Section 1
General Information

INTRODUCTION

The operation of heavy mining machinery can be hazardous. To ensure safe operation, operators and personnel must be alert, competent, correctly trained, tested and licensed in the principles, capabilities and correct operating and isolation procedures of the machinery.

This manual is designed to provide the MH-40 Shield Hauler operator with the proper information regarding the machine's instrumentation, operating controls and general safe working procedures. All operators of this machine must be conversant with the information contained within this manual before operating the machine.

To ensure safe and efficient operation, the MH-40 Shield Hauler must be adequately maintained by the operators and service personnel. To achieve this, the operator's pre-start inspection procedure contained in Section 6 of this manual must be performed before any use of this machinery is undertaken.

Any abnormalities should be reported immediately to service personnel to avoid costly machine repairs, production downtime and unsafe operation of the machine.

DESCRIPTION

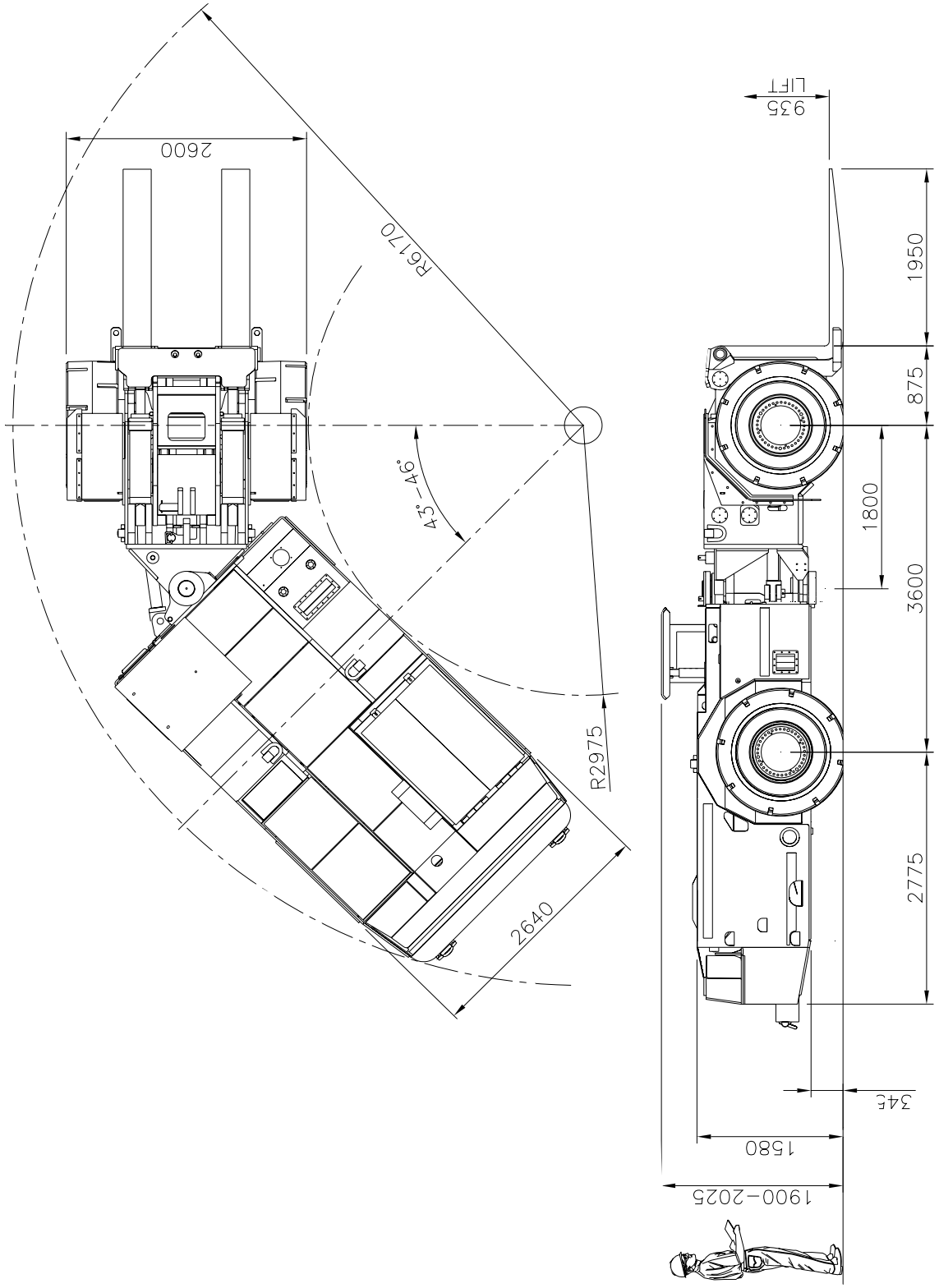
The MH-40 is a 40000 kg high capacity Shield Hauler. It has been designed for lifting and carrying heavy pieces of equipment and machinery in underground coal mines. Its main function is carrying and placing of longwall equipment and shields. The machine comes standard with a set of fork tines and winch for this purpose.

The motive force is provided by a 172 kW Caterpillar 3216 turbocharged four-stroke inline six cylinder flameproof diesel engine package. Flameproofing of the system includes a *wet bath* exhaust conditioning system complete with exhaust and intake flame traps. The start system is pneumatic. The Diesel Control System (DCS) is an intrinsically safe electronic monitoring system. The engine power output is connected to the constant four-wheel drive system via a drive coupling and converter through a four-speed bidirectional power shift transmission to heavy duty axles with liquid cooled Posi-Stop brakes.

The MH-40 Shield Hauler utilises a wet bath exhaust system complete with a exhaust purifier. A removable flame trap for ease of cleaning is fitted on the outlet of the exhaust conditioner housing.

