustainability as a Green Area Model By Reducing Carbon Footprint”, May 2019.
- Gülcan Bekaroğlu, “A Comparative Investigation of the CO₂ Emission Reduction-Environmental and Urban Effects of Vertical Garden Applications on Concrete Surfaces”, January 2019.
- Tuncay Karadağ, “Static Reinforcement Suggestion for Officially Registered Masonary Constructions of Industrial Heritage and Yedikule Railway Repair Shop”, January 2019.
- Ali Rıdvan Aldemir, “Managing the Transition Process of Traditional City Systems to Smart City Systems”, June 2018.

- Zafer Bektaş, “Investigation and Analysis of Expectations on Public Transport Systems”, June 2018.
- Cumali Akça, “Evaluation and Development of Urban Transportation Systems: The Case of Güngören-Istanbul”, January 2018.
- Burak Alp, “Use of Concrete and Stone Mastic Asphalt Technique in Bridge Applications”, January 2018.
- Abdurrahim Tanşu, “Management Models in Urban Transport and Management Model Proposal for Kayseri Province”, April 2017.
- Mohammed Abdulsaid, “Effects of Different Aggregates in Mass Concrete Production”, Project, January 2016.
- Yasin Şirin, “Water Impermeability Problems and Impervious Concrete Applications in Construction Foundations”, In progress.
- Gülhan Peri, “Risk Investigation of the Transformation of Areas Under Disaster Risk Based on Transformation Practices” In progress.
- Alper Dereli, "Potential of Asphalt Concrete Road and Concrete Road Applications in Turkey", In progress.