Powertrans Products and Services
The Powertrans team has a history of developing and operating innovative bulk haulage systems, as well as developing the concept further as a separate commercial operation. We have developed expertise in building these systems, as well as in evaluating the most appropriate option for a site, and correctly operating and maintaining road train combinations.

Products
In addition to our underground mining transport systems, Powertrans manufactures truck and powered and unpowered trailer systems for use in surface mining. Our Powerspares™ division supplies a range of spare parts for the heavy-duty haulage industry. Powertrans appreciates the critical role that haulage systems play in a mining operation, and provides 24-hour product support.

Services
Powertrans provides a consultancy service to assist customers to be aware of bulk haulage options, and to select the most appropriate option for a site. It has a proven history of developing new options where appropriate.

Training is offered for operators and maintenance personnel working with Powertrans haulage systems, and service and maintenance schedules can be recommended.

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Innovative Transport Systems

POWERTRAIN™
UNDERGROUND Haulage SYSTEM
An innovative, low-cost haulage system for underground mining applications, providing a cost-effective, more productive, and more flexible alternative to conventional underground mining trucks.

NET HORSEPOWER
640-960 kW/860-1290 hp
HAULAGE CAPACITY
55.6-91.3 metric tonnes/
61.3-100.7 US tons

Innovative, low-cost haulage system for underground mining applications, providing a cost-effective, more productive, and more flexible alternative to conventional underground mining trucks.
Finite element analysis is undertaken in ProMechanica to minimise chassis stresses.

Purpose-built for underground work

The Powertruck™ is built with only one thing in mind: working around the clock to haul material around and out of an underground mine. The low entry height ROPS/FOPS cab incorporates controls and engine monitoring for the Powertruck™ and Powertrailer™, a hydraulic pump and oil reservoir, and tipping controls for the truck and trailer(s). A single driver controls all operations from the truck cab.

Keeping cool under pressure

Large transverse-mounted radiators and temperature-sensitive hydraulic fans provide the cooling power to allow the Powertruck™ and Powertrailer™ to operate in 65°C (149°F) ambient temperatures.

Moving More For Less

SAFETY

Fully certified ROPS/FOPS underground mining cab
SDS Aluminco fire suppression on wheels and engines
Dry powder hand-held fire extinguisher
Emergency stop switch in cab and on back of chassis

TOW TRAILER

Dolly axes/suspension
York axes – 127 mm (5 in) round
Tandem rating 27200 kg (60,000 lbs)
Suspension
Hutch single point leaf spring

Rear tandem axes/suspension
York axes – 127 mm (5 in) round 2882
Tandem rating 27200 kg (60,000 lbs)
Suspension
Hutch single point leaf spring

ALL

Chassis
Web Depth 850 mm 33 1/2 in
Flange Thickness 20 & 25 mm 0.75 & 1 in

Brakes
Dual circuit air-actuated ADR 38-compliant type drum brakes designed for road train operation, with 5-cam actuation.
Steer 419 mm (16 1/2 in) dia. x 152 mm (6 in) wide, 24 chambers on 140 mm (5 1/2 in) slack adjusters
Drive 450 mm (18 in) dia. x 210 mm (8 1/4 in) wide, 30/36 chambers on 165 mm (6 1/4 in) slack adjusters
Dolly 419 mm (16 1/2 in) dia. x 178 mm (7 in) wide, type 30/36 chambers on 140 mm (5 1/2 in) slack adjusters

Springs-operated failsafe emergency and parking brakes.
Engine brake on Powertruck™ and Powertrailer™.

Wheels/Tyres
Steer
- wheels 22.5 x 11.75 steel, 10-stud
- tyres 385/65R22.5 tubeless

Drive
- wheels 2-piece or 3-piece steel, 10-stud
- tyres 10.00/20 14PR on drive

Tyre quantities
- Powertruck + 1 Powertrailer: 2x steer; 24x drive & trailing tyres. TOTAL 26
- Powertruck + 1 Powertrailer + 1 tow trailer: 2x steer; 40x drive & trailing tyres. TOTAL 42
- Tyres per additional Powertrailer/tow trailer: 16

Couplings
Front: 40 mm (1 5/8 in) towing pin; 40,000 kg (88,185 lb) capacity; two towing eyes 40,000 kg (88,185 lb)
Rear: Ringfeder type 2050 Aus D 260 kN (58,450 lbs force)

Electrical
12 volt DC system, ADR compliant lighting

Body
Side tipping, controlled from the truck cab.

