PROSPER-Related Projects

Highway and Airport Pavement Infrastructure Assessment and Modeling

1. Investigator: Ceylan, H.; Project: Nondestructive Evaluation of Iowa Pavements - Phase I; Sponsor: Iowa DOT; Duration: July 1, 2004 – July 31, 2007; Total funding: $157,442; Role: PI

2. Investigators: Williams, C. and Ceylan, H.; Project: Investigation of Electro-Magnetic Gauges for Determination of In-Place Density of HMA Pavements; Sponsor: IHRB; Duration: November 1, 2005 – February 28, 2007; Total funding: $50,896; Role: Co-PI


4. Investigator: Ceylan, H.; Project: Nondestructive Evaluation of Iowa Pavements - Phase II; Sponsor: Iowa DOT; Duration: January 1, 2007 – June 30, 2008; Total funding: $55,000; Role: PI

5. Investigators: Phares, B., Ceylan, H., Souleyrette, R., and Smadi, O.; Project: Development of a Device for Analysis of Portland Cement Concrete and Composite Pavements; Sponsor: FHWA and Iowa DOT; Duration: March 15, 2007 – March 15, 2008; Total funding: $80,000; Role: Co-PI

6. Investigators: Heitzman, M., Maser, K., Tran, N., Brown, R., Hiltunen, D., Holland, S., and Ceylan, H.; Project: R06-D Nondestructive Testing to Identify Delaminations between Pavement Layers, Sponsor: Strategic Highway Research Program (SHRP II); Duration: 3 years; Total funding: $800,000 Role: Investigator

7. Investigators: Ceylan, H., Gopalakrishnan, K., Shrotriya, P. and Taylor, P. C.; Project: Embedded Micro-Electromechanical Sensors and Systems (MEMS) for Monitoring Highway Structures and for Infrastructure Management; Sponsor: IHRB; Project dates: July 1, 2009 – June 30, 2011; Duration: 24 months; Total funding: $999,571; Role: PI

8. Investigators: Ceylan, H., Gopalakrishnan, K., and Kim, S. Improving the Accuracy and Usability of Iowa Falling Weight Deflectometer Data, Sponsor: Iowa DOT; Duration: 12 months; project dates: August 31, 2011 – August 31, 2012; Total funding: $109,991; Role: PI


Mechanistic and Performance-Based Pavement Analysis, Design, and Construction Technology

Highway and local road–related projects

1. Investigators: Ceylan, H., and Coree, B.; Project: Rehabilitation of Concrete Pavements Utilizing Rubblization and Crack and Seat Methods; Sponsor: IHRB; Duration: Jan. 1, 2002 – Oct. 31, 2005; Total funding: $173,000; Role: PI

2. Investigator: Cable, J. K., Ceylan, H., and Fanous, F.; Project: Design and Construction Procedures for Concrete Overlay and Widening of Existing Pavements; Sponsor: IHRB and FHWA; Duration: October 1, 2003 – September 30, 2005; Total funding: $214,333; Role: Co-PI

3. Investigators: Cable, J. K. and Ceylan, H.; Project: Long Term Performance Evaluation of Concrete Pavements; Sponsor: FHWA; Duration: November 1, 2003 – December 31, 2004; Total funding: $13,000; Role: Co-PI

4. Investigators: Coree, B., and Ceylan, H.; Project: AASHTO 2002 Pavement Design Guide Implementation Plan; Sponsor: IHRB; Duration: November 1, 2003 – May 31, 2005; Total funding: $88,000; Role: Co-PI

5. Investigators: Phares, B., Wipf, T., and Ceylan, H.; Project: Impacts of Overweight Implements of Husbandry on Minnesota Roads and Bridges; Sponsor: Minnesota DOT; Duration: August 1, 2004 – December 31, 2004; Total funding: $19,939; Role: Co-PI


7. Investigator: Ceylan, H.; Project: NCHRP Project No. 1-40A(02), Independent Review of the Recommended Mechanistic-Empirical Pavement Design Guide and Software – New PCC Pavements (NCHRP Study 1-37A); Sponsor: NCHRP; Duration: November 1, 2004 – November 30, 2005; Total funding: $18,000; Role: PI

8. Investigators: Schaefer, V., White, D., Ceylan, H., Sharma, R., and Stevens, L.; Project: Design Guide for Improved Quality of Roadway Subgrade and Subbases; Sponsor: IHRB; Duration: November 1, 2004 – April 30, 2006; Total funding: $153,212; Role: Co-PI


10. Investigators: Ceylan, H., and Gopalakrishnan, K.; Project: Performance Evaluation of Rubblized Pavements in Iowa; Sponsor: IHRB; Duration: January 1, 2006 – August 31, 2007; Total funding: $46,212; Role: PI

11. Investigators: White, D. J., Ceylan, H., Suleiman, M. T., Jahren, C. T., and Cackler, T.; Project: Performance Evaluation of Concrete Pavement Granular Subbase; Sponsor: Iowa DOT; Duration: February 1, 2006 – July 31, 2007; Total funding: $150,000; Role: Co-PI
12. Investigators: Ceylan, H., Gopalakrishnan, K., and Smadi, O.; Project: Existing Pavement Input Information for the Mechanistic-Empirical Pavement Design Guide (Task 7); Sponsor: Iowa DOT; Duration: May 1, 2006 – April 30, 2007; Total funding: $40,000; Role: PI

13. Investigators: Ceylan, H., Gopalakrishnan, K., and Smadi, O.; Project: Validation of Pavement Performance Models for the Mechanistic-Empirical Pavement Design Guide (Task 8); Sponsor: Iowa DOT; Duration: May 1, 2006 – April 30, 2007; Total funding: $40,000; Role: PI

