

## **Sanjaya P. Senadheera, Ph.D.**

### **Assistant Professor of Civil Engineering**

Department of Civil Engineering

Texas Tech University

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### **EDUCATIONAL BACKGROUND**

Ph.D. in Civil Engineering, Texas A & M University, College Station, May 1995

Dissertation Topic: Spalling in Concrete Pavements: Its Relationship to Coarse Aggregate in Concrete and a Framework for Design

Major Advisor: Dr. Dan G. Zollinger

M. S. in Civil Engineering, Texas A & M University, College Station, August 1990

Thesis Topic: Analysis for Design of Thick Granular Bases Under Heavy Aircraft Loading

Major Advisor: Dr. Robert L. Lytton

Bachelor of Science in Civil Engineering (Honors), Univ. of Peradeniya, Sept. 1981

Project Report Topic: Construction of Brick Dome for Underground Structures

Major Advisor: Dr. M. M. Amaratunga

### **RESEARCH INTERESTS**

Pavement Materials, Civil Engineering Materials, Durability of Portland Cement Concrete, Aggregates, Binder-Aggregate Bonding, Fracture Mechanics, Surface Science, Pavement Design, Pavement Maintenance, Pavement Management, Transportation Engineering

### **PROFESSIONAL EXPERIENCE IN THE ACADEMIC ENVIRONMENT**

Aug. 2001 – todate: Assistant Professor (Tenure-Track) with Graduate Faculty Status, Dept. of Civil Engineering, Texas Tech University, Lubbock.

Duties: Teaching undergraduate and graduate courses, conducting funded research, supervision of graduate student research, advising graduate students

Teaching Topics: Transportation Engineering (undergraduate), Advanced Pavement Materials (graduate), Advanced Pavement Design (graduate), Pavement Management Systems (graduate)

Research Topics: Pavement materials, aggregate-binder interface in asphalt and Portland cement concrete, pavement maintenance, concrete durability, fracture mechanics, recycled materials

Sept. 1996 - May 2001: Research Assistant Professor with Graduate Faculty Status, Dept. of Civil Engineering, Texas Tech University, Lubbock.

Duties: Conducting funded research, supervision of graduate student research, advising graduate students, teaching graduate and undergraduate classes

Research Topics: Forensic investigation of pavement failures, pavement reflectivity of roadway lighting, pavement design specifications for design-build contracts, recycled materials in highway construction, skid resistance of asphalt concrete pavements, roadway design improvements

Teaching Topics: Introduction to geotechnical engineering (undergraduate), probability and statistics for civil engineers (undergraduate)

Oct. 1994 – Aug. 1996: Post-Doctoral Research Associate, Dept. of Civil Engineering, Texas Tech University, Lubbock.

Duties: Research support, supervision of graduate student research, teaching undergraduate students  
Research Topics: Skid resistance of asphalt concrete pavements, use of hydrated fly ash and glass cullet in highway construction

Teaching Topics: Pavement materials and design (for undergraduate transportation eng.), probability and statistics for civil engineers (undergraduate)

Aug. 1990 – Sept. 1994: Graduate Research Assistant, Texas Transportation Institute, Texas A&M University System, College Station.

Research Topics: Rigid pavement analysis and design, modeling of pavement distresses, Portland cement concrete, aggregates

Jan. 1988 – Aug. 1990 - Graduate Research Assistant, Texas Transportation Institute, Texas A&M University System, College Station.

Research Topics: Granular materials, development of finite element code for analysis of pavement structures, non-destructive testing and evaluation of pavements

## **EXPERIENCE IN THE INDUSTRIAL ENVIRONMENT**

Nov. 1986 – Nov. 1987: Business Analyst and Software Development Team Leader, Data Management Systems, Sri Lanka

Description of Work: Analysis of software needs in industrial organizations, systems engineering, management of software development projects

Nov. 1985 – Oct. 1986: Works Manager, Precast Yard, State Engineering Corporation of Sri Lanka

Description of Work: Overall administration of precast concrete manufacturing facility

Apr. 1984 – Oct. 1985: Design Engineer, State Engineering Corporation of Sri Lanka