Readily available off-highway light earthmoving tyres

The Powertrans underground mining haulage systems use multiple axles of standard G35/6SR 22.5 on steer, 10.00/20 14PR on drive) tyres, which are readily available, easily handled and fitted, and economical.
**POWERTRUCK™**

**Engine**
- 12.7 litre (775 cu in) 6-cylinder Detroit Diesel S60 ADR80 turbocharged, air-to-air charge cooled diesel, 127 mm (5 in) exhaust with horizontal muffler and catalytic converter.
- Power (2100 rpm) 320 kW 430 HP
- Torque (1200 rpm) 3200 Nm 2390 lb-ft

**Transmission**
- Allison HD466SP automatic
- Forward 1: 4.70:1
- 2: 2.21:1
- 3: 1.52:1
- 4: 1.00:1
- 5: 0.76:1
- 6: 0.67:1
- Reverse 1: 5.55:1

**Average speeds (14% gradient)**
- 55 t cap, laden: 16-18 km/h (10-11 mph)
- 85 t cap, laden: 10-12 km/h (6-7 mph)
- 100 t cap dual Powertrailer™, laden: 15-17 km/h (9-11 mph)

**Steering**
- Dual steering boxes
- Max. inside wheel cut angle: 43 degrees

**Front steer axle / suspension**
- Meritor FL641
- Load Rating: 9100 kg 20,062 lbs
- Slipper spring front suspension, 1550 mm (61 in) working length

**Rear drive axles / suspension**
- Sisu Tandem FR2P-32 with planetary hub ends
- Ratio: 10.55:1
- Load Rating: 32,000 kg 70,946 lbs

**Cooling**
- A patented transverse-mounted cooling module is mounted at the rear of the Powertruck™ and Powertrailer™, and incorporates radiator, charge air and hydraulic cooling. The hydraulic fans of the radiator and charge air cooler are controlled by the Engine Control Module, and are temperature-sensitive for economy.

**Coolant and lubricant capacity**
- Engine: 36 liters 9.5 US gallons
- Transmission: 28 liters 7.4 US gallons
- Drive axles: 44 liters 11.6 US gallons
- Cooling system: 150 liters 39.6 US gallons
- Steering system: 15 liters 4.0 US gallons
- Hydraulic (front): 90 liters 23.8 US gallons
- Hydraulic (tipping): 162 liters 42.8 US gallons
- Fuel: 540 liters 142.6 US gallons

**POWERTRAILER™**

**Engine**
- 12.7 litre (775 cu in) 6-cylinder Detroit Diesel S60 ADR80 turbocharged, air-to-air charge cooled diesel, 127 mm (5 in) exhaust with horizontal muffler and catalytic converter.
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**Steering**
- Dual steering boxes
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**Suspension**
- Meritor FL641
- Load Rating: 9100 kg 20,062 lbs
- Slipper spring front suspension, 1550 mm (61 in) working length

**Cooling**
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**Steering**
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**Front steer axle / suspension**
- Meritor FL641
- Load Rating: 9100 kg 20,062 lbs
- Slipper spring front suspension, 1550 mm (61 in) working length
- Load Rating: 10,000 kg 22,046 lbs

**Rear drive axles / suspension**
- Sisu Tandem FR2P-32 with planetary hub ends
- Ratio: 10.55:1
- Load Rating: 32,000 kg 70,946 lbs
- Slipper spring suspension with rubber springs
- Load Rating: 25,500 kg 56,008 lbs

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- Fuel: 540 liters 142.6 US gallons

**Off-the-shelf trailer running gear**
- Proven, robust, off-the-shelf trailer suspension is used, for affordability and to avoid costly delays waiting for parts.

**A strong backbone**
- All trailers are built on 850 mm (33½ in) deep chassis rails designed to take the punishment of around-the-clock operation in a harsh underground environment.

**The power to pull up steep inclines**
- With an engine and automatic transmission on the Powertrailer™ combining with the engine and transmission of the Powertruck™, there's plenty of power for hauling up the steepest grades. In some mines it may even be possible to add a second Powertrailer™ or an unpowered tow trailer, further enhancing the productivity of the Powertrons combination. Faster cycle times and greater payload per vehicle add up to greater productivity and fewer vehicles to move a given volume of material.
Innovative solutions using standard components

The Powertruck™ and Powertrailer™ use proven, readily available components in an innovative way to provide mine owners, operators and transport contractors with a cost-effective means of moving larger volumes of material out of an underground mine than can be moved by traditional underground haulage vehicles.

Depending on mine requirements and operating conditions, up to two trailers can be towed by the Powertruck™; at least one of those trailers will be a Powertrailer™. The Powertrailer uses the same drivetrain as the Powertruck™, and requires only a single operator.

