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PERSPECTIVE

Autonomous vehicles and equipment in construction

Currently, autonomous vehicles are primarily used in the mining and agricultural industries. For example, Komatsu has autonomously hauled more than two billion tons of surface material and it expects to deploy an additional 150 trucks to the Canadian oil sands over the next seven years.¹ Not to be outdone, Caterpillar is set to deploy a fleet of autonomous trucks and autonomous blast drills for the Rio Tinto Koodaideri iron mine in Western Australia.²

In the construction industry, autonomous, semi-autonomous and remote control equipment that are currently being developed include excavators, dozers and robotic bricklayers.³

There is evidence that the use of autonomous vehicles and equipment improves productivity, thus increasing profitability. For example, in its 2017 mining operations, Rio Tinto reported that driverless trucks proved to be more efficient than their manned counterparts, as the autonomous vehicles operated on average 700 hours longer and with 15 per cent lower unit costs. Rio Tinto therefore projects that its autonomous truck fleet will add billions of dollars of increased productivity.⁴

In addition to increased productivity, autonomous vehicles and equipment have the potential to help combat the current labour shortages being experienced in the construction industry⁵ and may also improve safety on construction sites.⁶

Potential challenges with the use of autonomous technology in the construction industry lie with the inherent complexity and unpredictability of construction sites, challenges that do not usually present themselves on repetitive agricultural or mining sites that involve fewer obstacles and navigational issues. These challenges give rise to both legal and commercial risk. The legal risks associated with the use of autonomous vehicles relate to worker training and safety, the potential damage to property if something goes wrong, and the costs associated with properly maintaining the equipment. Contracts will need to address the allocation of risk as between the projects owners, contractors and manufacturers. This can be a complex issue, particularly because it may not always be easy to determine who may be at fault after damage occurs. Similarly, insurance provisions must be reviewed and consideration given to what types of insurance may be required to respond to losses that arises from the use of such vehicles and equipment.

Some of the commercial risks and factors include a high initial capital investment, the consideration of cost allocation to a project, recovery of capital costs, pricing considerations when submitting bids for projects, especially where a procurement process prioritizes the lowest cost, an unproven effectiveness of these technologies, and an unclear return on investment.

Other risks to consider include the consequences of a breakdown of equipment, including the cost to replace the equipment and any delays as a result. Finally, autonomous vehicles and equipment may create a competitive advantage or disadvantage for large or small contractors with regard to their capacity to make large capital investments. Adopting new technologies represents a risk and can be more difficult for smaller businesses, which may have less financial stability.

In order to promote and facilitate the adoption of autonomous technologies, the construction industry will need to consider which types of projects are most likely to benefit from the use of autonomous vehicles and equipment without creating unmanageable risk that would outweigh the potential benefits.

¹ "Report: 2 Billion Tons Hauled Autonomously" Engineering and Mining Journal (December 2018) at page 106.

² "Rio Tinto to buy autonomous mining truck fleet from Caterpillar" Reuters (May 6, 2019).

³ Rina Diane Caballar, "[This Bricklaying Robot Is Changing the Future of Construction](#)" Redshift by Autodesk (May 23, 2019).

⁴ "Rio Tinto's autonomous haul trucks achieve one billion tonne milestone" Rio Tinto press release (January 30, 2018).

⁵ "Shaping the Future of Construction: An Action Plan to Solve the Industry's Talent Gap" World Economic Forum (February 2018); See also Presse Canadienne, "Quebec construction industry facing a severe worker shortage: report" Montreal Gazette (October 10, 2019).

⁶ "Shaping the Future of Construction: A Breakthrough in Mindset and Technology" World Economic Forum (May 2016) at page 21.


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Table of contents

2023 Series

- [Autonomous vehicle laws in Canada: Provincial & territorial regulatory review](#) - January

2022 Series

[Autonomous vehicles: Key 2022 industry hotspots](#) - April

[Autonomous vehicle laws in the States: Congress offers hope for national regulatory framework](#) - June

[Autonomous vehicles: cross jurisdictional regulatory perspectives update](#) - October

2021 Series

[Autonomous vehicles: Moving forward in 2021](#) - January

[Full steam ahead: Recent developments in maritime autonomous technology](#) - February

[Next-gen spotlight: 5G, autonomous vehicles and connected devices](#) - March

[Raising financing during turbulent times: Debt capital options for tech companies](#) - April

[Construction and autonomous vehicles: Considerations for increased adoption](#) - May

[Autonomy on the roads: Intelligent Transportation Systems](#) - June

[Autonomous vehicles in mining operations: Key legal considerations](#) - July

[Autonomous technology in Calgary: Reducing emergency vehicle travel times](#) - August

[Autonomous vehicles: Cross jurisdictional regulatory perspectives](#) - September

[Transport Canada: 2021 Guidelines for Testing Automated Driving Systems in Canada](#) - October

[Autonomous vehicles: Canada's readiness for the future](#) - November

[Autonomous vehicle laws in Canada: Provincial & territorial regulatory landscape](#) - December

2020 Series

[Driving change: The year ahead in autonomous vehicles](#) - January

[Mobility-as-a-service & smart infrastructure: A new risk paradigm](#) - February

[The future of farming: Autonomous agriculture](#) - March

[Autonomous transportation in the time of COVID-19](#) – April

[Driverless vehicles: Two years of autonomy on Québec roads](#)– May

[A review of Canada's vehicle cybersecurity guidance](#) – June

[Highlights of the connected and autonomous vehicles report by ICTC and CAVCOE](#) – July

[Raising financing during turbulent times: The takeaways](#)– August

[Raising financing during turbulent times: Exploring for capital in the public markets](#) – September

[Advanced driving assistance systems: Three issues impacting litigation and safe adoption](#) – October

[Autonomous vehicles and big data: Managing the personal information deluge](#) – November

[Payments on wheels: Self-driving vehicles and the future of financial services](#) – December

2019 Series

[The Legal Crystal Ball: Autonomous Vehicles Development to Watch For in 2019](#) – January

[Autonomous Vehicles and Export Controls](#)– February

[The State of Insurance and Autonomous Vehicles in Ontario](#) – March

[Collective Bargaining and the Implementation of Autonomous Vehicles Technologies](#)– April

[Building a Privacy-Compliant Autonomous Vehicles Business](#)– May

[The State of Autonomous Vehicles in Alberta](#) – June

[Unfamiliar Waters: Navigating Autonomous Vessels' Potential and Perils](#)– July

[The Lay of the Land: Obtaining a License for Testing Autonomous Vehicles in Ontario](#) – August

[The State of Autonomous Vehicles in Saskatchewan](#) – September

[Lingua Vehiculum: The Competition for Connected Car Communication](#) – October

[Autonomous Vehicles and Equipment in Construction](#) – November

[The Future of Mobility: The 2020 Autonomous Vehicles Readiness Matrix Legal Summit](#) – December

2018 Series

[Current Industry Developments](#)– February

[Managing Cybersecurity Risks](#)– March

[Québec Regulation Update](#) – April

[The Connected City](#)– May

[Are Patent Wars Coming for AVs?](#) – June

[Automated Vehicles May Revolutionize Mobility but Perhaps not Auto Insurance](#) – July

[Cleared for Take-off: Autonomous Technology and Aviation Litigation](#) – August

[The Ultimate Mobility Synergy: Autonomous Vehicles and Electric Vehicles](#)– September

[Automotive and Insurance Industries Consider Hot Issues Faced by the Autonomous Vehicles Sector](#)– October

[Insuring Automated Vehicles: The Insurance Bureau of Canada Recommends "Single Insurance Policy"](#) – November

