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Aveng Rail Engineering
Aveng operates in a diverse range of sectoral and geographic markets. Our primary geographic markets are southern Africa and Australia and we leverage our presence in these markets to pursue growth opportunities in East Africa, Southeast Asia and the Middle East.
Aveng Rail introduction

The growth strategy of Aveng, which is focused on building and maintaining a robust, enduring business for the benefit of all its stakeholders, recognises rail as a key strategic sector. The company is well positioned in this sector with its strong and expanding geographical footprint and breadth of capacity.

Aveng Rail provides a highly sophisticated range of construction and maintenance services for its rail customers as well as manufacturing a diverse range of precast concrete products for the development of rail infrastructure.

**We have:**
- A comprehensive range of modern technology, on-track maintenance machines manufactured in South Africa.
- In-depth track construction experience and capabilities.
- Track maintenance knowledge and experience in both private and government sectors.
- Associations with world-leading partners in the track construction and maintenance industry.
- In-house resources and experience with regard to equipment design, manufacture and support.

**We are:**
- Manufacturers of a diverse range of precast concrete products.
- Compliant to world-class quality standards encompassing the requirements of SANS using the ISO 9001:2008 Quality Management System.
- Fully committed and internationally accredited in terms of safety, health, the environment and quality management systems.
- Represented throughout southern Africa through strategically located factories in South Africa, Mozambique, Swaziland, Zambia and Zimbabwe.
Aveng Rail overview

Aveng Rail is the pre-eminent track work contractor in southern Africa, and is focused on the development, construction, rehabilitation and maintenance of regional track work systems.

Highly experienced and competent engineers, project managers and skilled personnel ensure that projects, no matter how large and complex, are delivered to specification within agreed time frames.

The company owns and operates an extensive fleet of track maintenance equipment geared to undertake all aspects of track construction, rehabilitation and maintenance. In general, the machines are locally built in our workshops, east of Johannesburg.

Our core values of safety, accountability and honesty are entrenched in the way we do business. We work as a team, and pride ourselves on continuously learning from our experiences, thus being able to offer innovative solutions to our clients.

Aveng Rail is focused on training, developing and empowering employees, and is committed to social investment in our areas of operation to ensure the long term sustainability of our business.

In addition to track construction and maintenance, Aveng Infraset manufactures various types of prestressed concrete sleepers for main-lines and sidings, ranging from 18.5 ton to 30 ton axle loads as well as a range of precast electrification masts and poles.
Aveng Rail owns, operates and maintains a variety of ballast regulating machines for all ballast regulating requirements. Depending on the requirements, machines are able to perform ballast regulating for existing track or newly constructed track.

Operation capabilities

**Heavy ballast regulating machines**
- New regulating concept with a variety of possibilities for regulating operations. Possibilities include shoulder only, shoulder to centre or centre to shoulder.
- Traveling speed of 80km/h.
- Grading speed of 15km/h.
- Computerised hydrostatic drive.
- Fuel efficient.
- Capable of operating on 1067mm and 1435mm gauge.
- Suitable for construction and maintenance operations.
- Brush box for web sleeper cleaning.

**Light ballast regulating machine**
- Accurate ballast transferring.
- Grading speed of between 5km/h and 10km/h.
- Optional 5m² hopper for ballast transfer.
- BED-17 designed for one-man operation.
- Brush box for web sleeper cleaning.
Aveng Rail owns, operates and maintains a fleet of ballast screening machines. These machines, in conjunction with rail tamping and regulating, are capable of complete ballast removal, screening and track rehabilitation.

Operational capabilities

**BC1 and BC5 Ballast screening machines**

- Track lowering.
- Complete ballast rejection.
- Various cutting depths and widths.
- Spoil is distributed into spoil wagons for offsite disposal.
- Maximum production speed 350m³ per hour of ballast removal.
- Able to operate in conjunction with self-disposing ballast wagons for high production.

