Natural Resources Canada | Ressources naturelles Canada

MDEC: 3rd Annual MVPC 2025

Presentation# S4P2

Epiroc BEV and Diesel LHD Comparison Test at Hudbay Mine

HUDBAY | Epiroc | Natural Resources Canada / Ressources naturelles Canada — Canada — CanmetMINING / CanmetMINES

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Canada

Test Site Information

HUDBAY

"One Team One Vision"

- Hudbay Minerals - Hudbay Mine in Snow Lake, Manitoba
- Located 200 km east of the city of Flin Flon
- 700 km from Winnipeg
- Underground operation: 980m depth
- Production: 5000 tonnes/day
- Mining Method: 40% Post Pillar Cut/Fill, 60% longhole Stoping
- Precious metals: Copper, Zinc, Gold and Silver

Source: Thompson Citizen Nickel Belt News

Questions and objectives motivating this study

- Question 1: Can BEV and diesel LHD move all the materials from a blast production round in a shift?
- Objective 1: Compare Epiroc ST14 BEV & diesel LHDs in terms of performance (material movement, energy vs fuel consumption)

Test Outline

- Test were executed in 1170 level and ran in the following order:
  - Baseline 1, BEV and diesel LHDs executing the same test (duty cycle and airflow rate).

  - Then the BEV LHD was tested at a reduced airflow rate 1.

  - Finally, the BEV LHD was tested again at a further reduced airflow rate 2.

Epiroc ST14 LHDs

BEV LHD

Diesel LHD

BEV & Diesel LHD specifications

Description	BEV-ST14_#1406	Diesel-ST14_#1405
Motor/engine power (kW) [HP]	360 [483]*	250 [335]
Bucket size (m^3) [Yd^3]	6.1 [8]	6.1 [8]
Payload (tonnes)	14	14
Gross weight (tonnes)	42	39.1
Battery (kWh), tank size (L)	300 **	390
Battery chemistry, engine type	NMC	Tier 4i

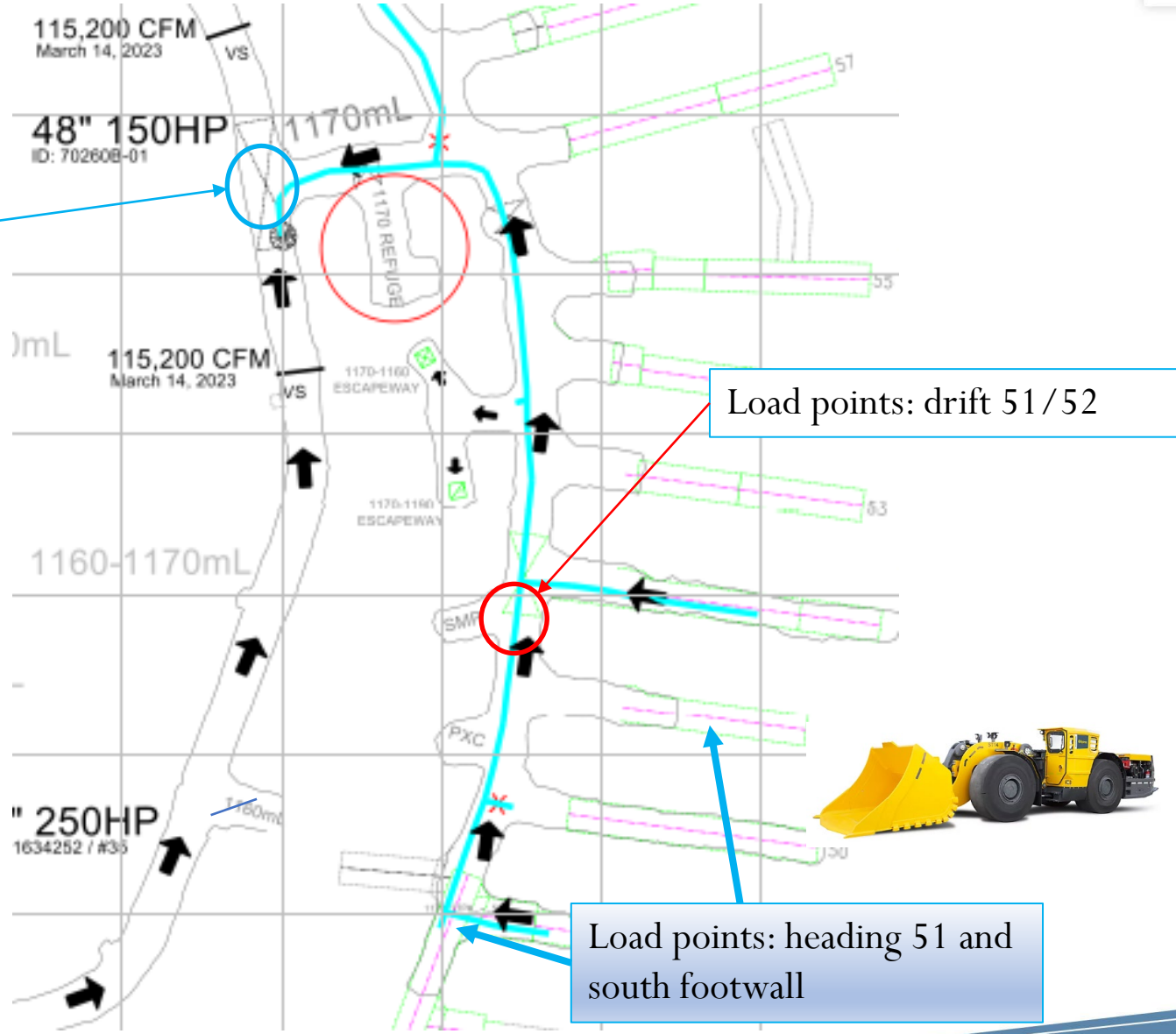
* Traction and auxiliary electric motors continuous power

