

MineTrans

know-how
experience
innovation

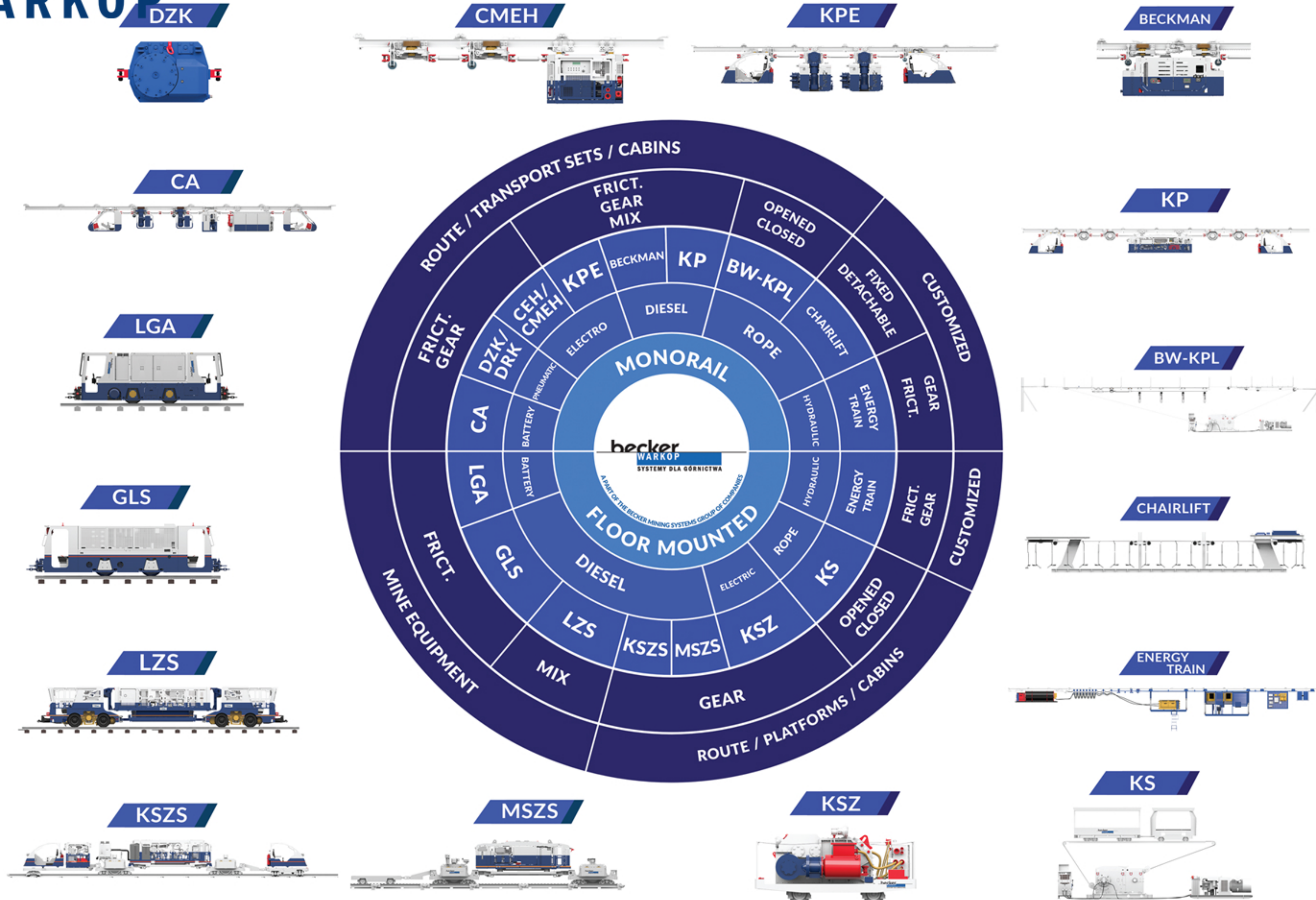
MODERN UNDERGROUND MINING TRANSPORT SYSTEMS WITH REGARD TO LIMITING ADVERSE ON THE WORKING ENVIRONMENT

becker
WARKOP
SYSTEMY DLA GÓRNICTWA



A PART OF THE BECKER MINING SYSTEMS GROUP OF COMPANIES

e-mobility A green circular icon containing a stylized battery symbol with a plug-like shape at the bottom, representing electric mobility.