**Track Gophers ballast screening machine**

- Turnout screening.
- Track undercutting.
- Excavated material discarded via conveyors.
- Production rate of 1.5m per minute screening.
- Capacity to perform spot screening.
- Compact design enables transportation to and from working sites via road transport.
Ballast Tamping

Aveng Rail owns, operates and maintains a comprehensive fleet of heavy-duty on-track tamping machines. These machines are built in South Africa and are adapted to suit South African and international conditions and requirements.

Aveng Rail’s fleet of ballast tamping machines have different production and operational requirements, which range from switch tamping, continuous tamping and open line tamping.

Operational capabilities

**High production ballast tamping**
- 16-tool combinations for turnout and open line tamping.
- Automated Jupiter electronic control system.
- Equipped with a laser alignment system.
- Production rates in excess of 18 sleepers/minute can be achieved.
- Off-tracking equipment is standard on all MKIII machines, suitable for any standard off-tracking platform.

**Construction ballast tamping**
- Ideally suited for construction type tamping requirements due to its long relative base for lifting and alignment.
- 12 to 15 sleepers/minute production.
- Machines can be fitted with a laser alignment system.
- Off-tracking equipment is standard on all machines.
Flash Butt Welding

Aveng Rail owns, operates and maintains state-of-the-art rail flash butt welding plants. The units are mounted on a customised road truck fitted with special equipment such as stabilisers and a rail road system. The flash butt welding units are suitable for depot based or ontrack formation welding.

Operational capabilities

- Flash butt welding unit can accommodate any rail size and shape.
- Aveng time for butt-welding rails is seven minutes.
- Flash butt welding unit is controlled by an automated control system that ensures weld quality and safety.
- Machine is roadworthy and can move to and from site.
- A road-rail system is mounted to the welding unit for on-track welding.
Aveng Rail has developed a fleet of self-propelled machines for overhead maintenance; these machines are commonly referred to as overhead maintenance vehicles (OMV). Machines are specifically designed for short track occupation slots to perform maintenance on the catenary and contact wire.

**Operational capabilities**
- The machine can be off-tracked on any standard off-tracking platform.
- The machine is equipped with elevating platforms designed to enable OHTÉ staff to reach most places safely and with ease.
- The machine is equipped with cherry picker that is fitted to a telescopic crane.
- The hydraulic crane is of sufficient capacity to pick up masts, booms and other items.
- A hydraulic catenary support mast enables the catenary to be suspended for the changing of suspension equipment, insulators and steady arms.
- An electronic measuring system displaying contact wire stagger and height is fitted to aid maintenance staff.
- The measuring system can be used on live 3kV DC and 25kV AC electrified lines.
- The OMV is built on a modular basis enabling the client to request different configurations to meet specific requirements.
Aveng Rail owns and operates rail handling trains, and has designed and manufactured various other rail handling trains for clients using our own patented rail handling technology. This rail handling train is capable of loading up to 240m rails from both sides of the track in one operation.

Operational capabilities

- Capacity to load and off-load 30 lengths of 240m rails per load.
- Rails can be loaded in the section or from stacks next to the track.
- The train consists of a rail pewing wagon and one rail treading wagon.
- A movable rail handling unit that runs on the train is used during the loading of the rails.
- A safety monitoring system is provided to ensure the safe transporting of rails.
Rail Profile Rectification

Aveng Rail has been manufacturing, operating and maintaining grinding machines designed by Speno International of Geneva since 1968. Rail rectification includes all the aspects of surface fatigue treatment, corrugation removal, profile restoration and wheel burn removal.

Economic benefits
- Better track stability – extending track geometry durability.
- Extending wheel life – improved rail/wheel contact.
- Reducing noise levels – elimination of corrugations and surface defects.
- Extending rail life – reducing surface fatigue and wear.
- Reduction in tractive effort – fuel and energy savings.

Operational capabilities

Open track grinding machine:
- Operating gauge 1 067mm.
- 7km/h to 15km/h grinding speed.
- 75km/h to 100km/h self-propelled traveling speed.
- 48 grinding stones (24 per rail line).
- Grinding range of 60 degrees gauge side and 15 degrees field side.

