OYU TOLGOI PANEL 0 - BLOCK CAVE

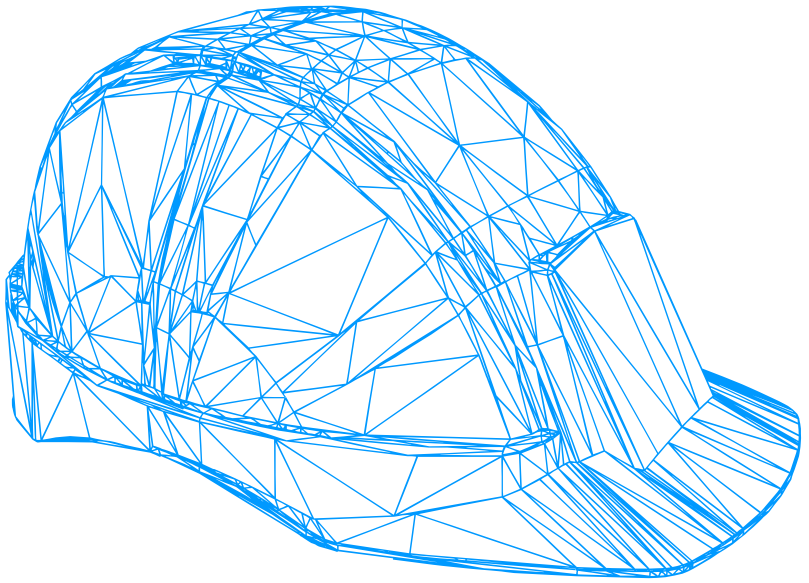
LH518B TENDER STUDY



SAFETY FIRST

Sandvik‘s objective is zero harm to our people, the environment we work in, our customers and our suppliers.

- PROTECTIVE EQUIPMENT
- FIRST AID KIT
- ALARM
- EMERGENCY NUMBER
- EMERGENCY EXIT
- ASSEMBLY POINT
- HYGIENE
- PHYSICAL DISTANCING
- PSYCHOLOGICAL SAFETY
- COUGH CORRECTLY
- STAY HOME WHEN FEELING SICK



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COMPLIANCE

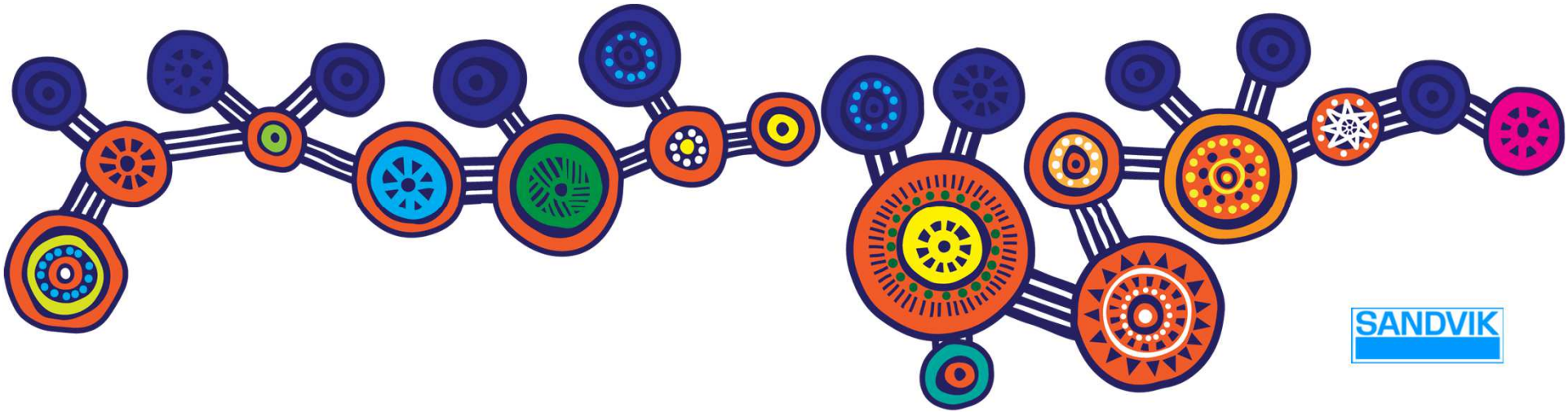
COMPLIANCE

We’ve always been committed to conducting business with high integrity and in a legal and ethical manner. We embrace our corporate responsibility to combat corruption.