- » INCREASE IN THE MINING DEPTH 
- » EXTENSION OF TRANSPORT AND CREW ACCESS ROUTES 
- » INCREASE OF WORKING ENVIRONMENT REQUIREMENTS 
- » CONSTANT INCREASE IN THE POWER OF INSTALLED MACHINERY AND EQUIPMENT 
- » THE NEED TO REDUCE CARBON FOOTPRINT AND GREENHOUSE GAS EMISSIONS 

2014

Battery-powered
monorail
type CA-190

2020

Battery-powered
maneuvering
monorail
type MCA-1

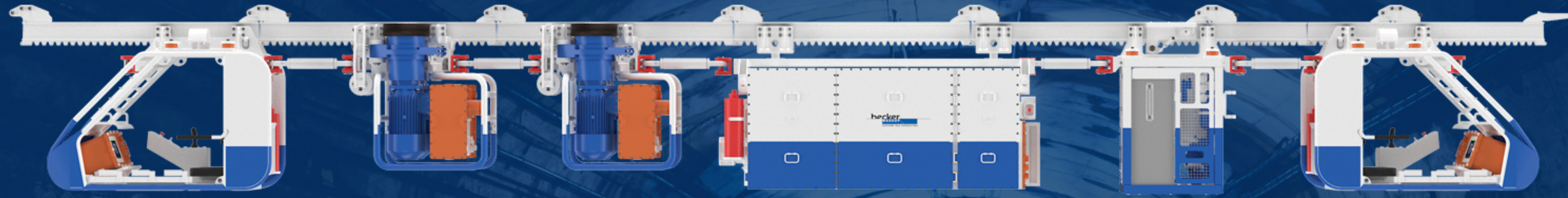


Battery-powered
maneuvering
monorail
type CMA-190

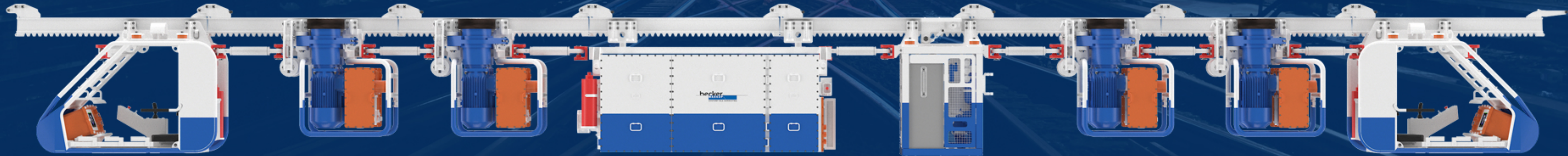
2016

Battery-powered
monorail
type CA-190
with the new
VOLTER
type battery

2020



Battery monorail CA-190 with VOLTER
lithium battery in configuration
with two friction drives.

