

## UMME AMINA MANNAN

### School Address

Department of Civil Engineering  
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### Research Interests

Highway material characterization, Rheological and mechanical analyses of viscoelastic materials, Dynamical mechanical and thermomechanical analysis, Linear and nonlinear viscoelastic properties characterization, Pavement response and performance modeling, Traffic characterization for pavement design.

### Education

#### **PhD Candidate**, Civil Engineering

University of New Mexico, Albuquerque, NM      GPA 4.04/4.00      2016  
Thesis: “*Quantifying Healing During Fatigue Damage in Asphalt Binder and Mastic*”

#### **Master of Science**, Civil Engineering

University of Akron, OH      GPA 3.953/4.00      2012  
Thesis: “*Effect of Recycled Asphalt Shingles (RAS) on Physical and Chemical Properties of Asphalt Binders*”

#### **Bachelor of Science**, Civil Engineering

Bangladesh University of Engineering & Technology, Dhaka, Bangladesh      GPA 3.64/4.00      2009  
Thesis: “*Analytical Study of Horizontally Curved Bridge Deck by STAAD.Pro*”

### Honors, Grants & Fellowships

- UNM Civil Engineering Travel Grant, \$500      2016
- Elvidio V. Diniz, P.E. UNM Water Resources Scholarship, New Mexico Section of ASCE, \$1000      2015
- UNM Civil Engineering Travel Grant, \$500      2015
- Student Research Grant (SRG), Graduate & Professional Student Association, University of New Mexico, NM, \$500      2014
- Research Assistantship, University of New Mexico, NM      2012 – present
- Research Assistantship, University of Akron, OH      2010 – 2012
- Technological Scholarship (award for excellence in engineering education) Govt. of Peoples Republic of Bangladesh      2008
- Academic Achievement Scholarship (award for excellent result in undergraduate education), Bangladesh University of Engineering & Technology, Dhaka, Bangladesh      2007

### Research Experiences

#### **Asphalt Binder Lab**, University of New Mexico, NM

2012–present

Conducted experiments on Asphalt materials using RTFO, PAV, DSR, BBR and Rotational Viscometer; supervised and trained Masters students and new PhD students; coordinated communication between professors and suppliers.

**LTPP Data Analysis**, University of New Mexico, NM 2012–present  
Analyzed LTPP database and correlated with the NM field data; incorporated the LTPP data in the MEPDG software.

**Pavement Lab**, University of New Mexico, NM 2012–present  
HMA mix design and volumetric properties of mixture; Dynamic Modulus Test, Four-point Beam Fatigue Test, Hamburg Wheel Tracking (HWT) Test and Moisture Induced Sensitivity Test Sensitivity Test (MIST).

**Asphalt Binder Lab**, University of Akron, OH 2010–2012  
Conducted experiments on Asphalt materials using RTFO, PAV, DSR, BBR and Rotational Viscometer; coordinated communication between professors and suppliers.

**Chemical Testing**  
Experience on GPC, DSC, TGA, NMR, microscopy techniques. 2011–present

### Teaching Experiences

**Mechanics of Materials** (Instructor), University of New Mexico, NM Spring 2015  
Developed course syllabus, assignments and exams; handled teaching and grading with full responsibility; advised students during office hours.

**Solid Mechanics** (Teaching assistant), University of Akron, OH Fall 2011 & Spring 2010  
Graded the assignments; gave lectures while professor was out of town; advised students during office hours.

**Soil Mechanics** (Teaching assistant), University of Akron, OH Fall 2010  
Graded the assignments; advised students during office hours.

**Soil Mechanics Lab**, University of Akron, OH 2010–2012  
Supervised undergraduate students during the lab; graded lab report.

### Teaching Interests

Solid Mechanics, Mechanics of Materials, Soil Mechanics, Highway materials, Advanced Characterization of Highway Materials, Pavement Design and Analysis.

### Proposal Writing

- SOLARIS Transportation Center Grant, Relating Dynamic Shear Modulus of Performance Grade Asphalt Binders to Nanoindentation Stiffness, Role: Co–Investigator (with Principal Investigator Dr. R. A. Tarefder), Total Amount: \$79,950, 2014-2015.
- New Mexico Department of Transportation (NMDOT) Grant Evaluation of Plus Grades of Performance Graded (PG) Asphalt Binder Phase II, Role: Co–Investigator (with Principal Investigator Dr. R. A. Tarefder), Total Amount: \$250,000, (Submitted).

### Journal Publications

- A. R. Abbas, U. A. Mannan, and S. Dessouky, Effect of recycled asphalt shingles on physical and chemical properties of virgin asphalt binders, *Construction and Building Materials*, vol. 45, pp. 162–172, Aug. 2013.
- M. R. Islam, U. A. Mannan, A. A. Rahman, and R. A. Tarefder, Effects of Reclaimed Asphalt Pavement on Hot-mix Asphalt, *Advances in Civil Engineering Materials*, vol. 3, no. 1, p. 291–307, May 2014.