ACKNOWLEDGEMENT OF COUNTRY

In keeping with Sandvik's commitment to reconciliation and respect, we acknowledge the Traditional Owners of the land that we are standing on today.

We pay our respect to elders both past and present and we pay respect to all Aboriginal and Torres Strait Islander people and non-indigenous persons listening and watching today.



AGENDA

1. Scope
2. Inputs and Assumptions
3. Loader Productivity Model (LH518B)
   - Manual Production Bogging
   - Automine Lite Production Bogging
4. Summary

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SCOPE

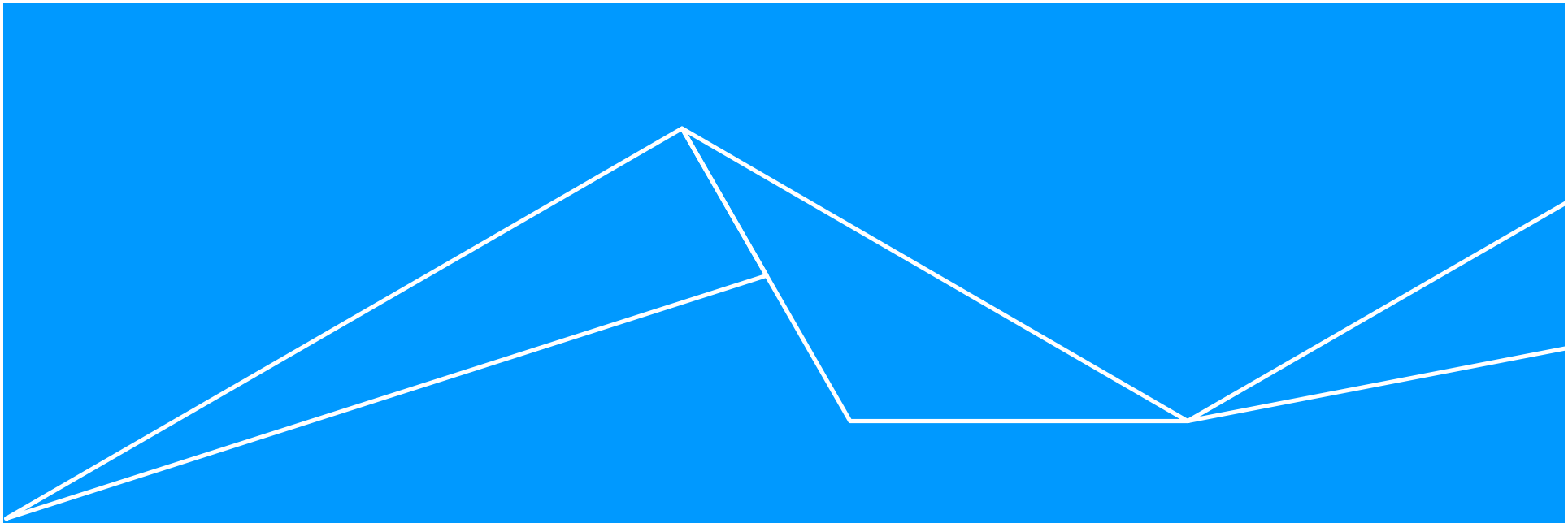
OYU TOLGOI PANEL 0 - BLOCK CAVE
TENDER STUDY

- Oyu Tolgoi JV would like to explore BEV productivity for Panel 0 Block Cave production, this study will present;

  - Machine and Battery Performance:
    - Manual Battery Electric Loader (LH518B) with 9.1m^3 bucket size
    - Automine Lite Battery Electric Loader (LH518B) with 9.1m^3 bucket size

  - Number of machines according to the schedule
  - Number of batteries and charge stations

