



CPATT NEWS

Message from the Director

We are very pleased to be sending this, our second CPATT newsletter. In an effort to better communicate our news to you, our stakeholders, we publish this newsletter three times annually. We will do our best to highlight some of our key on-going initiatives and keep you up-to-date on our activities. The last several months have been busy with completing projects and getting ready for a busy season of field work. The university laboratories are busy with testing various materials. The University of Waterloo was very successful in the recent round of Ministry of Transportation research proposal, Congratulations to all!

The CPATT equipment in the structures laboratory is busy with various student projects from several professors within civil engineering. The John J. Carrick Pavement CPATT Laboratory has been fully utilized over the last few months. Several pavement slabs are enduring multiple freeze-thaw cycles and many designs and materials are sustainable and designed to be incorporated into municipal and provincial roads. Recently, the CPATT Surpro equipment was out for the MTO calibrations of profilers.

In January, the Norman W. McLeod Chair in Sustainable Pavement Engineering was announced. This is a complimentary activity to CPATT and we are looking forward to hiring a new professor.

If you would like to learn more about anything we have presented in this newsletter, please do not hesitate to contact either Laura Bland at lbland@uwaterloo.ca or Susan Tighe at stighe@uwaterloo.ca. We look forward to hearing from you!

Sincerely,

Susan L. Tighe

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Feature CPATT Faculty Member Shawn Matott, PhD Assistant Professor

Education

Professor Matott is an Assistant Professor in the department of Civil and Environmental Engineering at the University of Waterloo. He has a B.S. in Computer Engineering from Clarkson University, Potsdam, New York and a PhD in Civil, Structural and Environmental Engineering from the University of Buffalo, Buffalo, New York. Prior to joining the faculty at the University of Waterloo, Dr. Matott was a post-doctoral researcher at the United States Environmental Protection Agency's Office of Research and Development.

Shawn Matott, PhD. Assistant Professor, Civil and Environmental Engineering, University of Waterloo.

Research

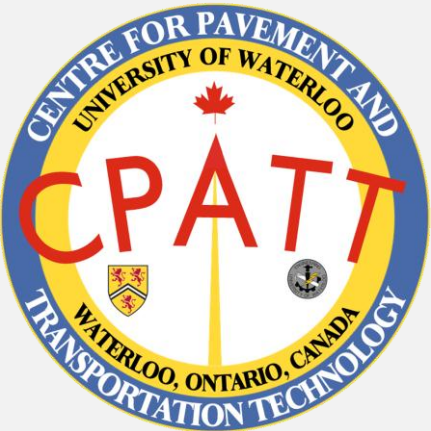
Professor Matott's research investigates the capabilities and limitations of using predictive environmental models to support policy and management decisions. As a graduate student, his work focused on the application of heuristic optimization to groundwater management. As a post-doctoral researcher, he developed uncertainty analysis tools for policy-relevant integrated environmental models. For example, these tools will aid in the analysis of proposed and ongoing mountaintop mining and confined animal feeding operations in the Southeastern United States. Current Canadian-based research activities (with funding source in parenthesis) include design and/or analysis of: hydropower reservoirs (CEATI), wastewater treatment plants (PhRMA), carbon sequestration systems (CMC), and groundwater remediation systems (NSERC).

Current Research Interests in CPATT

- Dr. Matott's research interests in CPATT include using predictive models to facilitate risk assessment of critical Canadian infrastructure, along with scenario analysis of alternative disaster management and response strategies. Dr. Matott is also interested in developing ways to better predict and plan for collateral catastrophes (such as nuclear radiation, 9/11 dust clouds, toxic Katrina flood water) that can severely inhibit disaster relief and recovery efforts and can have effects that persist long after the initial disaster.