- U. A. Mannan, M. R. Islam, and R. A. Tarefder, Effects of recycled asphalt pavements on the fatigue life of asphalt under different strain levels and loading frequencies, *International Journal of Fatigue*, vol. 78, pp. 72–80, 2015.
- U. A. Mannan, M. R. Islam, M. Weldegiorgis, and R. A. Tarefder, Experimental investigation on rheological properties of recycled asphalt pavement mastics, *Applied Rheology*, vol. 25, pp. 7–15, 2015.
- R.A. Tarefder and U.A. Mannan, Evaluation of Asphalt Mastic Containing Mica Due to Aging, *Proceedings of the Institution of Civil Engineers - Transport* (in Press).

### Technical Reports

- U. A. Mannan, H. Faisal and R. A. Tarefder, Mechanical and Rheological RAP Characterization of NMDOT Mixes, *Report to the Research Bureau of New Mexico Department of Transportation*, Interim report, 2014.
- U. A. Mannan, H. Faisal and R. A. Tarefder, Mechanical and Rheological RAP Characterization of NMDOT Mixes, *Report to the Research Bureau of New Mexico Department of Transportation*, Quarterly report, vol. 1–13.

### Conference Proceedings

- U. A. Mannan and R. Tarefder, Performance of Recycled Asphalt Pavements (RAP) Based on LTPP Data of Southern Regions, in 3rd International Conference on Environmental Pollution and Remediation, 2013.
- M. Hossain, U. A. Mannan, and R. Tarefder, Predicting pavement performance due to temperature increase caused by global warming, *Sustainability, Eco-efficiency, and Conservation in Transportation Infrastructure Asset Management*, p.453, 2014.
- M. R. Islam, U. A. Mannan, A. Rahman, and R. A. Tarefder, Simplified Thermal Stress Model to Predict Low Temperature Cracks in Flexible Pavement, in *Pavement Materials, Structures, and Performance*, 2014, pp. 251–261.
- R. M. Islam, U. A. Mannan, A. A. Rahman, and R. A. Tarefder, Effects of Recycled Asphalt Pavement on Mix and Binder Properties and Performance in the Laboratory, *Transportation Research Board 93rd Annual Meeting*. No. 14-4748. 2014.
- U. A. Mannan and R. Tarefder, Evaluation of Long-Term Pavement Performance Based on New Mexico LTPP SPS5 Data, in 2nd Transportation and Development Institute (T&DI) Congress 2014, 2014.
- U. A. Mannan, M. R. Islam, and R. A. Tarefder, Fatigue Behavior of Asphalt Containing Reclaimed Asphalt Pavement, *Transportation Research Board 94th Annual Meeting*. No. 15-5828. 2015.
- M. Ahmad, U. A. Mannan and R. A. Tarefder, Effects of Moisture Conditioning on Chemical and Mechanical Properties of Asphalt Concrete, *Transportation Research Board 95th Annual Meeting*. No. 16-6677. 2016.
- J. Pan, U. A. Mannan and R. A. Tarefder, Investigation of Oxidation Effect on the Properties of Asphalt Under Different Temperatures Using Molecular Simulation and Laboratory Testing, *Transportation Research Board 95th Annual Meeting*. No. 16-4831. 2016.

### Professional Services

#### Memberships

University of New Mexico-Future Leaders in Pavement and Transportation (UNM-FLPT)  
Society of Women Engineers (SWE)  
New Mexico Section of American Society of Civil Engineers (ASCE)  
Engineers Without Borders UNM (EWB-UNM)  
American Society of Civil Engineers (ASCE)

**Journal Reviewer**

Applied Rheology  
Journal of Testing and Evaluation

**Workshops**

Introduction To Rheology with Anton-Paar	2015
Asphalt Binder extraction and recovery (Rotavapor) for NMDOT	2014
DSR Testing for NMDOT	2014

**Professional Affiliations**

**Engineer Intern (EI)**, Ohio Board of Registration for Professional Engineers and Surveyors (2012)

**Industry Experience**

**Junior Project Engineer** Design Develop Build Ltd., Dhaka, Bangladesh 2009-10  
Checking and designing Structural Drawing; Contract Management and Project Monitoring; Cost Estimation.

**Professional Skills**

Rheology, Pavement Material, Pavement Engineering, Geotechnical Engineering, Traffic Engineering, Transportation Engineering, ArcGIS, Matlab, Microsoft Office, AutoCAD, STAAD, ABAQUS, RStudio, SPSS, SAP, MS Project, Cost Estimating, Project Estimation, MathCAD, Structural Analysis, Foundation Design, Concrete, Highways.

**References**

Available upon request.