TRANSITional Times

Transit Ideas that are Leading The Way

WHAT'S INSIDE:

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MORRISON HERSHFIELD

OPERATIONS ENHANCED BY DESIGN

How the Design of the Centennial Bus Garage Promotes a Safe and Productive Workplace

The Edmonton Transt System's (ETS) Centennial Garage is a LEED® Silver project. It involved the site development and construction of a new maintenance and storage facilitycapable of housing up to 250 buses with space for cleaning, servicing and maintenance. It also included the construction of a new administration building.

The project planning team brought together the expertise of designers, builders, municipal and provincial funding partners and ETS staff to successfully design and construct this facility.

The Centennial Bus Garage includes advanced features that provide a safe and productive workplace for Edmonton Transit and Fleet Service employees. In addition, it incorporates numerous energy saving innovations and demonstrates the City of Edmonton's commitment to environmental responsibility.

The Centennial Garage design has enhanced City bus operations, which now exceed all benchmarks in maintaining a clean fleet. ETS staff from other locations are transferring to work at the new facility to take advantage of design features implemented by MH. These include an eco-friendly controlled lighting system that provides employees with bright and natural light, and an innovative ventilation system that moves fumes away from occupied areas for improved employee safety and comfort. As a result of the improved occupant comfort, staff productivity and employee performance are reported to be "off the scale." Health problems and absenteeism among those working at Centennial has declined dramatically.

Collaborative design decisions and innovative systems have contributed to positive outcomes for ETS. Aside from improved staff safety and productivity, unique energy usage features were incorporated into the building design. These features include the addition of highly reflective roofing to reduce the cooling energy required, indoor bus storage to provide inherent energy savings, and water efficiency technologies such as a low-volume bus wash system that uses recycled water to reduce the amount of water consumption on both the administration and bus maintenance sides of the building.

Energy modeling test results indicated that the Centennial Garage is approximately 33% more energy efficient than a typical Canadian building of its size and type.

Turnaround and processing of the fleet is now faster, driving efficiencies in operations. The planning process, innovative design and project outcomes realized by the Centennial Garage are highly relevant to the planning and design of any new transit facility.

BATTERY POWERED BUS FLEETS OF TOMORROW

Charging Systems that are Right for Your Fleet

The transit industry is rapidly evolving to accommodate a wider range of propulsion technology options and transit infrastructure needs. Propulsion technologies vary from Diesel, Compresses Natural Gas (CNG), Liquified Natural Gas (LNG) and Renewable Natural Gas (RNG) to newer technologies of electric hybrid, hydrogen fuel cells, and battery electric with each system providing specific benefits and challenges to employ.

Bus fleets of tomorrow will operate much differently than the steadfast bus fleets of today and years past. Agencies must take new propulsion technology and their associated capital costs and benefits into consideration when planning future fleet programs to meet safety and operational efficiency requirements.

The Popularity of Battery-Power

With the shift to promote zero-emission mandates in Canada, battery-powered buses are considered to represent the start of a green revolution for some of the larger transit agencies. These buses are powered by an electric motor and obtain energy from on-board lithium-ion batteries that can be charged at bus stops or at the depot.

Benefits of Battery-Powered Fleets:

- Reduced Greenhouse gas emissions
- Reduced ambient noise and exhaust smell, making city centres more desirable
- Less vibration
- Smooth acceleration
- Reduced operational costs as a result of fewer parts to maintain (no internal combustion engine, transmission or engine cooling system)
- Reduced capital costs due to elimination of infrastructure needed for a constant grid connection

It is clear that battery-powered fleets offer significant environmental and economic benefits. Bem Case, head of vehicle programs for the Toronto Transit Commission notes that the TTC plans to buy 60 battery-powered vehicles this year.

"…the TTC's fleet, which consists of roughly 2,000 diesel-electric hybrids, "clean diesel," and conventional diesel buses, consumes 90 million litres of fuel every year. Replacing them with battery electric buses would save roughly $90 million in fuel costs annually."