Awards

- Certificate – Short Course in Predictive Uncertainty Analysis of Environmental Models
- US EPA 'S' Award – Superior Accomplishment Recognition Award
- US EPA Science Communication Award – Environmental Management (EM) Magazine Team
- Advanced Graduate Certificate: Concentration in Geographic Information Science
- Integrative Graduate Education and Research Training (IGERT) – National Science Foundation (NSF)



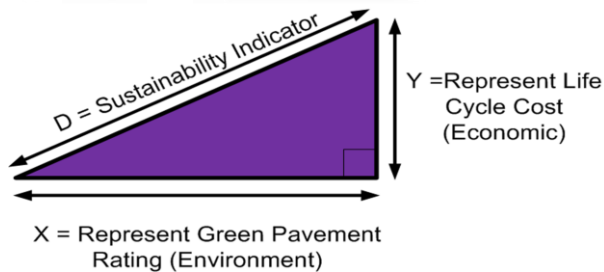
Research Focus – John J. Carrick Pavement Laboratory



Pervious Concrete Slabs



Recycled Shingles



Quantifying Pavement Sustainability

Laboratory Updates

Some of the on-going testing and projects in the laboratory include: Pervious concrete slabs which continue to be tested in the walk-in freezer to evaluate maintenance treatment, the evaluation of warm asphalt technology as a possible tool for resolving longitudinal joint problems, and RAP percentages in various typical Ontario hot mixes. Also we have done some testing and evaluation of an innovative light weight full product from Cematrix. We are also examining the usage of Recycled Concrete Aggregate in concrete.

Another project underway is “Automated Performance Measures for Contract Administration”. The main objective of this study is to develop a practical framework to identify and quantify the effectiveness of automated performance measures. This study will also explore how the identified measures can be effectively monitored and provide guidelines on quality assurance and quality control.



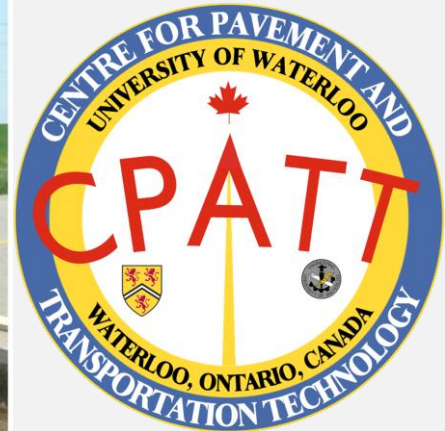
Research Focus – Satellite Test Sections



Collecting
Recycled
Concrete
Aggregate



Strain Gauge
Testing of
Perpetual
Pavements



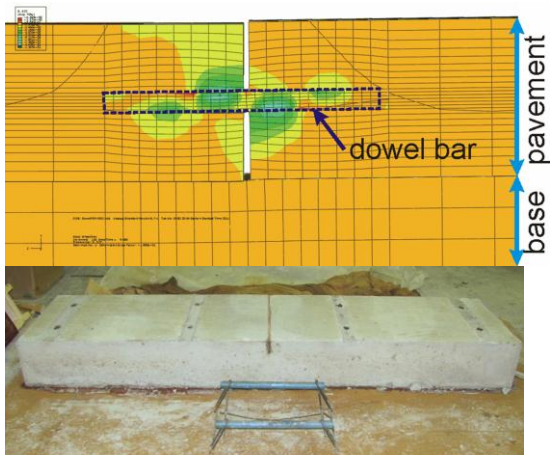
Test Track Updates

The CPATT office/trailer at the Region of Waterloo's Waste Management Facility sits within the footprint of waste cell NE-4. It has been decided that this waste cell will be developed in 2012. Therefore, the Waste Management Facility requires all infrastructures sitting on the cell footprint to be relocated in order to facilitate construction of this waste cell.

After discussion between CPATT and the Waste Management Division it has been decided that the University would like to continue utilizing the site for research purposes.



