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***“Education and Training needs of the NB  
paving industry”***

**Perspectives from Users and Producers**

Report from the UNB/NBUPG panel session held at the 2012  
NBUPG Annual Seminar

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October 30, 2012

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## **Introduction**

New Brunswick, Canada is a jurisdiction with 750,000 people and approximately 18,700 km of highway<sup>1</sup>. Nearly all paved roads in New Brunswick are paved with asphalt, which makes the road network a substantial public asset to maintain. This has led to the development of innovative strategies (such as optimizing paving schedules based on asset deterioration to reduce long term costs) and innovative approaches (adoption of warm-mix asphalt). Fostering the culture of innovation in the paving industry requires a continuous improvement process involving education, research and development, where institutions of higher learning (universities and colleges) can be expected to play a critical role. This role can be in the training of new technical staff, graduate engineers, highly-qualified personnel (HQP), and those already working the paving industry.

A panel session was held on May 15, 2012 hosted by the University of New Brunswick, Department of Civil Engineering and the New Brunswick User Producer Group (NBUPG). The purpose of the panel session was to engage individuals from a broad spectrum of the paving industry to discuss the education and training needs of the New Brunswick paving industry. The session was moderated by Trevor Hanson, Assistant Professor of Civil Engineering at UNB and included several panelists:

- Kent Duggan, General Manager of Classic Construction and founding director, NBUPG
- Dylan Gamble, Manager of Roads and Streets, City of Fredericton
- Terry Hughes, Paving Engineer, NB Department of Transportation and Infrastructure (DTI)
- Matt MacArthur, Resident Engineer, NB DTDI and recent UNB Civil Engineering graduate
- Jamie Weatherbee, Materials Engineer, GEMTEC Ltd

George Morrison, P.Eng, instructor of Asphalt Technology at the New Brunswick Community College (NBCC) in Moncton was unable to attend the session but provided written feedback which was read to the participants by Trevor Hanson.

## **Session Introduction**

Dr. Hanson began with an overview of what UNB currently offers in pavement education, including his role with the Department of Civil Engineering. There is a funded faculty position called the D.C. Campbell Chair in Highway Research and Pavement Design which is dedicated to developing and sustaining a long-term active link between the construction industry, research industry and academia. The Chair, Dr. Donath Mrawira, is currently on leave until 2013 and Dr. Hanson's role is to support and continue the work of the Chair until his return.

Dr. Hanson outlined the goals and objectives of the session which was to develop an agenda for enhancing the education and training experience for paving education in New Brunswick.

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<sup>1</sup> <http://www.gnb.ca/0113/publications/annual-reports/AR-DOT/AR10-11.pdf>

### **Overview of paving education at UNB**

Dr. Hanson noted that the undergraduate (BScE) Civil Engineering curriculum at UNB has changed over the last few years, most notably that it is now a 4-year program instead of 5-year, corresponding to a decrease in course credits from 180 credit hours (cr) to 163 cr. This brings it in line with other universities in Canada. While there are 35 Technical Elective (TE) courses available, not all of them are taught every year and each student only requires 5-6 TE courses to graduate. Consequently, students who are interested in road materials may not have the time in their schedule to take the available courses. There are three paving related undergraduate TE courses offered from the Department of Civil Engineering, ranging from 3-5 hours per week of instruction for 14 weeks:

CE5201: Road Materials and Structures

CE5212: Pavement Design 1

CE5241: Introduction to Pavement Management Systems

In terms of lab equipment it has:

- Equipment for the Marshall Test
- Nuclear gauges for HMA Density
- Computer software for “Asset Management”
- ... but does not have equipment for Superpave

There are also courses in soil mechanics, foundations, embankments, concrete technology, construction equipment and methods, and transport facility design.

There are also graduates courses available which are taken by students who have finished their engineering degree and wish to specialize further. Courses include pavement design, soil mechanics, embankments, pavement management systems, asset management, pavement materials (including covering SuperPave and Marshall Mix Design) and concrete materials.

### **Overview of paving education at NBCC Moncton**

Mr. Morrison instructs the Asphalt Technology program which is 5 hours per week of instruction for 15 weeks. The topics explored include:

- Introduction to Asphalt Technology
- Materials: Asphalt & Aggregates
- Traffic Analysis & Thickness Design
- Superpave Mix Design
- Asphalt Plants
- Paving Operations
- Compaction
- NBDTI Standard Specification
- Pavement Acceptance/Rejection
- HMA Recycling
- Pavement Maintenance Techniques

While students participate in several lab exercises, Mr. Morrison notes that NBCC Moncton does not have a gyratory compactor, but they would like one and asked if any industrial partners could help out.