The downside to battery-powered fleets is that they have less range, higher weight and higher procurement costs compared to traditional diesel fuel operated buses. The most significant cost to a battery powered fleet is the infrastructure needed to recharge the batteries.

Charging System Options

On-Route Charging

Typically, on-route charging provides the means for electric buses to remain in service all day. Buses are equipped with an overhead Pantograph and street embedded charging infrastructure is available to charge batteries at designated transit stops throughout the route. On-route charging can provide an unlimited range without returning to the depot. Extended range configurations can achieve a greater distance on a single charge.

Advantages include:

- Smaller battery pack
- Ability to charge while in service, allowing for 24/7 operation
- Fast charge time – 5 – 10 minutes
- Minimized grid impacts due to distributed demand

Things to consider:

- Expensive charging infrastructure
- Shorter range of 40 to 60 km between charges
- Complex route planning and city infrastructure
- Electricity requirements on grid's peak loading times
- Cost to modify routes in the future

Off-Route Charging

Off-route charging requires on site infrastructure at a depot. This system takes advantage of lower off-peak electricity rates as the buses are typically charged during downtime or overnight. This option offers greater flexibility for route selection and route changes.

Advantages include:

- Longer range of 120 to 250 km between charges
- Larger, high capacity batteries
- Less complex charging infrastructure
- Alignment with incumbent technologies and operating systems
- Energy supplied directly within depot while out of service

Things to consider:

- Pug-in charger required
- Slow and fast charge options of 2 to 8 hours
- Must be out of service to recharge
- Larger battery packs mean more weight
- Heavy electrical modifications required at depot

Implementing Battery Electric Bus Fleet Technology requires a significant amount of strategic planning. If you are considering a conversion, let us help you with planning, designing and constructing your infrastructure upgrades and new facilities.

Dan Jagos, Practice Lead, Transit Stations & Maintenance Facilities

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EVENTS

Look For Our Team at an Upcoming Event Near You

WTS, Toronto Area Chapter Annual Dinner

WHERE: The Old Mill Inn, Toronto

WHEN: October 18, 2018

Our Transit Team is excited to sponsor and attend the 7th Annual Women In Transportation Dinner. This year, Dr. Josipa Petruni, Executive Director & CEO of CUTRIC, will be speaking about zero-emissions transportation and “smart vehicles” innovation.

More info about WTS **HERE**!

Annual Address by TransLink CEO, Kevin Desmond

WHERE: Fairmont Hotel Vancouver

WHEN: November 8, 2018

Geoff Cooper of our Transit Team will be attending the much-anticipated update on the current state of transit and transportation and the future of mobility in the growing region of Metro Vancouver.

More info about this event **HERE**!

CUTA Annual Conference & Trade Show

WHERE: Metro Toronto Convention Centre

WHEN: November 18-21, 2018

Morrison Hershfield is proud to be one of the many great sponsors for this annual event. Come stop by our trade show booth (No.1934) where you can meet our Transit Team, learn more about the innovative projects that we are involved with, and enter to win an exciting giveaway!

More info about this event **HERE**!

NEW TO MORRISON HERSHFIELD

Geoffrey Cooper, P.Eng., C.Eng., MICE

Transit Project Delivery Lead

Geoff brings more than 30 years of experience in multi-disciplinary highway, traffic, civil engineering and development infrastructure projects for public and private sector clients in Canada, the UK, and the Middle East.

Geoff's experience includes managing major transit projects for TransLink and Metrolinx and over 10 years of managing the operations of large transportation teams.

Read more about Geoff's experience **HERE.**

Daniel Jagos, C.E.T.

Practice Lead, Transit Stations & Maintenance Facilities

The Transit Design team is excited to be working alongside Dan!

He brings extensive experience with light rail transit, heavy rail commuter transit, and freight locomotive and car maintenance facility operations. Dan has successfully coordinated several multi-million dollar mainline fueling reconstruction assignments, as well as AFP LRT and GO Transit maintenance facility projects.

Dan has experience working with domestic and foreign railways, transit authorities, government agencies and the private sector.

Read more about Dan's experience **HERE.**

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