Description of Work: Design of reinforced concrete buildings including an 8-storey structure for the Petroleum Corporation of Sri Lanka, drainage design

May 1983 – Mar. 1984: Project Engineer, State Engineering Corporation of Sri Lanka

Description of Work: Construction of a building complex for Central Bank of Sri Lanka

May 1982 – Apr. 1983: Site Engineer, Construction Group, State Engineering Corporation of Sri Lanka

Description of Work: Construction of a 5-mile highway with flexible pavement for Investment Promotions Zone

Nov. 1981 - May 1982: Site Engineer, Construction Group, State Engineering Corporation of Sri Lanka

Description of Work: Construction of a multi-story reinforced concrete building and a water retaining structure for land development project

## **HONORS, AWARDS AND OTHER RECOGNITION**

TxDOT Top 10 Innovative Research Project Award for *Seal Coat Constructability Review* (1999)

TxDOT Top 10 Innovative Research Project Award for *Roadway Lighting Design by STV* (2001)

Merit Award, Professional Licensure Exam, Inst. of Civil Engineers, London, England (1985)

## TEACHING

### University Courses Developed/Taught:

#### Undergraduate Courses Taught

- CE 4361: Transportation Engineering
- CE 4331: Special Problems in Civil Engineering
- CE 3210: Procedures in Problem Analysis II (Probability and Statistics)
- CE 3321: Introduction to Geotechnical Engineering

#### Graduate Course Taught

- CE 5351: Advanced Pavement Materials
- CE 5352: Advanced Pavement Design
- CE 5353: Pavement Management Systems
- CE 5331: Advanced Work in Specific Fields

#### Graduate Courses Developed

- CE 5351: Advanced Pavement Materials
- CE 5352: Advanced Pavement Design
- CE 5353: Pavement Management Systems

### Graduate Student Committees

#### As Chair of Doctoral Dissertation Committee:

1. A. S. M. Ashek Rana, Doctoral Candidate  
Dissertation Topic: Evaluation of Recycled Material Performance in Highway Applications and Optimization of their Use
2. Aruna Amarasiri, Ph.D., December 2003  
Dissertation Topic: A study of fracture properties of medium-strength concrete using notched-cylinders

#### As Chair of Master's Theses Committee:

1. Subrata Das, Master's Thesis Student  
Thesis Topic: Characterization of Asphalt-Aggregate Interface in Seal Coats
2. Baris Yazgan, Master of Science, December 2003  
Thesis Topic: A New Testing Protocol for Seal Coat Aggregate-Binder Compatibility
3. Jabed Riyad Khan, Master of Science, December 2003  
Thesis Topic: Influence of Aggregate Surface Characteristics on Concrete Pavement Performance
4. Sang-Yun Lee, Master of Science, August 2002  
Thesis Topic: Petrographic Evaluation of Bridge Deck Concrete Durability
5. Montasheema Afrose, Master of Science, May 2002  
Thesis Topic: Effect of Curing Time on Bridge Deck Concrete Durability
6. Ashfia Yasmin, Master of Science, December 2000  
Thesis Topic: An Analysis of Practices for Concrete Bridge Deck Durability
7. Md. Mosharrif Hossain, Master of Science, August 1998  
Thesis Topic: Influence of Moisture Content in Granular Bases on Pavement Performance
8. Mainul Hasan Khan, Master of Science, August 1998  
Thesis Topic: Influence of Pavement Surface Characteristics on Light Reflectance Properties

As Chair of Master of Engineering Committee:

1. Manav Nanda, Master of Civil Engineering, December 2003  
Report Topic: A comparison of some durability characteristics of bridge deck mix designs
2. Mohamed Al-Masud, Master of Civil Engineering, May 2002  
Report Topic: Modeling of CRC Pavements using LTPP Data
3. Kiranmayi Sonti, Master of Civil Engineering, August 1999  
Report Topic: Use of Scrap Tires in Civil Engineering Applications
4. Sk Md Zulfiqar Rahman, Master of Civil Engineering, December 1998  
Report Topic: Geometric Design Considerations of Super-Two Highway
5. Mustaque Ahmed Rumi, Master of Civil Engineering, August 1998  
Report Topic: A Framework for Evaluation of Pavement Designs in Design-Build Contracts