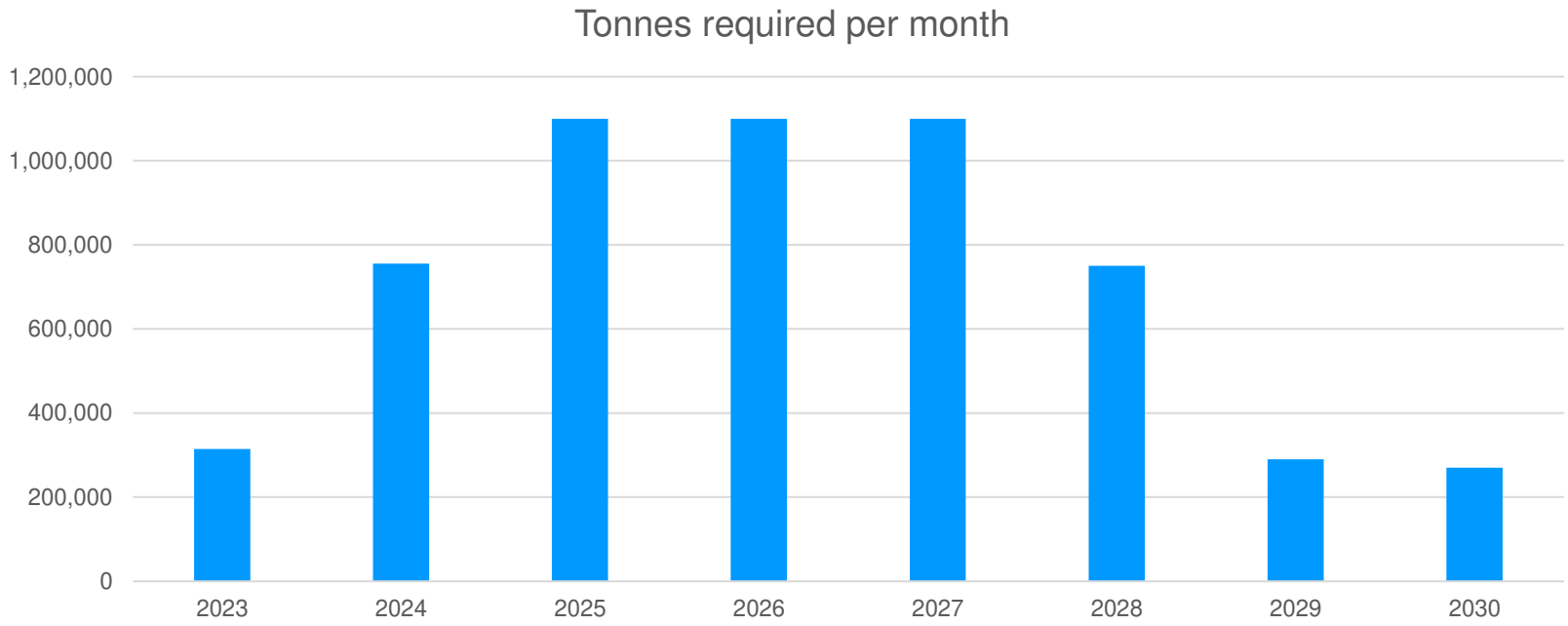
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INPUTS AND ASSUMPTIONS