Open track and switch grinding machine:
- Operating gauge 1 067mm.
- 1 435mm gauge conversion on request.
- 4km/h to 7km/h grinding speed.
- 75km/h self-propelled traveling speed.
- 16 grinding stones (8 per rail line).
- Grinding range of 70 degrees gauge side and 8 degrees field side.

Other value adding features
- Computer controlled angular positioning of the grinding units.
- Automatic pre-selection of a wide range of patterns according to surface defects and the required transverse profile.
- Automatic grinding load control.
- Transverse profile measuring equipment for quality control and operator interface.
- Water cannons for efficient fire fighting together with passive spark deflectors.
- Dust suppression for maintenance and environmental reasons.
Aveng Rail provides a complete turnkey track renewal operation. The operation uses state-of-the-art Matisa-designed track renewal machines.

**Typical activities**
- Total track renewal.
- Partial track renewal – sleepers or rails only.
- Re-spacing of sleepers.

**Advantages of track renewal**
- Natural distressing of rail line.
- Lifting or lowering of ballast profile.

**Activities in turnkey operation**
- Sleeper fastener removal.
- Old sleeper removal.
- New sleeper replacement.
- Sleeper spacing.
- Rail to sleeper fastening using fist, fast or e-clip using automated systems.
- Ballast profiling.
- Initial rail lifting and aligning.
- Final rail lifting and aligning.

**Operational capabilities**

**P190 track renewal machine**
- Rail gauge 1 067mm.
- Traveling speed of 40km/h.
- Sleeper replacement rate of 720 sleepers per hour (12 sleepers per minute).
- Automated sleeper spacing ranging from 600mm to 800mm.
- Capable of sleeper and rail replacement.
- Capable of replacing wood, concrete and steel sleepers.

**P811 track renewal machine**
- Rail gauge 1 067mm.
- Traveling speed of 40km/h.
- Sleeper replacement rate of 480 sleepers per hour (8 sleepers per minute).
- Automated sleeper spacing ranging from 600mm to 800mm.
- Capable of sleeper and rail replacement.
- Capable of replacing wood, concrete and steel sleepers.
Aveng Rail’s ultrasonic rail flaw detection machines are designed for revealing defects along the whole length and across rail sections of railway lines, with continuous testing of speeds up to 35km/h.

Aveng Rail is the licensed operator of the RFAS 2100 ultrasonic rail flaw detection system. This system is the latest development by Speno Rail Maintenance Australia (Pty) Ltd.

Operational capabilities
- Real time defect analysis and presentation, along with saving of all raw data for replaying purposes.
- Vehicles able to perform testing on a non-stop testing principle.
- Probe configurable to clients’ needs, with remote probe positioning.
- Road-rail vehicles used in all operations.
- High speed testing up to 35km/h.
- Bi-directional testing.
- Testing can be done on 1,067mm and 1,435mm gauge.
- Able to replay any previous test run.
- Testing resolution (pulse repetition rate) 4mm – driven by a 1mm ‘shaft encoder’ resolution.
- Capable of operating at night.
Track Geometry

The Aveng Rail’s track geometry measurement system is a low production but effective system for measuring basic track geometry parameters.

Operational capabilities

- Reports can be customised to suit the client’s requirements.
- Hi-rail road vehicles used in all operations.
- Average testing speed of 7km/h.
- Automatic intermittent measurements of 200mm.
- Site establishment and time of approximately 15 minutes
- Testing can be done on 1 067mm and 1 435mm gauge.
- Testing on 1 000mm gauge can be accommodated by hand testing.
Utility Vehicle

Aveng Rail has developed a general purpose on-track maintenance machine. These machines, known as utility vehicles (UVs), are cost effective machines that can be used for multiple applications.