A site specific Risk Assessment is recommended to be conducted before this machine is introduced into service.

GENERAL ARRANGEMENT



SPECIFICATIONS

All specifications are subject to change without notice. Always consult BUCYRUS to obtain current information before applying critical loads.

Weight

Operating with full fuel and operator	39400 kg

Tractive Effort (standard wheels)

1st gear	430 kN
2nd gear	232 kN
3rd gear	134 kN
4th gear	77 kN

Vehicle Speeds (standard wheels)

	Empty
1st gear	3.5
2nd gear	7.3
3rd gear	12.6
4th gear	21.7

Grade Ability

Front to rear	1:4
Side to side (empty)	1:4
Side to side (laden fully raised)	1:8

Engine

Make/model	Caterpillar 3126 MUI
Displacement	7.2 litre
Maximum power	172 kW @ 2500 RPM

Engine Cooling System

Cooling system	Water based radiator
Cooling fan	Hydraulic driven fan
Water pump	Engine driven
Radiator and fan orientation	Horizontal

Engine Speeds

Low idle	800 RPM
High idle	2600 RPM

Fuel Consumption

At full power	60 litres/hr
Average mine duty	20-40 litres/hr

Start System

Starter motor type	Turbine air start

Intake Air Cleaner

Type/Make	Dry
Elements	Dual (primary and safety)
Flame trap	Intake between turbo and after cooler

Exhaust Conditioner

Type	Wet Scrubber
Make	BUCYRUS
Exhaust filter	Replaceable element
Exhaust flame trap	Wet MA
After treatment	Catalytic exhaust purifier

Exhaust Heat Exchanger Cooling System

Cooling system	Water based radiator
Cooling fan	Hydraulic driven fan
Water pump	Hydraulic driven
Radiator and fan orientation	Horizontal

Transmission

Make/Model	Dana 32000
Speeds, forward/reverse	4

Torque Converter

Make/model	Dana

Axles

Type	Outboard planetary
Front axle make/model	Dana 53R
Rear axle make/model	Dana 53R
Differential type	Bevel gear and pinion
Differential lock type - front	Posi-Torque
Differential lock type - rear	Posi-Torque

Tyres – Standard

Size	1397 diameter x 559 mm
Inflation media	Solid

Hydraulic Systems

Steering	Closed centre 17.30 MPa
Brakes	Closed centre 17.30 MPa
Carry plate lift and tilt	Open centre 21.05 MPa
PTO	Open centre 21.05 MPa
Tank type	Sealed and pressurised
Tank pressure	50 kPa

Hydraulic Filtration

Auxiliary system	
Type	In tank return replaceable with bypass
Rating	10 micron
Steer/brake system	
Type	Inline return replaceable with bypass
Rating	10 micron
Optional PTO	
Type	Inline return replaceable with bypass
Rating	25 micron

Carry Plate Pump

Type	Gear open centre
Nominal output @ 2500 RPM	156 lpm

Fan Pump

Type	Gear open centre
Nominal output @ 2500 RPM	67 lpm

Alternator/HEX Pump

Type	Gear open centre
Nominal output @ 2500 RPM	25 lpm

Steering and Brake Pump

Type	Pressure compensated piston
Nominal output @ 2500 RPM	96 lpm

Cylinders

Type	Double acting
Rods	Hard Chromed
Counterbalance valves	Lift and tilt
Cushion stops	Steering and tilt

Steering

Type	Centre articulated, hydraulic

Steering System

Control valve	Closed centre
Actuation	Orbital
Pressure compensated	17.30 MPa
Crossover relief	19.30 MPa

Accumulator – Brakes

Type	Piston
Quantity x capacity	1 x 2 litre
Operating pre-charge pressure	6.2 MPa

Service Brake

Type	Totally enclosed, liquid cooled Posi-Stop
Make	Dana
Application	Spring applied hydraulic release
Location	Each wheel end

Park Brake

Type	Totally enclosed, liquid cooled Posi-Stop
Make	Dana
Application	Spring applied hydraulic release
Location	Each wheel end

Articulation

Bearing type and size	Pin and spherical bearing (top) bush, (bottom) fully sealed
Bush material	Hardened steel
Pin material	Hardened steel
Degrees of turn either side	45 degree

Oscillation

Type	Dana rear axle mounted trunnion
Bush material	Hardened steel
Pin material	Hardened steel
Up and down from horizontal	6 degree

Seating (Operator)

Type	Cross-seated
Make	BUCYRUS
Suspension	Shock absorption

Canopy

Type	Protective device MDG1

Electrical System

Type	Flameproof
Voltage	12 V
Polarity	Negative ground

Lights

Number/location	STD 2 front, 2 rear
Type	Approved flameproof

Alternator

Drive	Hydraulic
Type	BUCYRUS Flameproof

Pneumatic System

Compressor type	Piston engine gear driven
Air flow	0.50 m^3/min @ 1500 RPM
Governed pressure	800 kPa
Relief pressure	830 kPa
Air receiver volume	80 litres

Shutdown System

System type	Bucyrus DCS electronic Intrinsically safe approved

Service Capacities

Hydraulic tank	450 litre
Fuel tank	350 litre
Transmission/converter oil	45 litre
Engine crankcase oil (with filter)	22 litre
Engine cooling system water	72 litre
Axle oil (each)	60 litre
Wet scrubber water reserve	468 litre

Overloading equipment could cause personal injury, death or equipment damage. Due to configuration or options these weights can vary up to 20%. Bucyrus recommends that relevant standards and safety procedures should always be used when operating this machine. Removal of protective canopies, doors, interlocks and structures etc., could cause serious injury of death. Replacement with correctly torqued fasteners is mandatory.