As Member of Doctoral Dissertation Committee:

1. Biju Thomas, Doctor of Philosophy, December 2001  
Dissertation Topic: Neural Network Approach to Predict Skid Resistance of Pavements
2. Prasanna Rachakatla, Doctor of Philosophy, December 2000  
Dissertation Topic: Application of Relational Database Principles for Rating Bituminous Coarse Aggregates with Respect to Frictional Performance
3. Hsiu-Chung (Edward) Lee, Doctor of Philosophy, December 1997  
Dissertation Topic: An Analysis of Long-Term Seasonal Interaction Between Slab-on-Ground Foundation and Expansive Soils
4. Farid Uddin Khan, Doctor of Philosophy, August 1997  
Dissertation Topic: Mathematical Simulation of Horizontal Well Performance in Naturally Fractured Rock Formations, (As graduate school representative)

As Member of Master's Thesis Committee:

1. Hari Amidala, Master of Science, December 2003  
Thesis Topic: Effects of Curing on Shrinkage Cracking in Bridge Deck Concrete
2. Ran Kamiyama, Master of Landscape Architecture, May 2003  
Thesis Topic: Analysis and Evaluation of Bicycle Route Networking in Lubbock
3. Hector Garcia-Monzon, Master of Science, May 2003  
Thesis Topic: Maturity of Concrete Strength Development
4. Mohammed Didarul Alam, Master of Science, August 2000  
Thesis Topic: Constructability Review and Economic Analysis for the Installation of Large Diameter HDPE Drainage Pipe,
5. Taya Ann Retterer, Master of Science, May 2000  
Thesis Topic: Gravity and Mechanically Stabilized Earth Walls using Whole Scrap Tires
6. Frank Phillips, Master of Science, May 2000  
Thesis Topic: Comparative Analysis Between the Magnesium Sulfate Soundness and Micro-Deval Tests in the Evaluation of Bituminous Aggregates

As Member of Master of Engineering Committee:

1. Appa Rao Hoare, Master of Civil Engineering, December 2003  
Report Topic: Feasibility of Using the Micro-Deval Test Method in Aggregate Quality Control
2. Umut Isler, Master of Civil Engineering, August 2000  
Report Topic: In-Situ Vitrification of Subgrade Soils
3. Ilker Karaca, Master of Engineering, May 1999  
Report Topic: Analysis of Statewide Seal Coat Constructability Review
4. Emin Silay, Master of Engineering, December 1998  
Report Topic: Benefit-Cost Analysis for Improved 2-Lane, 2-Way Highway Sections