Operational capabilities
- Accommodate 4 people in the driving cabin, 6 people in the transit cabin.
- Loading capacity of 5 tons for perway material.
- A separate trailer fitted with a drain cleaner unit can be provided with a utility vehicle for drain maintenance.

Equipment on the UV is as follows:
- Heavy-duty 8 tool tamping heads suitable for open track and switching tamping
- Telescopic crane for loading/unloading
- Rail saw, rail drill, impact wrench, welding machine and track jacks
- Storage bins for various other perway equipment
- Vacuum braking system

Optional equipment that can be fitted to a UV on request:
- Sleeper replacing head
- Brush cutter
- Spot weed spraying
- Ballast regulating blade
- Back-actor for drains cleaning
- Multi purpose 14m wagon trailer
Aveng Rail construction capabilities summary

**Construction capabilities**
- Turnkey mechanised railway construction using own machinery and equipment.
- Mainline rail construction includes light and heavy haul lines.
- Multiple gauge possibilities i.e. 1 067mm and 1 435mm.
- Balloon and yard construction.
- Railway rehabilitation.

**Aveng Rail-owned construction equipment**
- On and off-track mobile flash butt welding machines.
- Donnelli gantry system for sleeper distribution.
- Locomotives and AY ballast wagons.
- Ballast tamping machines.
- Ballast regulating machines.
- KGT-road-rail loader/excavator.
- Match wagon system-used for offloading. 250m (and longer) rail directly onto formation or sleepers.
- Rubber wheeled excavators with various attachments.
Northern rail extension project – Namibia

All railway sleepers for the contract were manufactured at Aveng Grinaker-LTA’s factory in Tsumeb. A total of 26 000 tons of rail (sufficient for 270km of track) was imported from Italy, shipped to Walvis Bay and then transported by rail to Tsumeb. Ballast stone was available in stockpiles at quarries at Aris and Okorusu and transported in AY wagons to site by rail at a rate of 4 000m³ per week. The total staff complement on site was 180 people, 90% of which were drawn from the local community.

The work included:
- Contractor’s site establishment.
- Survey and staking of the track centreline.
- Load from stack at Tsumeb, transport and offload on site rails, turnouts, sleepers and fastenings.
- Construct skeleton track.
- Offload ballast delivered in AY wagons on site.
- Lift, align and tamp track to the design line and level.
- Weld 36m rails into long welded rail and destress.
- Heavy on-track machines used: two sets of gantries.
- Tamper, regulator, flash butt welder and two rail threaders.
- Construct turnouts and track in three station yards and four crossing loops.
- Construct level crossings.
- Supply and install flange lubricators, track signs, road signs, stop blocks, off tracking platforms, cattle guards and some fencing.
- Earthworks for erosion repairs to formation and service roads.

<table>
<thead>
<tr>
<th>Location</th>
<th>Namibia, Tsumeb</th>
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</thead>
<tbody>
<tr>
<td>Title</td>
<td>Northern Railway Line Extension</td>
</tr>
<tr>
<td>Client</td>
<td>Ministry of Works &amp; Transport</td>
</tr>
<tr>
<td>Construction Period</td>
<td>May 2004 – July 2006</td>
</tr>
<tr>
<td>Work Constructed by</td>
<td>Aveng Rail</td>
</tr>
<tr>
<td>Associated Companies</td>
<td>Aveng Grinaker-LTA Tsumeb</td>
</tr>
<tr>
<td>JV Partners</td>
<td>Transnamib Holdings (25%)</td>
</tr>
<tr>
<td>Main Quantities</td>
<td>246km of track was constructed: Rails: 48kg/m 25 000 tons Sleepers: P2 concrete 370 000 Ballast: 340 000 m³ Turnouts: 1:9 on steel 22 Turnouts: 1:12 on concrete 20 Thermit welds: 5 300 Flashbutt welds: 9 600 Level crossings: 300</td>
</tr>
</tbody>
</table>
Construction of 24km electrified track including building and installation of 12 turnouts. Construction of area lighting and 11KV transmission line. Construction of approach and departure track slabs at the ore load-out station.

