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ELECTRONIC STABILITY CONTROL IN FORESTRY TRUCKING APPLICATIONS – AN OVERVIEW

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INTRODUCTION

The level of hazards associated with forestry transportation is extremely high. In 2014–2015, FPInnovations had identified several commercially available technologies that could be adapted to forestry operations to improve safety and reduce the hazards faced by truck drivers and the public travelling on Canada's highways and resource roads (Hickman, 2015). One of the technologies identified in this report is electronic stability control (ESC), which requires immediate attention as it will be mandated in 2017 for all heavy-duty trucks in the United States (National Transportation Safety Board, 2015). Transport Canada (2015) is expected to make ESC mandatory to align with the mandate in the United States. Therefore, the scope of this note is to explore the implication of this mandate on Canadian forest operations. Different stakeholders' perspectives are documented, and the technology and knowledge gaps that need to be addressed to implement this system in an off-highway application are identified.

Figure 1. Logging truck accident.

Technology description

ESC is a type of stability control system available for heavy vehicles. It helps to augment a vehicle's directional stability by applying and adjusting brake torque at each wheel individually. It does so on at least one front axle and on at least one rear axle of the vehicle to correct understeer and oversteer.

ESC can be equipped on the tractor only, but for better results, the trailer should be similarly equipped. The table below lists the original equipment manufacturers (OEMs) and their respective technology suppliers.

OEM	TECHNOLOGY	COMPANY
Western Star	WABCO Electronic stability control	Meritor
Freightliner	WABCO Electronic stability control	Meritor
International	Bendix Electronic stability program	Bendix
Kenworth	Bendix Electronic stability program	Bendix
Peterbilt	Bendix Electronic stability program	Bendix
Mack	Road stability advantage	Bendix
Volvo	Volvo enhanced stability technology	Bendix

Table 1. OEM ESC technology manufacturers

GOVERNMENT LEGISLATION

ESC has been mandated in the United States. The rule, which was finalized in June 2015, takes effect for most new truck tractors in 2017, with the exception of truck tractor combinations ranging between 26 000 and 33 000 pounds, which have until 2019 to comply. Canada is expected to adopt the U.S. rules with similar rollout timelines.

DISCUSSION

Adoption of ESC technology in forest operations: Stakeholder perspectives

Supplier/dealer interviews

OEM truck dealers across Canada were contacted by phone and asked whether they sell vehicles equipped with ESC, among other safety systems, to log truckers. The dealers contacted stated that the technology was not at all common for forestry specification vehicles. The dealers cited customers' perceived dangers of using such technologies in off-highway situations, increased initial purchase cost ($2000–$3000 per unit), and undetermined reliability of sensors as the main reasons why vehicles were not specified with ESC or other safety technologies.

ESC is available for most current OEM model lines, but buyers are not looking for this new technology, nor are they specifying their new forestry vehicles with it. Many dealers stated that buyers are not even aware that these technologies are available or they simply prefer to stick to their previous "tried & true" specification procedures.

End users

Across Canada, no end users with ESC-equipped vehicles running log-haul on forest road networks were identified during our investigation. As such, it is impossible to describe user-related experiences with regard to working with the technology in an off-highway environment.

The lack of vehicles equipped with ESC demonstrates the apparent reluctance of forest haul contractors to adopt an "unproven" technology. Previous negative experiences with sensor issues for both ABS and emission control systems have led many forest haul contractors to believe that adding further complexity to the unit would be detrimental in terms of potential downtime and repair costs.

Technology and knowledge gaps

A Meritor WABCO representative was contacted and was asked the following question:

Q: Would the ESC system operate on off-highway gravel roads, and are extra precautions necessary for the longevity of the system?

A: Yes, ESC is capable of functioning on off-highway gravel roads. One could argue for having two different algorithms for ideal operation; however, it would add complexity. For the longevity of the system, electronics are solid. However, the cables and connectors present problems: they were designed for line haul use. While they could be ruggedized, the cost is expected to increase.

As with the majority of new technologies aimed at class 8 vehicles, the highway side of things always gets prioritized and the forest industry must adapt these technologies for use in the challenging situations found in Canadian forest operations.

Western Canadian forest operations predominantly use tridem drive configurations and it is yet unclear whether ESC would perform well with this configuration.

Lack of end user knowledge of the technology's functionality is a factor that must be addressed if the ESC regulation is to apply to forestry fleets as well as to on-highway fleets. Contractors must be made aware that the technology is coming and must know how it functions.

Figure 2. Logging truck on highway.

CONCLUSION

ESC has been designed for highway use and not specifically for off-road operations. While the technology will function on gravel roads, the hardware, sensors, and connectors must be tested and adapted for use in forestry operations. Information on the functionality and operation of ESC technology must be transferred to forestry haul contractors.

RECOMMENDATIONS

FPInnovations recommends studying further the ESC system equipped on various configurations found in Canadian forestry operations and assisting the forest industry to adapt these technologies into log-haul operations. The durability of the system must be established and, as such, a long-term investigation of two years is required to define problems and their subsequent solutions.

REFERENCES

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