OYU TOLGOI PANEL 0 - BLOCK CAVE

INPUTS – PRODUCTION SCHEDULE



OYU TOLGOI PANEL 0 - BLOCK CAVE

INPUTS

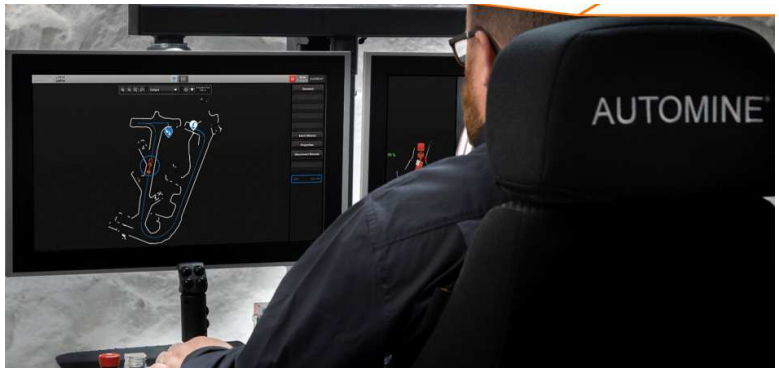


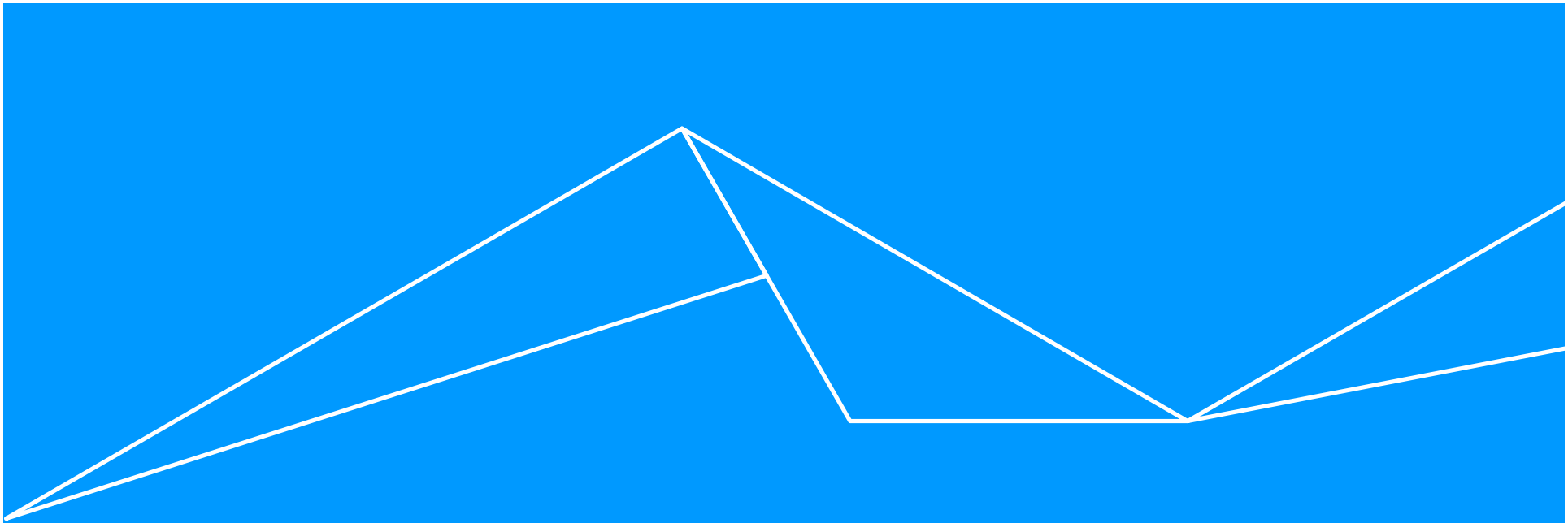
Mine Inputs		
Tonnes per shift (Steady State - 2025/2026/2027)	tps	18,092
Tonnes per day (Steady State - 2025/2026/2027)	tpd	36,184
Mine Speed Limit	km/h	30
SG Broken - Ore	tonne/m³	1.80
Operating days per month	days	30.4
Shifts per day	#	2
Average distance to Orepass	m	181
Average grade*	%	-1.6%

** 13.8m @ 0%*
** 9.1m @ 0%*
** 145.6 @-2%*
** 12.7 @ 0%*

OYU TOLGOI PANEL 0 - BLOCK CAVE
INPUTS

Loader Study		
	Manual	**Auto**
LH518B	9.1m^3 bucket	9.1m^3 bucket
Fill Factor	90%	90%
Effective Shift	7.5 hrs	10.5 hrs