**Kolomela Mine**

Location: Postmasburg

**Title**: Sishen South Project (Kolomela Mine)

**Client**: Kumba Iron Ore

**Construction Period**: February 2010 – February 2012

**Consulting Engineers**: Hatch Rail

**Work Constructed by**: Aveng Rail

**Main Subcontractors**: Botes & Kennedy Manyano for Civil Works. Tractionel for OHTE

**Main Quantities**: Electrified track: 24km Turnouts: 12
FMG Project Pilbara – Australia

Construction of 300km of standard gauge heavy haul track, 155km of duplication of the existing line between Cloudbreak and Port Hedland and 145km spur line to the Solomon Hub mine in the Pilbara region of North West Australia.

Location | FMG doubling and Spur
Title | Pilbara, North Western Australia
Client | Fortescue Metals Group
Construction Period | 2011 – 2012
Consulting Engineers | Calibre
Work Constructed by | Aveng Rail in JV with McConnell Dowell (50%)
Description | 155km of duplication of the existing line between Cloudbreak and Port Hedland and 145km spur line to the Solomon Hub mine in the Pilbara region of North West Australia
Main Quantities | Rail: ± 300km track
| Ballast: 839 700 000 ton
| Sleepers: 446 219
| Turnouts: 107
Construction of 25km of railway line, including two rail yards, of which the smaller one is in the harbour next to the container depot and quay. All major materials were supplied by the customer except the ballast. The method of construction included skeleton track, distributing ballast with own loco and ballast wagons, lift align tamp and regulate with own on-track machines. Flash butt welding of 18m rail on formation. 39 turnouts were built of which three were mainline turnouts and the rest were built in the yard.

<table>
<thead>
<tr>
<th>Location</th>
<th>Port of Ngqura</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Coega: Expansion Programme Railway platelaying for the Port of Ngqura including OHT Coega Project</td>
</tr>
<tr>
<td>Client</td>
<td>Transnet Freight Rail</td>
</tr>
<tr>
<td>Construction Period</td>
<td>October 2008 – June 2011</td>
</tr>
<tr>
<td>Consulting Engineers</td>
<td>Hatch, Mott MacDonald, Goba JV</td>
</tr>
<tr>
<td>Work Constructed by</td>
<td>Aveng Rail (100%)</td>
</tr>
<tr>
<td>Main Sub contractors &amp; Suppliers</td>
<td>Tractionel Enterprise (OHTE), Alstom (Signalling), VAE (Supply Tracks)</td>
</tr>
</tbody>
</table>
| Main Quantities | Turnouts: 39  
                                Insulated Rail Joints: 50  
                                Flash butt welds: 3 500  
                                Ballast: 3 300m³  
                                Sleepers: 33 700 |
United States Agency for International Development (USAID) funding to the value of R352 million was granted and the Limpopo Rail Line Rehabilitation Project was awarded to the company in joint venture in January 2002.

Description:

- United States Agency for International Development (USAID) funding to the value of R352 million was granted and the Limpopo Rail Line Rehabilitation Project was awarded to the company in joint venture in January 2002.

- The scope of the work included the rehabilitation of the railway line linking the capital of Mozambique, Maputo, with Aldeia De Barragem, 225km to the north, and the repair of bridges between those two points. The existing station buildings at Aldeia De Barragem, Chokwe, Lionde and Magude had to be rehabilitated, as well as 30 CFM employees’ houses. It also included temporary deviations, laying of new railway track, substantial earthworks, new culverts and drainage works.

- A stipulation by the Mozambique Participation Programme to spend money locally, meant that over 1 300 local workers were employed from Maputo along the line at Aldeia De Barragem. Local subcontractors were also used where possible.

- The project posed other challenges, such as communication and cultural differences with local Mozambicans; different industrial relations practices; local suppliers and subcontractors; local rules and procedures; landmines and unexploded ordinances.