Low maintenance and operating costs

The Powertruck™ and Powertrailer™ use off-the-shelf driveline and suspension components, while the unpowered trailer in the Powertrain™ uses readily available axle, brake and suspension components. Off-highway light earthmoving tyre sizes are used and, unlike large mining tyres, there are fewer supply problems.

Where possible, parts are common across the truck and trailer(s), minimising parts-holding requirements.

No specialist skills are required in servicing and maintaining the mechanical components.

The Powertruck™ and Powertrailer™ engine/transmission and cooling modules are readily accessible for service.

Visual and audible alarms warn the operator in the event of an engine or transmission failure, while the Powertruck™ and Powertrailer™ engine shuts down automatically in the event of a critical alert such as low oil pressure, high coolant temperature, high oil temperature or low coolant level, to guard against major equipment failure.

The heavy-duty electrical system is weatherproof and uses sealed electrical connectors.

Maintenance-free and greaseless hinges are used for the hoist cylinder, body and tipper door hinges.

The hard-wired umbilical cord linking the prime mover and trailers provides a simple, reliable data link.

Safety

By using rigs capable of achieving fast cycle times hauling up to 90 tonne payloads with a single operator, mines require fewer vehicles (and fewer operators) to move material, reducing hazards on the haul roads.

Directional stability exceeds conventional road train performance, while careful attention to trailer coupling location and weight distribution minimises the swept path requirement of the Powertrain™.

With engine braking from both the prime mover and the Powertrailer™ engines, as well as braking on all axles, the Powertrain™ has the stopping power to control a fully laden vehicle on a steep down slope. Transmission retarders can be supplied as an option.

Durability

The Powertrans haulage systems for surface and underground mining have been designed for long service life. As of September 2006 there were 27 underground and 36 above-ground Powerttrans road trains operating, having accumulated over 450,000 engine operating hours in total. Based on the experience of these machines, engines, transmissions and drive axles can all expect a service life of around 12,000 hours, while dump bins can expect a life of around 20,000 hours.

NOTE: These figures are averages based on past experience. Actual service life will depend on operating conditions and maintenance regimes.
Powertrain™

Moving More For Less

FEATURES

Innovative solutions using standard components
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### Powertrain™ SPECIFICATIONS

#### POWERTRUCK™

**Engine**
- 12.7 litre (775 cu in) 6-cylinder Detroit Diesel S60 ADR80 turbocharged, air-to-air charge cooled diesel, 127 mm (5 in) exhaust with horizontal muffler and catalytic converter.
- Power (2100 rpm) 320 kW 430 HP
- Torque (1200 rpm) 2034 Nm 1500 lb-ft

**Transmission**
- Allison HD4660P automatic
- Gear ratios:
  - Forward 1: 4.70:1
  - 2: 2.21:1
  - 3: 1.52:1
  - 4: 1.00:1
  - 5: 0.76:1
  - 6: 0.67:1
  - Reverse 1: 5.55:1

**Average speeds (14% gradient)**
- Unladen (all capacities) 50 km/h 31 mph
- 55 t cap, laden: 16-18 km/h 10-11 mph
- 85 t cap, laden: 8-10 km/h 5-6 mph
- 100 t cap dual Powertrailer™, laden: 15-17 km/h 9-11 mph

**Steering**
- Dual steering boxes
- Max. inside wheel cut angle 43 degrees

**Front steer axle / suspension**
- Meritor FL641
- Load Rating 10,000 kg 22,046 lbs
- Slipper spring front suspension, 1550 mm (61 in) working length
- Core Area 1.25 sq m 1,937 sq in

**Cooling**

- A patented transverse-mounted cooling module is mounted at the rear of the Powertruck™ and Powertrailer™, and incorporates radiator, charge air and hydraulic cooling. The hydraulic fans of the radiator and charge air cooler are controlled by the Engine Control Module, and are temperature-sensitive for economy.

- Radiator
  - Core Area 1.25 sq m 1,937 sq in
  - Fan Diameter 1,016 mm 40 in
- Coolant and lubricant capacity
  - Litres US gallons
    - Engine 36 9.5
    - Transmission 28 7.4
    - Drive axles 44 11.6
    - Cooling system 150 39.6
    - Steering system 15 4.0
    - Hydraulic (front) 90 23.8
    - Hydraulic (tipping) 162 42.8
    - Fuel 540 142.6

#### POWERTRAILER™

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**The power to pull up steep inclines**

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Moving More For Less

SAFETY

Fully certified ROPS/FOPS underground mining cab
SDS Aluminox fire suppression on wheels and engines
Dry powder hand-held fire extinguisher
Emergency stop switch in cab and on back of chassis