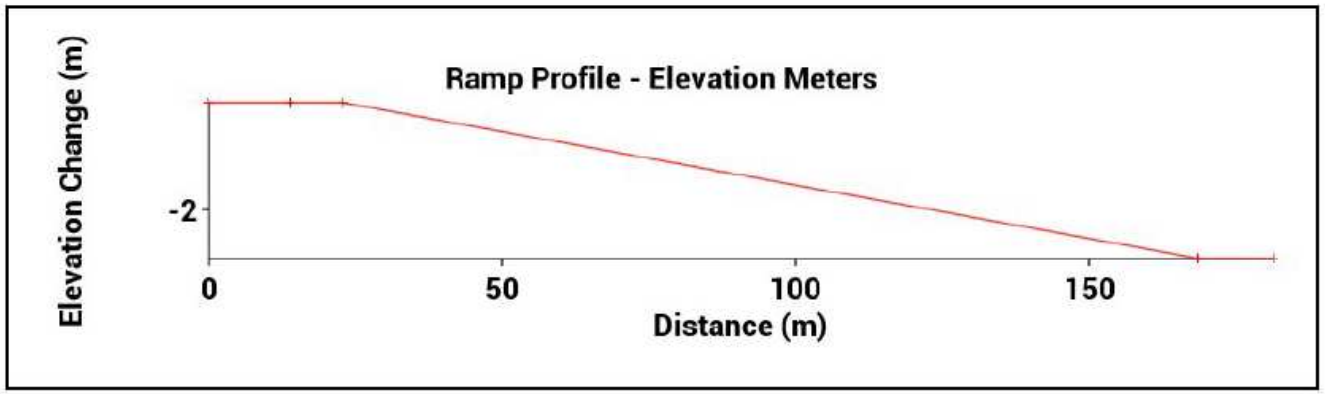
LOADER PRODUCTIVITY

LOADER PRODUCTIVITY

AVERAGE DISTANCE – RAMP PROFILE



Ramp Definition	Ramp Segments			
Index	1	2	3	4
Segment Distances in m	13.8	9.1	145.6	12.7
Segment Grades	0%	0%	-2%	0%



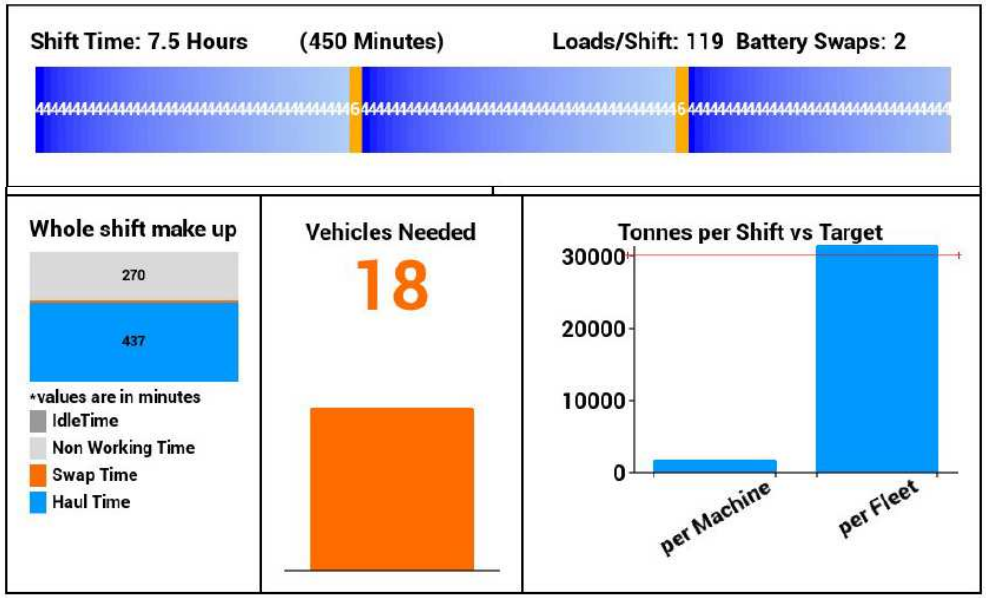
MANUAL LH518B (STEADY STATE)



LOADER PRODUCTIVITY

MACHINE PERFORMANCE





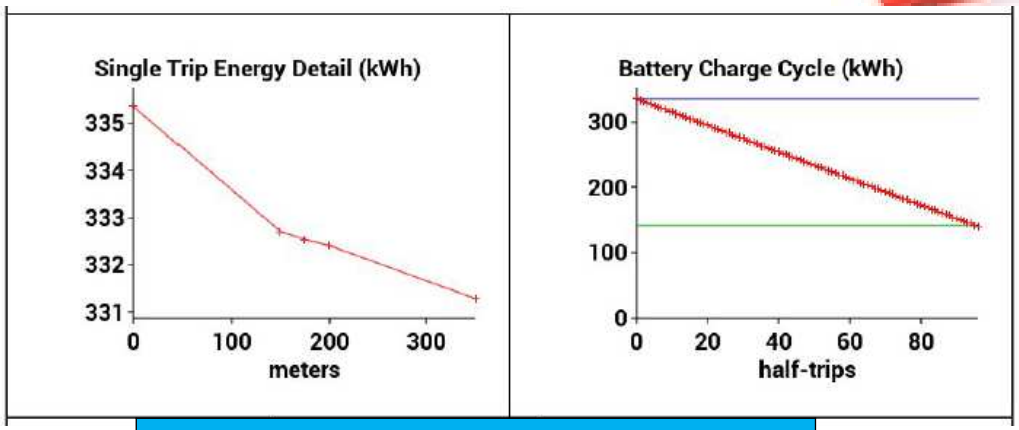
MACHINE PERFORMANCE		
Total distance (one way)	m	181
Operating hours per shift	hrs	7.5
Tonnes per load	tonnes	14.7
Average speed out	kph	13.4
Average speed back	kph	15.6
Time to travel outbound on the cycle	min	0.8
Time to travel back on the cycle	min	0.7
Time stopped per cycle for traffic etc	min	1.0
Time per cycle for loading, turning, dumping.	min	1.16
Time to make one cycle (Total)	min	3.7
Swapping time per battery	min	6
Number of cycle each vehicle can make in a shift	loads	119
Total trips possible before swapping	#	42
Number of swapping batteries per shift	swaps	2
Loaders needed to meet daily goal	#	18
Tonnes each vehicle hauls in a shift	tonnes	1049
Total tonnes achievable per shift	tonnes	18889
Total tonnes required to be moved per shift	tonnes	18092