## RESEARCH

### Research Publications

#### Technical Papers

1. Sanjaya Senadheera, Priyantha W. Jayawickrama and A.S.M. Ashek Rana, "Crushed Hydrated Fly Ash as a Construction Aggregate", *Geotechnical Special Publication No. 79*, Geo Congress '98, ASCE Annual Congress, Boston, October 1998.
2. Gransberg, D.D., Sanjaya Senadheera and I. Karaca, "Seal Coat Constructability Program," *1999 Transactions*, American Assoc. of Cost Engineers, Denver, June 1999.
3. Mainul Khan, Sanjaya Senadheera, Douglas Gransberg and Roman Stemprock, "Influence of Pavement Surface Characteristics on Nighttime Visibility of Objects", in *Traffic Signing, Visibility, and Rail-Highway Grade Crossings*, Transportation Research Record 1692, Nov. 1999.
4. Ashek Rana, Sanjaya Senadheera, Phillip Nash and Rebecca Davio, "Long-Term Monitoring of Recycled Material Performance", *Proceedings*, ASCE Texas Section, Spring 2000 Meeting.
5. Kiran Munukutla and Sanjaya Senadheera, "Scrap Tires as a Construction Material", *Proceedings*, ASCE Texas Section, Spring 2000 Meeting.
6. Mujahid Akram and Sanjaya Senadheera, "Use of Geotextiles in Pavement Construction and Rehabilitation", *Proceedings*, ASCE Texas Section, Spring 2000 Meeting.
7. Aruna Amarasiri, Sanjaya Senadheera and R. Scott Phelan, "Fracture Properties of Bridge Deck Concrete", *Proceedings*, ASCE Texas Section Spring 2002 Meeting.
8. Douglas Gransberg, Ilker Karaca and Sanjaya Senadheera, "Calculating Roller Requirements for Chip Seal Projects", Paper Accepted for Publication in the *Journal of Construction Engineering and Management*, American Society of Civil Engineers, 2003.
9. Baris Yazgan and Sanjaya Senadheera, "A New Testing Protocol for Seal Coat (Chip Seal) Material Selection", Being reviewed for *Transportation Research Record*
10. Sanjaya P. Senadheera and Dan G. Zollinger, "A Framework for Incorporation of Spalling in the Design of Concrete Pavements", *Design and Rehabilitation of Pavements*, Transportation Research Record 1449, Based on Paper Presented at the 73rd Annual Meeting of the Transportation Research Board, January 1994.
11. Dan G. Zollinger, Sanjaya P. Senadheera, and Tianxi Tang, "Spalling of Continuously Reinforced Concrete Pavements", Vol. 120(3), *Journal of Transportation Engineering*, ASCE, May/June 1994.
12. Tianxi Tang, Dan G. Zollinger and Sanjaya P. Senadheera, "Analysis of Concave Curling in Concrete Slabs", Vol. 119(4), *Journal of Transportation Engineering*, ASCE, July/Aug.1993.

#### Technical Notes

1. Douglas D. Gransberg and Sanjaya P. Senadheera, "Design-Build Contract Award Methods for Transportation Projects", Technical Note No. 18154, Vol. 125(6), *Journal of Transportation Engineering*, ASCE, November/December 1999.

### Guest Lectures/Invited Presentations

1. Invited Presentation on Seal Coat Constructability Review to TxDOT/Texas Transportation Institute Transportation Short Course (2000)
2. Invited Presentations on Seal Coat Constructability Review to Texas Hot Mix Asphalt Pavement Association Southern Region Seal Coat Committee Meeting in Corpus Christi (2000), Western Region Seal Coat Committee Meeting in Abilene (1999)
3. Invited Presentation on Hydrated Fly Ash to Seminar Sponsored by De Pauw Fly Ash, Inc. of Amarillo held in Lubbock, Texas (1996).

## **Other Presentations**

### For Industry Groups:

- 12 Seal Coat training seminars at various TxDOT districts
- 7 Training Workshops on Recyclable Material Usage at various TxDOT districts

### Technical Papers/Posters:

- Paper at *Road to Recycling* conference sponsored by TxDOT/TNRCC, Austin (1999)
- Paper/poster at 5th NSF Conf. on *Bridge Research in Progress* at Minneapolis (2001)
- Paper at the Conference on *Beneficial Use of Recycled Materials in Transportation Applications*, Arlington, VA (2001)
- Paper at 81st Transportation Research Board Annual Meeting (2002) on *Environmental Suitability of Traditional Construction and Maintenance Materials*
- Paper for Andrew Budek at the ACI Convention in Phoenix (2002) *Why the Eye isn't Good Enough: Crack Width Measurement Methods for Concrete*.
- Aruna Amarasiri, Priyantha Jayawickrama and Sanjaya Senadheera (1999), *Use of Large-Diameter HDPE Pipes on Highway Construction: Current State of Practice*, Paper Presented at the Annual Meeting of Transportation Research Board, Washington D.C.

## **Research Reports**

- 11 research reports published at Texas Tech University for Texas Dept. of Transportation
- 1 research reports published at Texas A & M University for Texas Dept. of Transportation

## **Dissertations and Theses**

- Sanjaya P. Senadheera, "Spalling in Concrete Pavements: Its Relationship to Coarse Aggregate in Concrete and a Framework for Design," Doctoral Dissertation, Texas A&M University, College Station, May 1995.
- Sanjaya P. Senadheera, "Analysis for Design of Thick Granular Bases Under Heavy Aircraft Loading," Master's Thesis, Texas A&M University, College Station, August 1990.