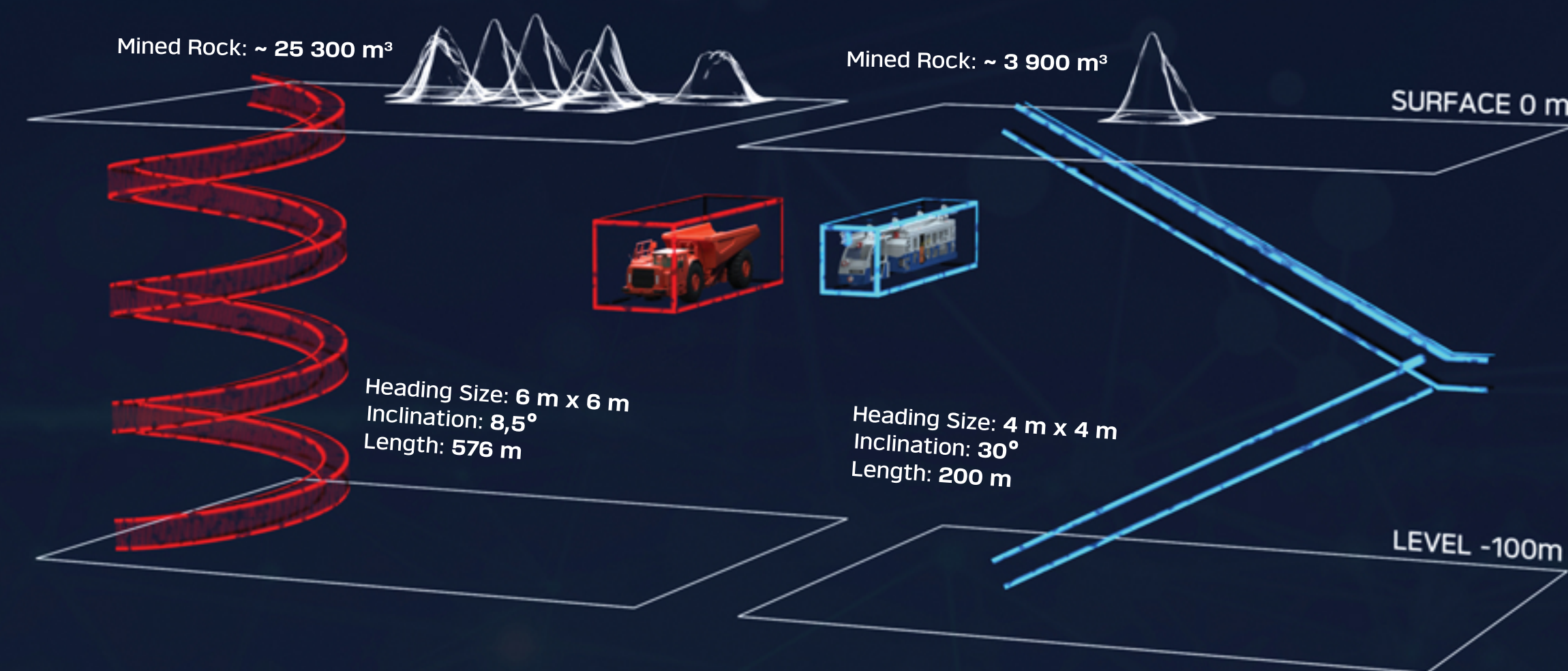


Battery monorail CA-190 with VOLTER
lithium battery in configuration
with four friction drives.

STEEP TRANS



SteepTrans is a part of MineTrans, a large number of transport machines designed, manufactured and offered by European company Becker Warkop – a leading global manufacturer of transport systems for mining since 1969. MineTrans are machines with transport capabilities for operating on slopes up to 58% (30°), which includes diesel and electrically powered machines (battery, busbar or cable) for application such as transporting of heavy equipment, consumables, rocks, people and more.



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TECHNICAL PARAMETERS
OF THE CA-190 TYPE MONORAIL
WITH VOLTER TYPE BATTERY

PULLING FORCE (FRICTION DRIVE)	MAX. 20 KN (1 DRIVE) MAX. 40 KN (2 DRIVES) MAX. 60 KN (3 DRIVES) MAX. 80 KN (4 DRIVES)	NOMINAL VOLTAGE OF BATTERY UNIT	432 V DC
MAXIMUM SPEED	2.0 m/s (limited to 1.0 m/s for version without operator cabins)	NOMINAL VOLTAGE OF CHARGING	500 V AC / 660 V AC
MINIMUM HORIZONTAL TURNING RADIUS	4 m	BATTERY CAPACITY	277 Ah
MINIMUM VERTICAL TURNING RADIUS	8 m	POWER OF ONE ELECTRIC MOTOR	11 kW
MINIMAL STATIC BRAKE FORCE	1,5 X PULLING FORCE	MASS WITHOUT OPERATOR CABINS (1, 2, 3, 4 DRIVES)	5490 / 6930 / 8370 / 9800 kg
MAXIMUM INCLINE OF THE TRACK	±30°	MASS WITH OPERATOR CABINS (1, 2, 3, 4 DRIVES)	6790 / 8230 / 9670 / 11110 kg
HEIGHT X WIDTH	1275 X 800 MM	LENGTH WITHOUT OPERATOR CABINS (1, 2, 3, 4 FRICTION DRIVES)	5970 / 7495 / 9210 / 10740 mm
TYPE OF THE TRACK	I155(I140E), I140V95, I250 OR OTHER COMPATIBLE	LENGTH WITH OPERATOR CABINS (1, 2, 3, 4 FRICTION DRIVES)	10760 / 12290 / 13810 / 15340 mm

Comparison of battery parameters used in CA-190 type monorails
the previously used BWZA type battery and a new generation VOLTER battery