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LOADER PRODUCTIVITY

BATTERY PERFORMANCE





BATTERY PERFORMANCE		
Total Energy consumed for a complete cycle	kWh	4.3
Average energy consumption per hour per loader	kWh	69
Battery Runtime	hrs	2.57
Fast charge time (350kw)	min	31
DOD Used before swapping	%	51%
Years to 80% capacity assuming 2 packs (Battery Life)	Years	8.51
Battery usable capacity upper limit	%	95
Battery discharge capacity lower limit	%	45

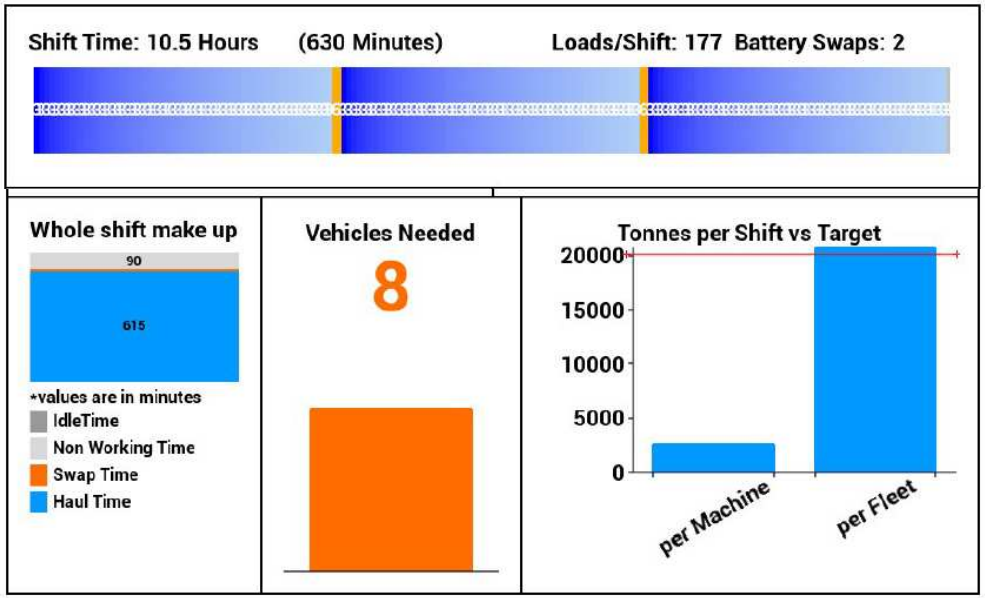
AUTOMATED LH518B (STEADY STATE)