** Battery pack usable energy

Tests

BEV & diesel LHD tests (39.0 kcfm)

- Layout



Performance Results

Description	June/1 (BEV)	June/2 (Diesel)
Location - 1170 mL level	#51 & footwall	#51 & footwall
Terrain grade	flat to 9%	flat to 9%
Air ventilation (kcfm)	39	39
Time (hh:mm)	11:28 to 15:16	10:30 to 14:03
Total test duration (hr)	3.8	3.6
Total tramming (hr)	1.9	1.8
Tramming distance (km)	9.0	7.8
Avg. tramming speed (km/h)	4.9	4.3

Performance results

Description	June/1 (BEV)	June/2 (Diesel)
Battery SoC (% of useable energy), Fuel (% of full tank)	96 to 33.9	100 to 83
Energy (kWh), fuel (L) consumed from the RCS	185	67
Production bucket count	36	36
Total load moved (tonnes) from RCS	332.6	336.9
Avg. load (tonnes/bucket)	9.2	9.4
Avg. Energy (kWh/10 tonnes), fuel consumed (L/10 tonnes)	5.6	2.0
Avg. Energy (kWh/bucket), fuel (L/bucket)	5.1	1.9
Avg. Energy (kWh/km), fuel consumed (L/km)	20.6	8.6

- BEV moved the same number of buckets with 1 charged battery as compared to diesel

BEV LHD - video

Diesel LHD - video

Summary LHDs performance

Description	June/1 (BEV)	June/2 (Diesel)	June/3 (BEV)	June/6 (BEV)
Battery SoC (% of useable energy), Fuel (% of full tank)	96 to 33.9	100 to 83	93 to 18	97 to 8
Total tramming (hr)	1.9	1.8	2.2	2.6
Tramming distance (km)	9.0	7.8	13	15.2
Avg. tramming speed (km/h)	4.9	4.3	5.9	5.9
Production bucket count	36	36	33	40
Avg. consumption Energy (kWh/km), fuel (L/km)	20.6	8.6	16.8	16.6

- BEV moved the same number of buckets with 1 charged battery as compared to diesel LHD in a shift
- BEV's average tramming speed is faster than diesel in all 3 tests
- In all 3 tests, BEV moved a range of 33 to 40 buckets with 1 charged battery (97 to 8 % SoC)

Can BEV and diesel LHD move all the materials for a blast production round in a shift?

- Both BEV and diesel LHD moved all the materials in 1 blast production round with one charged battery and full diesel tank respectively in a shift.
- BEV LHD is capable of moving a maximum 40 buckets within 2.6 hours with a total distance of 15.2 km on flat to 9% grade with a fully charged battery
- Based on duty cycles observed in this case study, BEV could potentially replace diesel LHD without impacting productivity. This conclusion aligns with test results at New Afton mine in 2022.

Note: The LHD was not observed to be the bottleneck of the loading process (LHD + haul truck), more haul trucks available could potentially increase speed of cycles and material movement

Hudbay – Lalor Mine BEV Fleet Update – Sept / 2025

Electric LHD ST-14 (5)

Electric LHD ST-18 (1)

Electric Haul truck (3)

Electric M20 Jumbo (1), Arrive soon…..

Sources: *International Mining, Epiroc website*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Thank you!
Questions?

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