Research Focus – Structures & Concrete Lab



JPCP Dowelled Joint: Finite Element Analysis Under Wheel Loading

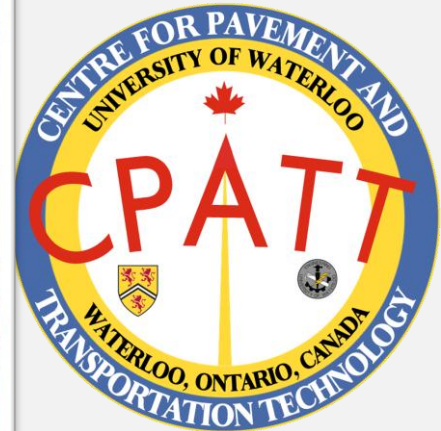
Pavement Slab-strip Specimen
(600mm wide strip, 250mm thick pavement)



RCA Samples



Fracture Energy Testing of Concrete Containing RCA



Structures/Concrete Update

A project is investigating alternative joint load transfer devices for jointed plain concrete pavements (JPCP). Several device concepts have been developed with the objectives of reducing sensitivity to misalignment, improving durability and maintaining joint load transfer. Concepts have been investigated using finite element analysis, and the most promising devices are now being tested in the lab using full-depth slab-strip specimens representing a 600mm wheel path. An FRP plate dowel will be compared to a traditional dowelled joint in the experiments.

Another ongoing project is investigating the use of recycled concrete aggregates (RCA) in structural concrete applications (e.g. bridges, buildings, retaining walls, etc.). The objective of this research is to establish correlations between the RCA characteristics and the properties of concrete where RCA is used to replace all of the coarse aggregate. RCAs from three sources with varying quality have been extensively tested and used to develop concrete mixtures with a range of strengths. The physical and mechanical properties of the RCA concrete, and reinforcement bond and development, are being studied.

Announcements



Visiting Scholar – Xudong Hu

We are very pleased to welcome our visiting scholar Xudong Hu (Dom) from China. Dom works as a lecturer at the National University Defense Technology (NUDT) in China. Dom received his M.S. degree in Road Engineering from the School of Traffic and Transportation Engineering, Changsha University of Science & Technology. His research focuses on recycling asphalt pavement and the thin overlay technique and solar roadways. Dom was able to participate in a few important and interesting projects in China, one of which relating to recycled asphalt pavements was awarded the second prize of China Technology Invention Rewards in 2008. Dom is very happy and appreciative for the invitation to join CPATT as a visiting scholar. He is very pleased to be able to be involved in current state-of-the-practice research projects and to enhance on his knowledge.

Congratulations

Saiedeh Razavi (former PhD student, Carl Haas) – accepted the position of Chair in Heavy Construction at McMaster University

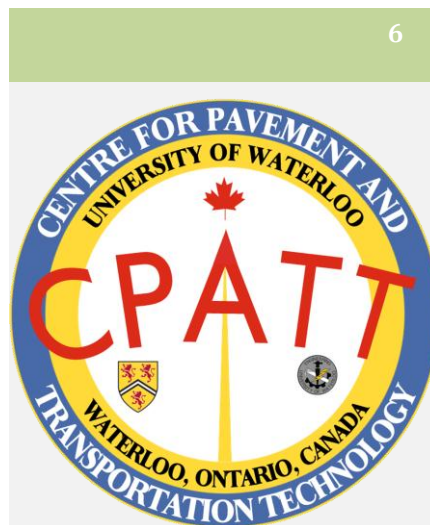
Riyad Ul-Islam (former MAsC student, Susan Tighe) – accepted the position of Project Manager at Stantec Consulting Inc.

Adnan Mushtaq (former MAsC student, Susan Tighe) – accepted the position of Engineer-In-Training at Trow Associates Inc.

Shila Khanal (former MAsC Student, Susan Tighe) – accepted the position of Data Analyst at Fugro Roadware Inc.

CPATT's newest member was born on February 17, 2011 at Grand River Hospital, Kitchener, ON. A beautiful, healthy, baby boy, **Yousef Amin Hamdi**. Yousef's proud parents, Amin (PhD Candidate) and Duaa, and older brother Hashim are enjoying their new bundle of joy!

WELCOME TO THE WORLD YOUSEF!



UPCOMING EVENTS

September 11-14, 2011

TAC 2011 Annual Conference and Exhibition, Edmonton, AB

October 28, 2011

CPATT Board of Advisor's Meeting, University of Waterloo

Student Paper Symposium, University of Waterloo

November 15-19, 2011

8th International Conference on Managing Pavement Assets, Santiago, Chile



Transportation Research Board January 2011

University of Waterloo Hospitality Suite

It is always nice to meet and mingle with UW friends, Alumni and Colleagues. Thank you to the Dean of Engineering Office and Department of Civil and Environmental Engineering for hosting the event.