### **Synthesis of the Panel Session**

The first question asked of the panel was ***“What are realistic expectations for new graduates?”***

Panelists commented the UNB program could benefit from more field knowledge, instead of focusing exclusively on design. The consultant on the panel commented that graduates that he has observed do not appear to have knowledge of asphalt mix designs or how asphalt as a material behaves. The contractor on the panel also felt that the most effective employees have had some field or summer jobs. One of the DTI panelists observed that the role of resident engineer has changed on DTI jobs over time, for example, the mix control has been shifted to the contractor. The DTI panelist felt that new graduates should be taught:

- Basic asphalt technology; mix design, properties, how plants work
- Practical experience; go out on jobs (e.g. coop program), actually see a pavement job
- Contract administration; how contracts are set up, the bonding that is involved, how contracts are structured. Guest speakers on this would be good

At the same time, there was the recognition by members of the panel that fewer mentors exist in the workplace, meaning new engineers have to adapt quicker to new situations with fewer people to guide them. The newest engineer on the panel also echoed these statements, highlighting the focus on design in the UNB program and limited asphalt experience. He also stated “you don’t know what you don’t know” until you get on the job.

Panelists were asked to comment on ***“What would you expect a new grad not to know when they graduate?”***

The consultant felt that new graduates may not be aware of the newest industry technologies, such as warm mix, or detailed estimating and job bidding, though they should know the basics of doing estimates. The contractor felt that new graduates should not be expected to know everything, but that they realize they need understand their own limitations and be willing to learn from those with more experience. The municipal panelist felt grads should know some of the highlights of mix design and suggested students would benefit from a two-week field course like the UNB survey camp. It was discussed that even though students can take co-op jobs in road materials, the timing has to be right as most materials work takes place during the summer.

The UNB graduates in the panel were asked how well UNB’s paving courses prepared them for a job in the paving industry. Two panelists indicated that their best training was on the job when paired with a mentor.

The panel then discussed the role of mentors. The consultant felt having a mentor was very important. The contractor had both good and bad bosses, but someone is needed who has been around the business for a long time to keep you on track. The business of paving has changed to be a 24/7 job and

does not fit for those with 8:30-4:30 mentalities. He felt that if something is happening at 3 am that you could learn from, the new graduate should go to it.

Discussion ensued on the differences between graduates today and in the past. “Millennium grads” have different expectations in the workforce than previous generations, in some cases feeling that respect has already been earned before demonstrating proficiency in the workplace.

Panellists were asked ***“How are we doing in terms of lab training?”***

The consultant noted a split between community college and university graduates. Community college graduates have been exposed to the lab components, while UNB grads appear to have not seen much of that. Without a gyratory compactor in their lab they would never have experience with it, but it is a huge expense for something that may not be used. He also noted some pushback from new university graduates to do what they perceive as technician type work. One DTI panellist indicated they would be open to having people in the lab, but most of the work does not happen in the winter. An audience member who graduated from the Université de Moncton also indicated that they did not go on any field trips to labs during his time there.

Panellists were asked ***“Are the continuing education needs of your industry being met?”***

The panel generally agreed that the NB User Producer seminar is the biggest and most successful continuing education event in the province, with most organizations or companies doing smaller initiatives in-house. A representative from the New Brunswick Road Builders and Heavy Equipment Association’s paving committee indicated that the focus of training on the contractor side is being mentored on the job.

The floor was then opened up for general questions.

One attendee asked: Are we hiring an engineer to do what a technologist should be doing? Are we hiring new grads to work in the labs because they work better? Do they end up in these positions with bigger aspirations and become unhappy? Is the industry doing its job to promote itself and the jobs correctly?

One panellist agreed to some extent, but offered that mix designs need to be stamped by a professional engineer, so that cannot be done by someone who has not learned how. You need an engineer to come up from the bottom to understand that.

Further comments related to the challenges of gaining the necessary experience on the job in the climate of economic restraint.

The final point was brought up by an employee with the City of Dieppe. He stated that graduates should not be expected to come out as asphalt experts, rather mentoring is the key. It should be the industry’s responsibility to train people to where they want them to be.

### **Survey results**

A total of 27 individuals representing the public, private, non-profit and academic sectors attended the session. A total of 16 individuals provided feedback on a survey distributed at each table. In the coming months, this same survey will be more widely distributed to increase the participation and improve the reliability of the conclusions drawn from the results.

### **Potential directions for paving education in New Brunswick**

Based the perspectives offered by the panelists and attendees, the following are potential directions for aligning post-secondary education in paving with the needs of industry and government:

1. Increasing the students exposure to real issues in the paving industry before graduation (i.e. guest speakers, field trips, etc)
2. Align the window for co-op job placements with the busiest time for the paving industry (i.e. 4 months of summer) to maximize their learning opportunities
3. Explore the potential of an asphalt field course similar to the successful UNB survey camp
4. Encourage student involvement in the professional continuing paving education opportunities, such as the NB User Producer Group annual seminar

Similarly, attendees and panelists discussed opportunities for the public and private sectors to contribute to improving paving education in concert with universities and colleges in New Brunswick:

1. Foster a culture of mentorship for new graduates
2. Maintain a dialogue with NB colleges and universities regarding state-of-the-art practices and lab equipment needs (such as a gyratory compactor for NBCC Moncton) to facilitate student access to these methods (or the acquisition of equipment by universities and colleges)