TOW/TRAILER

Dolly axles/suspension
York axles – 127 mm (5 in) round
Tandem rating 2200 kg 59,966 lbs
Suspension
Hutch single point leaf spring
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York axles – 127 mm (5 in) round 2882
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Hutch single point leaf spring

ALL

Chassis
Web Depth 850 mm 33½ in
Flange Thickness 20 & 25 mm 0.75 & 1 in

Brakes
Dual circuit airactuated ADR 38-compliant type drum brakes designed for road train operation, with 5-cam actuation:
Steer 419 mm (16¼ in) dia. x 152 mm (6 in) wide, 24 chambers on 140 mm (5½ in) slack adjusters
Drive 430 mm (16½ in) dia. x 210 mm (8¼ in) wide, 30/36 chambers on 165 mm (6½ in) slack adjusters
Dolly 419 mm (16¼ in) dia. x 178 mm (7 in) wide, type 30/36 chambers on 140 mm (5½ in) slack adjusters
Spring-operated failsafe emergency and parking brakes.
Engine brake on Powertruck™ and Powertrailer™

Wheels/Tyres
Steer
- wheels 22.5 x 11.75 steel, 10-stud
- tyres 385/65R22.5 tubeless
Drive
- wheels 2-piece or 3-piece steel, 10-stud
- tyres 10.00/20 14PR on drive
Tyre quantities
- Powertruck + 1 Powertrailer: 2x steer; 24x drive & trailing
- Powertruck + 1 Powertrailer + 1 tow trailer: 2x steer; 40x drive & trailing
- Tyres per additional Powertrailer/tow trailer: 16

Coupings
Front: 40 mm (1½ in) towing pin; 40,000 kg (88,185 lb) capacity; two towing eyes 40,000 kg (88,185 lb)
Rear: Ringfeder type 2050 Aus D 260 kN (58,450 lbs force)

Electrical
12 volt DC system, ADR compliant lighting

Body
Side tipping, controlled from the truck cab.

Purpose-built for underground work

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SDS Aluminox fire suppression on wheels and engines
Dry powder hand-held fire extinguisher
Emergency stop switch in cab and on back of chassis

TOW/TRAILER

Dolly axles/suspension
York axles – 127 mm (5 in) round
Tandem rating 2200 kg 59,966 lbs
Suspension
Hutch single point leaf spring
Rear tandem axles/suspension
York axles – 127 mm (5 in) round 2882
Tandem rating 2200 kg 59,966 lbs
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Hutch single point leaf spring

ALL

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Web Depth 850 mm 33½ in
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Drive
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- tyres 10.00/20 14PR on drive
Tyre quantities
- Powertruck + 1 Powertrailer: 2x steer; 24x drive & trailing
- Powertruck + 1 Powertrailer + 1 tow trailer: 2x steer; 40x drive & trailing
- Tyres per additional Powertrailer/tow trailer: 16

Coupings
Front: 40 mm (1½ in) towing pin; 40,000 kg (88,185 lb) capacity; two towing eyes 40,000 kg (88,185 lb)
Rear: Ringfeder type 2050 Aus D 260 kN (58,450 lbs force)

Electrical
12 volt DC system, ADR compliant lighting

Body
Side tipping, controlled from the truck cab.
Using proven technology in innovative ways to produce reliable, productive, cost-effective transport solutions for the mining industry.

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The Powertrans team has a history of developing and operating innovative bulk haulage systems, as well as developing the concept further as a separate commercial operation. We have developed expertise in building these systems, as well as in evaluating the most appropriate option for a site, and correctly operating and maintaining road train combinations.

Products
In addition to our underground mining transport systems, Powertrans manufactures truck and powered and unpowered trailer systems for use in surface mining. Our Powerspares™ division supplies a range of spare parts for the heavy-duty haulage industry. Powertrans appreciates the critical role that haulage systems play in a mining operation, and provides 24-hour product support.

Services
Powertrans provides a consultancy service to assist customers to be aware of bulk haulage options, and to select the most appropriate option for a site. It has a proven history of developing new options where appropriate. Training is offered for operators and maintenance personnel working with Powertrans haulage systems, and service and maintenance schedules can be recommended.

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POWERTRAIN™ UNDERGROUND HAULAGE SYSTEM

An innovative, low-cost haulage system for underground mining applications, providing a cost-effective, more productive, and more flexible alternative to conventional underground mining trucks.

NET HORSEPOWER
640-960 kW/860-1290 hp
HAULAGE CAPACITY
55.6-91.3 metric tonnes/
61.3-100.7 US tons