Transportation Research Board – Cont'd January 2011

University of Waterloo Hospitality Suite

More pictures from the event



Norman W. McLeod Chair in Sustainable Pavement Engineering Launch January 28th, 2011

On January 28th, 2011, Dr. Susan Tighe was named the Norman W. McLeod Chair in Sustainable Pavement Engineering. This endowed Chair will focus on cutting-edge pavement research, collaborative projects with industry and teaching and supervising graduate students.

We greatly appreciate the support of our partners on the new endowed Norman W. McLeod Chair in Sustainable Pavement Engineering. We thank them and look forward to our partnership and continued partnership with our CPATT members. Our industry partners are key industry stakeholders and are knowledgeable in the areas of research in which the Chair will pursue. The resources and expertise they can provide is extremely beneficial as we move forward on various research initiatives. Below is a list of our partners:

- Capital Paving Limited
- DBA Engineering Ltd.
- Golder Associates Ltd.
- Holcim Canada Inc.
- LVM-Jegel
- McLeod Endowment and Dr. Ralph Haas
- McAsphalt Industries Limited
- Miller Paving Limited
- Ministry of Transportation Ontario
- Ontario Good Roads Association
- Ontario Hot Mix Producers Association
- Ready Mixed Concrete Association of Ontario
- Roto-Mill Inc.
- Shiloh Canconstruct Limited
- Stantec Consulting Limited
- Steed and Evans Limited



Norman W. McLeod Chair in Sustainable Pavement Engineering – Cont'd



The reception before the announcement



A few of the many guests who attended the Chair Launch



The guests mingling



Attendees included the partners, industry members, faculty, staff and students



Adel Sedra, Dean of Engineering, University of Waterloo



Guest at the Chair Launch



Norman W. McLeod Chair in Sustainable Pavement Engineering – Cont'd



Feridun Hamdullahpur, President of University of Waterloo



Gerry Chaput, Executive Director, Chief Engineer, Provincial Highways Management Division, MTO



Ralph Haas, Emeritus Norman W. McLeod Professor, University of Waterloo



Vimy Henderson, PhD Candidate, University of Waterloo



Susan Tighe, Professor, Canada Research Chair and Norman W. McLeod Chair in Sustainable Pavement Engineering

Norman W. McLeod Chair in Sustainable Pavement Engineering – Cont'd



Susan Tighe and Dean Adel Sedra



Ralph Haas, Vimy Henderson, Adel Sedra, Feridun Hamdullahpur, Susan Tighe and Gerry Chaput



David Leckie (OGRA Past President), Susan Tighe, Paul Johnson (OGRA President) and Joe Tiernay (OGRA Executive Director)



Research Group



John Carrick Jr. (President, McAsphalt Industries), Malcolm Matheson (President, Steed and Evans), Susan Tighe



Neil Thomson (Chair of the Civil and Environmental Engineering), Susan Tighe

May 2011 Highlights

Feature Student – Shahram Hashemi Vaziri



Shahram Hashemi Vaziri is a research assistant and Ph.D Candidate at CPATT in the geotechnical group of the department of civil and environmental engineering at the University of Waterloo. He received his B.S degree in 1990 from the University of Tehran and his M.Sc in 1993 from the University of Amir Kabir (Polytechnic of Tehran) in Mining Engineering. After finishing his military service in 1996, he began collaborating with the Geological Survey Organization of Iran in some mineral exploration projects. He joined the Faryab Mining Co. in early 1998 as the supervisor for system optimization for the mineral processing plant. Faryab Co. is the leading producer of high-carbon ferromanganese Chromites, and high-carbon ferrochromium in Iran, with approximately 1800 personnel in mines, mineral processing and ferro-alloy plants. He was promoted to manager of the

R&D unit and deputy director of ISO 14000 in 2000. He was awarded a gold medal for his research achievements as founder of the R&D unit in this company. Shahram was married in 2001 to Fariba Amiri. Fariba received her PhD in Water Chemistry from Dresden University of Technology in Germany. Shahram and Fariba immigrated to Canada in May 2004. In December 2004, Fariba joined the University of Waterloo as a postdoctoral fellow in the civil engineering department. In October 2008, she joined the Drinking Water Research Group (DWRG) at the University of Toronto.