BATTERY TYPE	VOLTER LITHIUM
TYPE OF EXPLOSION-PROOF CONSTRUCTION	Ex d
NOMINAL CAPACITY	277 Ah
RATED VOLTAGE OF THE POWER SUPPLY FROM THE BATTERY	512 V DC
NOMINAL CHARGING VOLTAGE	500 V AC / 660 (OPTION) (DIRECTLY FROM MAINS POWER SUPPLY)
STORED ENERGY	141,8 kWh
CHARGING TIME	3h (0 to 80%) 4h (0 to 100%)
MASS	3000 kg
DIMENSIONS	~ 1100 x 800 x 2500 mm



THE VOLTER BATTERY IS CHARGED DIRECTLY FROM THE MAINS SUPPLY 500 V OR 660 V DEPENDING ON THE DESIGN OPTION.



0-100%



0-80%

VOLTER BATTERY DOES NOT HAVE THE SO-CALLED. "MEMORY EFFECT" WHICH MEANS THAT IT IS NOT NECESSARY TO DISCHARGE BATTERY TO A MINIMUM VALUE AND CHARGE IT TO MAXIMUM VALUE, IT IS POSSIBLE TO RECHARGE IT.

COMPARISON OF BASIC FEATURES OF DIESEL-POWERED MONORAIL WITH BATTERY-POWERED MONORAIL

POWERING MEDIUM

POWER SUPPLY
METHOD

ENERGY RECOVERY

EXHAUST GAS EMISSION

ENVIRONEMNTAL

SOUND LEVEL
IN THE EXCAVATION

DIESEL MONORAIL

DIESEL FUEL

REFUELING FROM SPECIAL
WAGONS TRANSPORTED
FROM THE SURFACE
TO DESIGNATED REFUELING
SITES AND THE RETURN
OF THE WAGONS

NO

YES

MACHINES POWERED BY DIESEL ENGINES TRANSFER TO THE ENVIRONMENT
APPROX. 3 TIMES MORE HEAT THAN MACHINES POWERED BY ELECTRIC
MOTORS. CONSEQUENTLY, THEY HAVE A SIGNIFICANTLY HIGHER IMPACT
ON THE DETERIORATION OF ENVIRONMENTAL CONDITIONS IN THE EXCAVATION
WHERE THE TRANSPORT IS CARRIED OUT

THE OPERATION OF THE
DIESEL ENGINE INCREASES
THE NOISE LEVEL

BATTERY MONORAIL

ELECTRIC ENERGY

BATTERY CHARGING
POSSIBLE AT ANY LOCATION
OF THE EXCAVATION

YES
DURING BRAKING AND
DRIVING DOWN THE SLOPE

NO

WITHOUT IMPACT
ON NOISE LEVELS

THE ENVIRONMENTAL BENEFITS OF USING BATTERY-POWERED MACHINES

- » ELIMINATION OF THE EXHAUST GASES, RESULTING IN A SMALLER QUANTITY OF AIR REQUIRED FOR DILUTION. IT IS ASSUMED THAT IN THE CASE OF USING MACHINES WITH DIESEL ENGINES 0,06 TO 0,08 m³/S AIR EXPOSURE PER KW OF INSTALLED POWER IS REQUIRED (ACCORDING TO THE SOUTHERN AFRICAN INSTITUTE OF MINING AND METALLURGY).
- » REDUCED HEAT EMISSION, RESULTING IN A REDUCTION IN THE AMOUNT OF AIR REQUIRED TO REMOVE HEAT FROM THE WORKINGS
- » LESS NOISE, VIBRATION AND HEAT EMISSION, LEADING TO IMPROVED OCCUPATIONAL HEALTH AND SAFETY FOR MINERS OPERATING EQUIPMENT UNDERGROUND IN MINES.
- » BATTERY-POWERED MACHINES SUPPORT THE GLOBAL DRIVE TOWARDS A TRANSITION TO SUSTAINABLE CLEAN ENERGY AND REDUCE THE CARBON FOOTPRINT OF MINES.
- » BATTERY-POWERED VEHICLES ARE WELL SUITED FOR AUTOMATION.
- » REDUCED COSTS FOR INSPECTION, MAINTENANCE, OVERHAUL AND SPARE PARTS STORAGE.

**MODERN ELECTRICALLY DRIVEN TRANSPORT SYSTEMS
IS THE ANSWER TO THE GROWING DEMANDS
ON THE WORKING ENVIRONMENT IN MINES.**

**THANK YOU
FOR YOUR ATTENTION**

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