Engineering, IT, and City Planning: Janice Miller's Unique Background Outlines Her Success in Transportation

Janice Miller Oversees a Team at Manitoba Transportation and Infrastructure that Streamlines Oversize and Overweight Vehicle Permitting.

"The part of the work that I like the most is the problem solving," said Janice Miller, acting director of permits and approvals at Manitoba Transportation and Infrastructure (MTI). MTI is the provincial government department in control of the Canadian province's expansive transportation network.

"You have a problem and you're trying to figure out a solution for it. Because I'm not working as an engineer, my solution is not always technical," she said.

Although not currently an engineer in her position at MTI, Miller has an engineering background. An excellent math and physics student at her rural Manitoba high school, Miller realized that a professional career incorporating both of those subjects would be rewarding — so she pursued engineering.

She earned a Bachelor of Science in electrical engineering and a Master of Science in biomedical engineering from University of Manitoba. After receiving her degrees, Miller obtained a job at one of the university's medical research labs. She worked directly with a neuro-ophthalmologist testing eye movements using magnetic resonance, where an individual wears a contact lens with a coil and sits in an area with a magnetic field. When the person averts their eyes, a measurable signal is generated that is proportional to the amount of eye movement.

"I liked that the project encompassed both a human and technical component, keeping the work interesting," Miller said. "There was a broad spectrum of technical work, from coding for eye movement digital analysis, to contracting for specialized lab equipment and working with vendors to install it."

After working on this project for seven years, she assisted the same doctor in setting up a clinical lab and continued to work in biomedical engineering for one more year. Then, Miller opted for a career change. She returned to University of Manitoba to work in information technology for distance and online education and did so for nearly nine years. While she was employed at the university in IT, Miller also decided to pursue a graduate degree in city planning.

City Planning Leads to Transportation

Miller completed her Master of City Planning degree in 2009 at the University of Manitoba, however she was hired as a transportation policy analyst by MTI in late 2008. This position primarily dealt with truck regulation policy issues.

“My engineering really helped with the work that I did around truck regulation because I worked a lot with vehicle weights and dimensions,” Miller explained, noting that her understanding of forces in engineering informed her comprehension of vehicle dynamics.

Consequently, her technical background enabled her to excel while working on trucking policy and regulation. Miller’s experience writing polices and developing programs for freight in this role led to her current position as a director responsible for oversize and overweight permitting and motor carrier safety initiatives.

Seeking a Compromise with MB MOOVES

The most enjoyable part of developing programs and policy, according to Miller, is engaging with people to find a solution that works for competing interests. The most recent project where Miller had to troubleshoot for opposing needs in the trucking industry came when MTI implemented a heavy trucking permitting system.

“Our engineers want to limit the size and the weight of trucks because they are damaging to the infrastructure, and the industry wants us to allow them to travel with heavier and larger trucks because it is more economical for them and because equipment is getting bigger. So, we’re always trying to find a compromise solution,” she said.

MTI launched the Manitoba (MB) Moving Oversize and Overweight Vehicles Efficiently and Safely (MOOVES) project to boost permit issuance for the oversized and overweight vehicles that travel along Manitoba’s 19,000 kilometers of highways and roadways. They achieved this goal by implementing Bentley Systems’ SUPERLOAD.

Miller served as the business owner on the MB MOOVES project. She was involved in contracting, business rules development and testing several aspects of the system, and ensuring the project team overcame any obstacles.

The provincial highway network requires three distinctive loading classifications. MTI also enforces reduced loading constraints on several highways during spring thaw and increased loading limits during the cold winter months. The dates of imposed loading restrictions due to weather vary across four climate zones in Manitoba to ensure the roadway network is safe. To incorporate all these restrictions, MTI built a routable network by integrating all road and attribute data from third-party systems and added routing, analytics, and review options. The integration with SUPERLOAD facilitated system-issue permitting to eliminate many manual processes.

“We put in our rules for what is allowable on certain classes of highways, and then the system analyzes whether or not that vehicle is legal or needs a permit, and if it needs a permit, then it helps with the approvals and managing the approvals,” Miller explained.

Part of an ‘Amazing Team’

Miller said the MB MOOVES team from both MTI and Bentley Systems were incredible to work with. Yet, one of the project leaders that Miller said needs recognition is Ruth Eden, who was the first female engineer that MTI hired. Eden, who has since passed away, worked at MTI for 30 years as a structural engineer for bridges. She was a member of the MB MOOVES’ steering committee since the project’s inception. Eden was a champion of this project because Manitoba has innumerable small, wooden bridges that were not built to support the size and weight of large trucks.

“She always saw the benefit of [the project] and could always see the vision for it,” said Miller.

By the time the new permitting system was employed, Eden was the first assistant deputy minister of an engineering division in the history of Manitoba.

Miller, Eden, and many others at MTI used their problem-solving, engineering, and technical skills to implement this integrated permitting system, which ensures that no heavy freight travels over those wooden bridges. Furthermore, the new system tracks asset use for every permit issued, revealing operational impacts on the roads and bridges that the trucks do drive over so maintenance keeps the assets safe.

“Working digitally allows modeling and analysis that would be impossible otherwise,” Miller said. “Even when modeling is not perfect, it enables insight and learning that make the ultimate solutions so much better.”

Narinder Manku is product marketing manager, road and rail, with Bentley Systems. He can be reached at narinder.manku@bentley.com.

Image 1:

Caption: Manitoba Transportation and Infrastructure launched the Manitoba (MB) Moving Oversize and Overweight Vehicles Efficiently and Safely (MOOVES) project to boost permit issuance for the oversized and overweight vehicles that travel along Manitoba's 19,000 kilometers of highways and roadways.

Image 2:

Caption: Manitoba Transportation and Infrastructure has put in place rules for what is allowable on certain classes of highways. The MOOVES system analyzes whether or not that vehicle is legal or needs a permit.

Image 3:

Caption: The MOOVES system tracks asset use for every permit issued, revealing operational impacts on the roads and bridges to ensure proper maintenance to keep the assets safe for travel.

Image 4:

Caption: Manitoba Transportation and Infrastructure enforces reduced loading constraints on several highways during spring thaw and increases loading limits during the winter months. The dates of imposed loading restrictions due to weather vary across four climate zones in Manitoba to ensure the roadway network is safe.

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