In December 2005, Shahram was the first researcher appointed as a research assistant by Dr. Carl Haas, the director of CPATT at the time, after he came back to Canada from many years in the U.S. Shahram is currently executing research on improving the weight estimation accuracy of piezoelectric Weigh-In-Motion (WIM) sensors. CFI and related grants were instrumental in extensive investments in WIM to collect traffic data, improve the technology, and improve the CPATT associated researchers' knowledge of this technology.

Shahram supervised the WIM installations for two of CPATT's experimental sites including the Erb St. Waterloo Regional Waste Management Facility landfill site and the Highway 401 LLP site between exits 238 and 250 Eastbound.

In April 2011, the Ministry of Transportation Ontario approved and awarded the University of Waterloo an HIFP grant on load spectra that involves the use, validation and interpretation of WIM data. The investigators include Shahram H. Vaziri and Drs. Carl Haas, Ralph Haas and Leo Rothenburg. Shahram is intending to work on this one-year project as postdoctoral research, and he is planning to finalize his PhD on WIM in 2011.

May 2011 Highlights Pictures of Shahram's Research

Feature Project – Weigh-In-Motion (WIM)



WIM Installation at Landfill, September 2007



The 2007 WIM Installation Crew, from left: Dr. Edward Jiang, Dr. Carl Haas, Ron White, Dr. Fariba Amiri, Lixin Zhang, Shahram H. Vaziri, Richard K. C. To

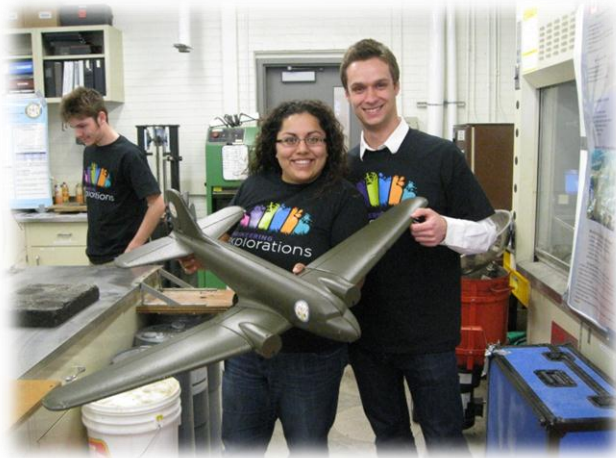


The Highway 401 LLP site between exits 238 and 250 Eastbound

Explorations and Campus Day

Explorations is an event where hundreds of grade 6-8 students and their parents descent upon Waterloo Engineering to experience the faculty by viewing a mix of displays in a tour of the various departments. The objectives of explorations are to excite students about engineering in hopes of sparking an interest in continuing their math and science studies throughout high school, to provide the public with an opportunity to see what we do at the University of Waterloo, and to promote the Faculty of Engineering.

Campus Day Open House is held to welcome thousands of prospective high school students and their parents. Special presentations on topics including financing a university education, co-operative education and student life are presented. The main purpose of Campus Day is to be able to provide the students with information all about life at UW. Below are pictures of Explorations and Campus Day in the CPATT Laboratory. We had many graduate student volunteers helping out for both Explorations and Campus Day and their help is truly appreciated.