## **Grants**

### Grants Received

1. Extension to Effects of Wet Mat Curing & Earlier Loading on Bridge Deck Durability, TxDOT, Co-PI, \$225,000, 1 year.
2. Seal Coat Field Guide, TxDOT Research Implementation Project, PI, \$10,000, 2 years
3. SiteManager-GIS Interface for Monthly Construction Progress Report, TxDOT Inter-Agency Contract, Co-PI, \$6,500, 1 year
4. Develop a Testing and Evaluation Protocol to Assess Seal Coat Binder-Aggregate Compatibility, TxDOT, PI, \$238,702, 2 years
5. Improving Edge Repair and Stabilization, TxDOT, Co-PI, \$196,851, 2 years
6. Regional Workshops on Nonhazardous Recycled Materials (NRMs), TxDOT, Co-PI, \$136,000, 2 years
7. Seal Coat Constructability Review Research Implementation, TxDOT, PI, \$12,875, 1 year
8. Inorganic Additives to Reduce Concrete Pavement Spalling, TxDOT, PI, \$56,673, 1 year
9. Effects of Wet Mat Curing & Earlier Loading on Bridge Deck Durability, TxDOT, Co-PI, \$1,100,000, 5 years
10. Environmental Assessment of Traditional Construction Materials, TxDOT, Co-PI, \$165,491, 2 years
11. Seal Coat Constructability Review, TxDOT, PI, \$293,000, 3 years
12. Comparative Analysis of Micro-Deval & Magnesium Sulfate Soundness Tests, TxDOT, Co-PI, \$132,549, 2 years
13. Evaluation of Backfill Materials and Installation Methods for HDPE Pipe, TxDOT, Co-PI, \$217,000, 3 years
14. The Road to Recycling, FHWA, Co-PI, \$115,000, 3 years

15. Use of Whole Tires in Earth Retaining Structures, TxDOT, Co-PI, \$222,000, 2 years
16. Pavement Forensic Study Support, TxDOT, Co-PI, \$30,000, 1 year
17. Evaluate Use of Scrap Tires, TxDOT, PI, \$57,000, 1 year
18. Improved 2-Way Highway Geometry, TxDOT, Co-PI, \$89,000, 1 year
19. Evaluation of Roadway Lighting Designed by STV Method, TxDOT, Co-PI, \$458,000, 3 years
20. Turn-Key Construction, TxDOT, Co-PI, \$75,000, 1 year

Proposals Approved by Appropriate Peer Group

28 proposals

## **SERVICE**

### **Professional Registration**

Engineer-in-Training, Texas

Passed the Professional Examinations conducted by The Institution of Engineers, Sri Lanka, to achieve Chartered Engineer Status (P.E. Equivalent), 1986

Passed the Professional Examinations conducted by The Institution of Civil Engineers, London, England to achieve Chartered Engineer Status (P.E. Equivalent), 1985

### **Membership in Professional Societies**

Member, American Concrete Institute (ACI)

Member, American Society of Civil Engineers (ASCE)

Member, International Society of Concrete Pavements (ISCP)

Affiliate Member, Transportation Research Board (TRB)

Former Member, American Association of Asphalt Paving Technologists (AAPT)

Former Member, American Society for Testing and Materials (ASTM)

### **Professional Service Activities**

Member, American Concrete Institute Committees 221 (Aggregates), 308 (Curing), 325 (Pavements)

Member, TxDOT Technical Advisory Panel on Pavement Research since 1996

Paper Reviewer for ASCE Journals of Transportation Engineering and Materials Engineering

Paper Reviewer for ACI Materials Journal

### **University Activities**

Texas Tech University Faculty Incentive Grant Review Panel

### **Departmental Activities**

Chair, Information Technology Committee

Member, Recruiting and Public Relations Committee, Since Fall 1998

Member, Transportation Faculty Search Committee

Served as Member of HEAF Committee