LOADER PRODUCTIVITY

MACHINE PERFORMANCE



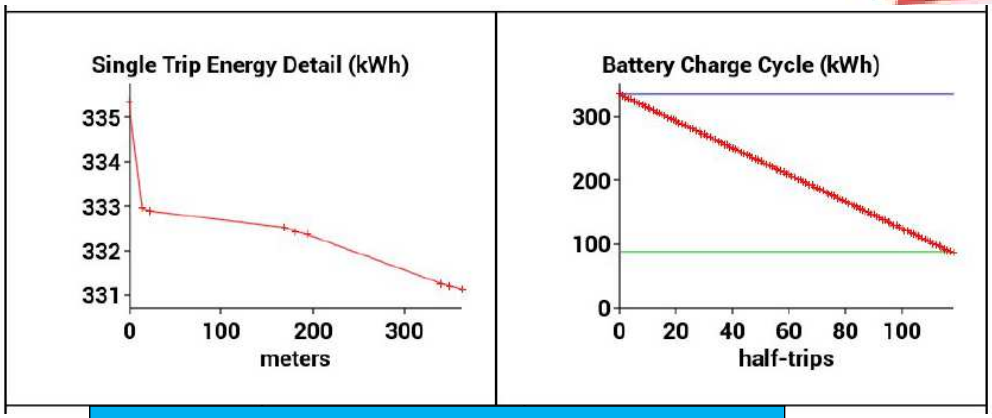


MACHINE PERFORMANCE		
Total distance (one way)	m	181
Operating hours per shift	hrs	10.5
Tonnes per load	tonnes	14.7
Average speed out	kph	15.4
Average speed back	kph	17.8
Time to travel outbound on the cycle	min	0.7
Time to travel back on the cycle	min	0.6
Time stopped per cycle for traffic etc	min	1.0
Time per cycle for loading, turning, dumping.	min	1.16
Time to make one cycle (Total)	min	3.5
Swapping time per battery	min	6
Number of cycle each vehicle can make in a shift	loads	177
Total trips possible before swapping	#	59
Number of swapping batteries per shift	swaps	2
Loaders needed to meet daily goal	#	8
Tonnes each vehicle hauls in a shift	tonnes	2342
Total tonnes achievable per shift	tonnes	18734
Total tonnes required to be moved per shift	tonnes	18092