- The Logistics Department of Aveng Grinaker-LTA Earthworks West Africa; staff from Aveng Rail (AMLRS) and the logistics team on site were responsible for moving equipment and materials from South Africa to Mozambique.

- A large amount of material came from South Africa, including 10 000 concrete sleepers from Aveng Manufacturing Infraset, over 2 000 thermit welds, 32 turnouts, over 1 700 precast concrete culverts and pipes, hundreds of Gabion and Reno mattress baskets and thousands of railway fittings.

- The contract was managed by Aveng Rail.
Sishen – Saldanha railway line

Work included loading, transporting and off-loading concrete sleepers; constructing skeleton track; off-loading ballast delivered to site by ballast wagons; lifting, aligning and tamping track to design requirements; welding rails into long welded rail and destressing; constructing turnouts; constructing stop blocks; constructing level crossings; supplying and installing flange lubricators, track and road signs.

<table>
<thead>
<tr>
<th>Location</th>
<th>Saldanha – Sishen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Ore Line expansion project: Sishen Saldanha (North)</td>
</tr>
<tr>
<td>Client</td>
<td>Transnet Freight Rail</td>
</tr>
<tr>
<td>Construction Period</td>
<td>June 2007 – October 2009</td>
</tr>
<tr>
<td>Consulting Engineers</td>
<td>HMG – JV</td>
</tr>
<tr>
<td>Work Constructed by</td>
<td>Aveng Rail as a subcontractor to Concor (100%)</td>
</tr>
<tr>
<td>Main Sub-contractors</td>
<td>OHTE: Tractionel</td>
</tr>
</tbody>
</table>
Ncala Corridor Section 2

Location: Moatize to Malawian boarder, Mozambique

Client: Vale


Project management: Vale

Work Constructed by: Aveng Rail

Quantities:
- Track: 65km
- Turnouts: 10
- Ballast: 150,000m³
- Sleepers: 108,000

18m rails were delivered on the Beira line at various stations. Ballast was supplied by Aveng Grinaker-LTA from local quarries. Sleepers were supplied by the client. Manufacturing by Aveng Infraset.
Moatize Coal Mine Yard

Construction of 12km of railway line including a yard and balloon. All concrete sleepers and turnout sets provided by Aveng Infraset in South Africa and were imported into Mozambique. All construction equipment was temporarily imported from South Africa and exported after construction. The method of construction included off-loading and distributing material, building skeleton track, distributing ballast with loco and ballast wagons.

<table>
<thead>
<tr>
<th>Location</th>
<th>Moatize Coal Mine, Tete Province, Mozambique</th>
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</thead>
<tbody>
<tr>
<td>Title</td>
<td>Rail Infrastructure Moatize Coal Project</td>
</tr>
<tr>
<td>Client</td>
<td>Vale</td>
</tr>
<tr>
<td>Construction Period</td>
<td>March to October 2011</td>
</tr>
<tr>
<td>Consulting/Project Management</td>
<td>Odebrecht, Carmargo Correa</td>
</tr>
<tr>
<td>Work Constructed by</td>
<td>Aveng Rail (100%)</td>
</tr>
<tr>
<td>Main Quantities</td>
<td>Flash butt welds: 2400</td>
</tr>
<tr>
<td></td>
<td>Sleepers: 20,000</td>
</tr>
<tr>
<td></td>
<td>Ballast: 20,000m³</td>
</tr>
<tr>
<td></td>
<td>Turnouts: 19</td>
</tr>
</tbody>
</table>
Heavy Duty Ballast Regulator