14. Investigators: Stevens, L., Suleiman, M., Schaefer, V., and Ceylan, H.; Project: Utility Cut Repair Techniques to Reduce Settlement in Repaired Areas, Phase 2; Sponsor: IHRB; Duration: December 1, 2006 – May 31, 2009; Total funding: $165,316; Role: Co-PI


16. Investigators: Khazanovich, L. and Ceylan, H.; Project: Effects of Implements of Husbandry “Farm Equipment” on Pavement Performance – FHWA Pooled-Fund Study; Sponsors: Minnesota DOT ($105,000), Minnesota Local Roads Research Board ($105,000), IHRB ($105,000), Illinois DOT ($105,000), Various Farm Equipment Manufacturers ($30,000 + In-kind contributions); Duration: 36 months (September 15, 2007 – September 14, 2010); Total funding: $433,000; Role: Co-PI (PI for the project share for Iowa State University)

17. Investigators: Schwartz, C. W. and Ceylan, H.; Project: NCHRP Project 1-47, Sensitivity Evaluation of MEPDG (Mechanistic-Empirical Pavement Design Guide) Performance Prediction (Phase I and Phase II), Expected project dates: August 1, 2009 – March 31, 2011; Sponsor: National Cooperative Highway Research Program; Duration: 21 months; Total funding: $250,000; Role: Co-PI. (Phase II funding was secured in 2010).

18. Investigators: Williams, R. C. and Ceylan, H.; Project: Mechanistic Design Guide Calibration for Pavement Rehabilitation; Duration: 22 months; Expected project dates: September 1, 2010 – June 30, 2012; Sponsors: Oregon DOT; Total funding: $139,998; Role: Co-PI.


20. Investigators: Cackler, T., White, D. J., and Ceylan, H. Optimizing Pavement Base, Subbase, and Subgrade Layers for Cost and Performance on Local Roads, Duration: 24 months; Project dates: November 22, 2011 – November 21, 2013; Sponsor: IHRB; Total funding: $150,000; Role: Co-PI.


Selected airport pavements–related publications and presentations


**Sustainable Infrastructure/Engineering Materials**

1. Investigators: Grove, J.; Cackler, T.; PCC Center Investigators including Dr. Ceylan; Project: Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements, Phases I and II; Sponsors: Pooled Fund Study including Iowa DOT, ACPA, and 16 other State DOTs; Duration: Feb. 1, 2003 – Dec. 2007; Role: Investigator

2. Investigators: Wang, K., **Ceylan, H.,** and Bektas, F.; Project: Determination of the Effect of Ordinary Portland Cement Fineness on ASTM C1260 Expansion - Portland Cement
Association Fellowship; Sponsor: FHWA; Duration: May 31, 2005 – December 31, 2006; Total funding: $20,000; Role: Co-PI

3. Investigators: Ceylan, H., Schaefer, V., and Gopalakrishnan, K.; Project: Characterization of Unbound Materials (Soils/Aggregates) for Mechanistic-Empirical Pavement Design Guide (Task 5); Sponsor: Iowa DOT; Duration: May 1, 2006 – October 31, 2007; Total funding: $40,000; Role: PI

4. Investigators: Ceylan, H., and Wang, K.; Project: Characterizing Voids and Sorptivity of Roller Compacted Concrete to Access the Frost Durability; Sponsors: Portland Cement Association and Iowa DOT; Duration: May 1, 2006 – August 31, 2007; Total funding: $30,000 ($25,000 + $5,000); Role: PI

5. Investigators: Rudolphi, T. and Ceylan, H.; Project: Micro-Mechanical Modeling of Pavement Materials: Federal Highway Administration Dwight Eisenhower Fellowship; Sponsor: FHWA and NHI; Duration: August 15, 2006 – August 15, 2007; Total funding: $97,000; Role: Co-PI (Student supported from this fellowship projects mostly worked with Dr. Ceylan).

6. Investigators: Ceylan, H., Gopalakrishnan, K., and Wang, K.; Project: Effect of Admixtures on Roller-Compacted Concrete Mixes; Sponsor: Portland Cement Association ($105,000), FHWA ($25,000); Duration: July 1, 2007 – June 30, 2009; Total funding: $130,000; Role: PI

7. Investigators: Ceylan, H., and Gopalakrishnan, K.; Project: Ethanol Plant By-Product Uses for Pavement Geo-Materials Stabilization; Sponsors: Grow Iowa Values Fund Program ($93,775), Matching funds: IHRB ($50,000 – cash), Grain Processing Corp. of Iowa ($20,000 – In-kind), ISU’s CCEE ($20,000 – In-kind), ISU’s Office of Biorenewables Program ($5,000 – cash); Duration: 22 months (Aug. 1, 2007 – May 31, 2009); Total funding: $188,775; Role: PI

8. Investigators: Wang, K., Taylor, P. C., Hu, J., Ceylan, H., and Bektas, F.; Project: Impact of Low Shrinkage Mixes on Late-age Random Cracking in Pavements with Use of Early Entry Sawing; Sponsor: IHRB; Duration: 24 months (June 1, 2007 – April 30, 2009); Total funding: $40,000; Role: Technical advisor/consultant


10. Investigators: Ceylan, H., Gopalakrishnan, K., and Kim, S. (2013). Biofuel Co-Product Use for Pavement Geo-Materials Stabilization: Phase II - Extensive Lab Characterization and Field Demonstration; Sponsor: Iowa DOT; May 8, 2013 – May 8, 2015; Funding: $247, 967 ($167,967 from IHRB + $80,000 In-kind and Cash Support from Buchanan County Engineer’s Office and industrial firms); Role: PI.