LOADER PRODUCTIVITY

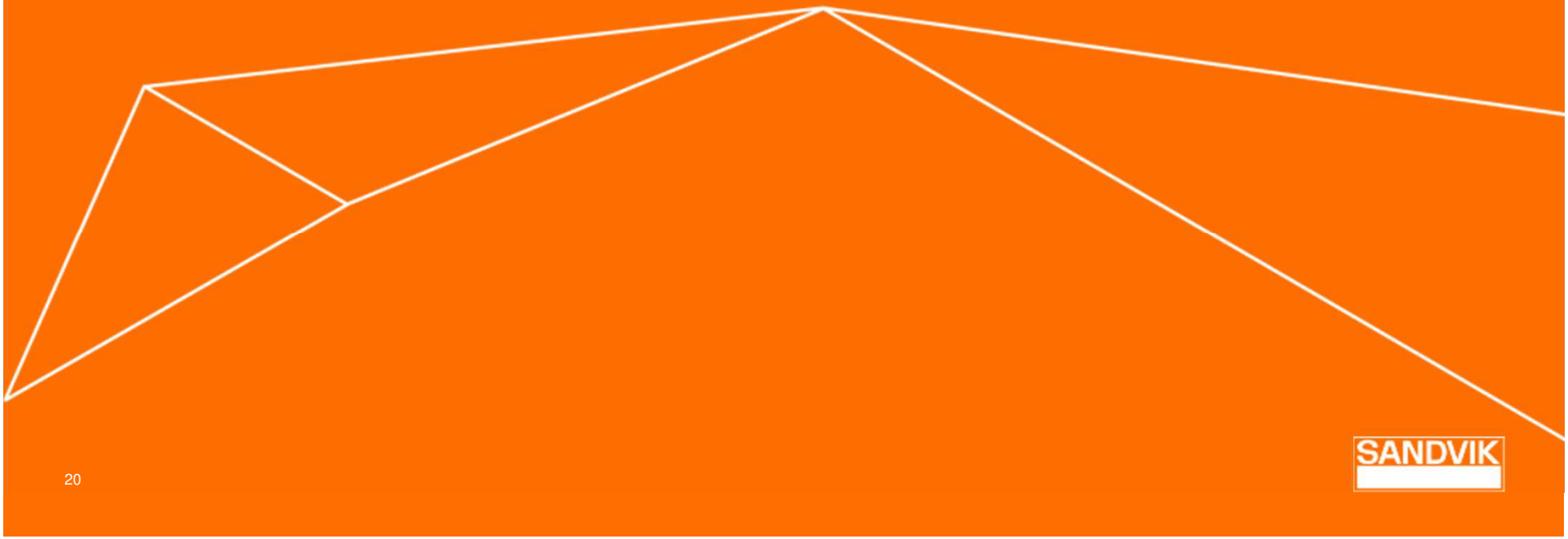
BATTERY PERFORMANCE



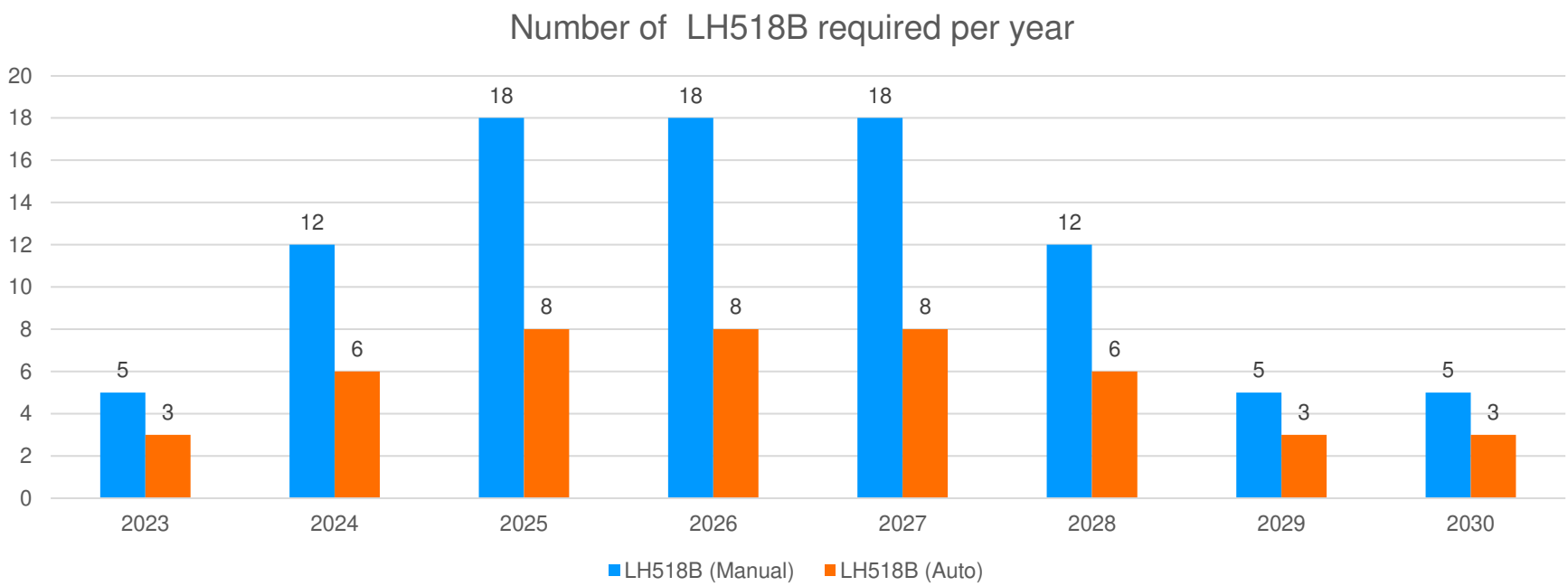


BATTERY PERFORMANCE		
Total Energy consumed for a complete cycle	kWh	4.2
Average energy consumption per hour per loader	kWh	73
Battery Runtime	hrs	3.42
Fast charge time (350kw)	min	43
DOD Used before swapping	%	70%
Years to 80% capacity assuming 2 packs (Battery Life)	Years	3.18
Battery usable capacity upper limit	%	95
Battery discharge capacity lower limit	%	25

MACHINES REQUIRED



MACHINES REQUIRED



SUMMARY

SUMMARY

- Broken SG = 1.8
- 90% Fill Factor
- Tonnes per load (9.1m^3 bucket size) = 14.7 tonnes

SUMMARY			
		Manual LH518B 9.1m3 bucket	**Auto LH518B 9.1m3 bucket**
Maximum number of loader required	#	18	8
2 x Batteries Pack per loader	#	36	16
1 x Charger Station per loader	#	18	8
Full battery at beginning of the cycle		Close to extraction area	Close to extraction area
Battery Charge/Swap Station		Close to extraction area	Close to extraction area

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HEAT GENERATION IN BATTERY ELECTRIC UNDERGROUND HAUL TRUCKS