General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>11.4 metres</td>
</tr>
<tr>
<td>Maximum width</td>
<td>2.85 metres</td>
</tr>
<tr>
<td>Maximum height</td>
<td>3.65 metres</td>
</tr>
<tr>
<td>Total weight tara</td>
<td>30 tons</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>80 kilometres per/hour</td>
</tr>
<tr>
<td>Main engine</td>
<td>Caterpillar 3306</td>
</tr>
<tr>
<td>Minimum radius when travelling</td>
<td>90 metres</td>
</tr>
<tr>
<td>Minimum radius when working</td>
<td>90 metres</td>
</tr>
<tr>
<td>Maximum gradient</td>
<td>1:25</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>610 millimetres</td>
</tr>
<tr>
<td>Brakes</td>
<td>Shoe brakes (mechanical)</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>308 litres</td>
</tr>
<tr>
<td>Production rate regulating</td>
<td>5 – 14 kilometres per/hour</td>
</tr>
<tr>
<td>Electrical power supply</td>
<td>24 volt / DC</td>
</tr>
</tbody>
</table>

Side view

Front view
Aveng Rail Ballast Tamping Machine

General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>13.4 metres</td>
</tr>
<tr>
<td>Maximum width</td>
<td>2.5 metres</td>
</tr>
<tr>
<td>Maximum height</td>
<td>3.94 metres</td>
</tr>
<tr>
<td>Total weight lata</td>
<td>35 tons</td>
</tr>
<tr>
<td>Maximum towing speed</td>
<td>60 kilometres per/hour</td>
</tr>
<tr>
<td>Maximum travelling speed</td>
<td>80 kilometres per/hour</td>
</tr>
<tr>
<td>Main engine</td>
<td>Caterpillar 3306 DITA</td>
</tr>
<tr>
<td>Minimum radius when travelling</td>
<td>90 metres</td>
</tr>
<tr>
<td>Maximum gradient</td>
<td>1:25</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>758 millimetres</td>
</tr>
<tr>
<td>Brakes</td>
<td>Shoe brakes (mechanical)</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>650 litres</td>
</tr>
<tr>
<td>Production rate regulating</td>
<td>Up to 20 sleepers per minute</td>
</tr>
<tr>
<td>Electrical power supply</td>
<td>24 volt / DC</td>
</tr>
</tbody>
</table>
Overhead Maintenance Vehicle

General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>13 metres</td>
</tr>
<tr>
<td>Maximum width</td>
<td>3 metres</td>
</tr>
<tr>
<td>Maximum height</td>
<td>3.96 metres</td>
</tr>
<tr>
<td>Total weight tarra</td>
<td>± 32 tons</td>
</tr>
<tr>
<td>Maximum towing speed</td>
<td>30 kilometres per/hour</td>
</tr>
<tr>
<td>Maximum travelling speed</td>
<td>80 kilometres per/hour</td>
</tr>
<tr>
<td>Main engine</td>
<td>Caterpillar 3306 / 175KW</td>
</tr>
<tr>
<td>Minimum radius when travelling</td>
<td>90 metres</td>
</tr>
<tr>
<td>Minimum radius when working</td>
<td>90 metres</td>
</tr>
<tr>
<td>Maximum gradient</td>
<td>1:25</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>609.6 millimetres</td>
</tr>
<tr>
<td>Brakes</td>
<td>Shoe brakes (mechanical)</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>320 litres</td>
</tr>
<tr>
<td>Electrical power supply</td>
<td>24 volt / DC</td>
</tr>
</tbody>
</table>
# Rail handling machine

## General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maximum length</strong></td>
<td>275 metres</td>
</tr>
<tr>
<td><strong>Maximum width</strong></td>
<td>3.070 metres</td>
</tr>
<tr>
<td><strong>Maximum height</strong></td>
<td>2.805 metres</td>
</tr>
<tr>
<td><strong>Total weight tara</strong></td>
<td>850 tons</td>
</tr>
<tr>
<td><strong>Maximum working speed</strong></td>
<td>3.5 – 8.5 kilometres per/hour</td>
</tr>
<tr>
<td><strong>Maximum travelling speed</strong></td>
<td>60 kilometres per/hour</td>
</tr>
<tr>
<td><strong>Main engine – Lobster</strong></td>
<td>Deutz BF6M 1012</td>
</tr>
<tr>
<td><strong>Auxiliary engine</strong></td>
<td>HATZ ID81 SX1</td>
</tr>
<tr>
<td><strong>Minimum radius when travelling</strong></td>
<td>90 metres</td>
</tr>
<tr>
<td><strong>Minimum radius when working</strong></td>
<td>150 metres</td>
</tr>
<tr>
<td><strong>Maximum gradient</strong></td>
<td>1:30</td>
</tr>
<tr>
<td><strong>Brakes</strong></td>
<td>Vacuum</td>
</tr>
<tr>
<td><strong>Fuel tank capacity</strong></td>
<td>240 litres</td>
</tr>
<tr>
<td><strong>Electrical power supply</strong></td>
<td>24 volt / DC</td>
</tr>
</tbody>
</table>
# Self-disposing wagons