Samantha Pinto and Attila Hertel
(CPATT MASc Students)



Tracy Zhou (Co-op student) and Dom Hu (visiting scholar)
(Mehran Kafi Farashah in the background)



Mehran Kafi Farashah (CPATT MASc Student),
speaking to high school students



Mehran Kafi Farashah, speaking to high school
students

Explorations and Campus Day Cont'd



Zaid Alyami (CPATT MASc student) teaching students about pavement materials



Mehran Kafi Farashah and Vimy Henderson (PhD student) teaching grade 6-8 students



Dr. Susan Tighe and CivE 342 students in the CPATT Laboratory



Alida Morrison (high school student) volunteering her time

Special Thanks – we would like to give a special thank you to Zaid Alyami, Liam Butler, Vimy Henderson, Attila Hertel, Dom Hu, Mehran Kafi Farashah, James Mann, Alida Morrison, Jodi Norris, Samantha Pinto and Tracy Zhou for volunteering to help with Explorations and Campus Day. Your assistance was greatly appreciated.

Speakers Corner

With the new Norman W. McLeod Chair in place, how do you see this benefiting the industry?

I have no doubt that the new Chair is of benefit to the industry. Better utilization of resources through recycling and improved methodologies, as well as better educated owners, consultants and contractors cannot help but benefit us all. Long-term sustainable pavements are good for the industry, the owner and ultimately the tax payer.

Malcolm Matheson, PEng
Steed and Evans Ltd.



There is an acute need for trained, knowledgeable practitioners who are well-versed in sustainable pavement materials, design and asset management to help address the preservation and replacement of our deteriorating transportation infrastructure. I'm sure that the establishment of the Norman W. McLeod Chair in Sustainable Pavement Engineering, with its emphasis on cutting-edge pavement research and collaboration with industry and agency stakeholders, will foster a solid interest among young professionals in becoming pavement engineers. The Chair will identify and develop innovative and cost-effective technologies to assess and extend the life of our critical pavement assets.

Michael MacKay, MEng., PEng.
LVM Inc.



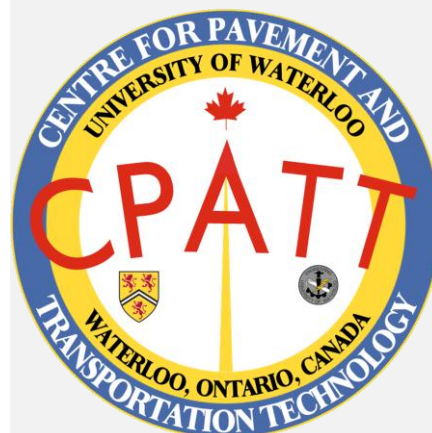
News

Publications and Papers

- [Pavement Performance of Central Hot Plant Recycling Asphalt Mixture](#) – adopted by the third international conference on transportation engineering, Chendu, China – **Dom Hu**
- [Perpetual pavement designs and sustainable road construction: Two sides of the same coin](#) – (Best presentation, Annual Inter-university Symposium) accepted for presentation of the Transportation Research Board – **Mohab El-Hakim**
- [Evaluating Pavement Performance for Network Level Pavement Management: Provincial/State vs. Municipal, What is the Difference?](#) – presented at the Annual Inter-university Symposium on Infrastructure Management (AISIM), Chicago, IL – **Mehran Kafi Farashah**
- [Framework for the evaluation and selection of automated performance measures for roads under performance based contracts](#) – presented at the Annual Inter-university Symposium on Infrastructure Management (AISIM), Chicago, IL – **Zaid Alyami**

Recent MTO/HIIFP Project Awards

- Engineered Concrete Systems for Innovative Structural Design Application – Dr. Jeff West (PI)
- Validation of Default Values Used in Ontario for Estimating Truck Axle Load Spectra – Dr. Carl Haas (PI)
- Development of Connection Details to Allow Use of FRP Reinforcement in Barrier Walls on Existing Deck Slabs – Dr. Khaled Soudki (PI)
- Modeling Impacts on Travel Time Reliability as a Component of Benefit-Cost Evaluation of Transportation Investments – Dr. Bruce Hellinga (PI)
- Seismic Protection of Ontario Highway Bridges Using Fluid Dampers – Dr. Sriram Narasimhan (PI)
- Effect of De-icing and Anti-icing Chemicals on the Durability of Cement-based Materials (Year 2) – Dr. Carolyn Hansson (PI)
- Determining Quantity of Recycled Asphalt Pavement in Hot Mix Asphalt in partnership MTO/OHMPA – Dr. Susan Tighe (PI)



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