## General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>18.6 metres</td>
</tr>
<tr>
<td>Maximum width</td>
<td>3 metres</td>
</tr>
<tr>
<td>Maximum height</td>
<td>3.950 metres</td>
</tr>
<tr>
<td>Total weight t ara</td>
<td>50 tons</td>
</tr>
<tr>
<td>Ballast capacity</td>
<td>40m³</td>
</tr>
<tr>
<td>Maximum towing speed</td>
<td>80 kilometres per/hour</td>
</tr>
<tr>
<td>Main engine</td>
<td>Caterpillar C13</td>
</tr>
<tr>
<td>Maximum travelling speed</td>
<td>15 kilometres per/hour</td>
</tr>
<tr>
<td>Minimum radius when travelling</td>
<td>90 metres</td>
</tr>
<tr>
<td>Minimum radius when working</td>
<td>90 metres</td>
</tr>
<tr>
<td>Maximum gradient</td>
<td>1:50</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>863 millimetres</td>
</tr>
<tr>
<td>Brakes</td>
<td>Shoe brakes, Air</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>1 000 litres</td>
</tr>
<tr>
<td>Electrical power supply</td>
<td>24 volt / DC</td>
</tr>
</tbody>
</table>

![Side view](image1.png)

![Front view](image2.png)
Drain Cleaning Machine

**General specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum length</td>
<td>8.5 metres</td>
</tr>
<tr>
<td>Maximum width</td>
<td>2.9 metres</td>
</tr>
<tr>
<td>Maximum height</td>
<td>3.675 metres</td>
</tr>
<tr>
<td>Total weight (tonne)</td>
<td>10</td>
</tr>
<tr>
<td>Maximum travelling speed</td>
<td>40 to 60 kilometres per hour</td>
</tr>
<tr>
<td>Minimum radius when travelling</td>
<td>90 metres</td>
</tr>
<tr>
<td>Minimum radius when working</td>
<td>90 metres</td>
</tr>
<tr>
<td>Maximum gradient</td>
<td>1:40</td>
</tr>
<tr>
<td>Wheel diameter</td>
<td>610 millimetres</td>
</tr>
</tbody>
</table>

![Image of Drain Cleaning Machine](image-url)
BB-Brush Box

General specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel gauge</td>
<td>1,067mm and 1,435mm</td>
</tr>
<tr>
<td>Travelling speed</td>
<td>4 km/h</td>
</tr>
<tr>
<td>Brushing speed</td>
<td>20 sleepers per minute</td>
</tr>
<tr>
<td>Power</td>
<td>12.5Kw</td>
</tr>
<tr>
<td>Main engine</td>
<td>Lombardine</td>
</tr>
</tbody>
</table>

Side view

Front view
Aveng Rail boasts a comprehensive engineering department where turnkey research and development projects can be undertaken using the latest design and manufacturing processes.

**Engineering features**

- ISO 9000 compliant.
- Advanced design verification through Finite Element Analysis.
- Detail design and manufacturing drawings using Autodesk Inventor and Autodesk AutoCAD.
- Detailed electrical schematic design and drawing using ePlan.
- Two fully equipped workshops for fabrication and assembly of parts and complete machines.
- Extensive network of technology partners.