M15 SWORDFISH

PNEUMATIC CHAINSAW

One Step Beyond

VTECH
CLEANING SOLUTIONS FOR MINING

MAGNEVANE™
Pioneering Pneumatic Efficiency

Introduction

Pneumatic drive tools are crucial for the mining sector of South Africa with a direct impact on the productivity of the sector and constitutes, on the other hand, a huge cost for it.
Magnevane has identified an enormous potential of applying its patented technology to the service of the mining sector of South Africa.

The current standard of the pneumatic sector is that 10 HP of electric power is necessary to deliver 1 HP of mechanical pneumatic drive. Magnevane's vision is to reduce this ratio to 5 to 1.

The current presentation will show the performance of Magnevane's Pneumatic Chainsaw and it's direct impact on the productivity and efficiency of the mining sector.

Challenge and Opportunity

The current standard chainsaws in the market (South Africa and the rest of the world), have several problems that we have identified:

- Short life cycles
- High maintenance level
- Huge energy consumption
- Tough portability (size and weight)
- Compete with productive equipment for air pressure

Magnevane's technology can heavily disrupt some of these problems, namely the Energy consumption and the competition for air, but the developers of the technology have decided to address the other issues and develop a unique product that can solve most of the problems.

Magnevane Technology

Magnevane is a technology patented in 65 countries, that uses magnetic force to secure a near perfect sealing of vanes, on a sliding vane motor, which is the most common and efficient pneumatic technology applied on the power tooling sector.

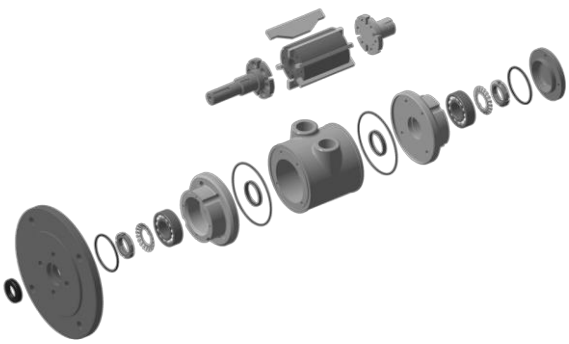
The technology was developed in 2014, went through the patenting process, followed by proof of concept in several commercial operations, and has launched it's commercial production in 2018.

Magnevane started it's operations in South Africa, and is now also present in Europe (Portugal) and Middle East (UAE).

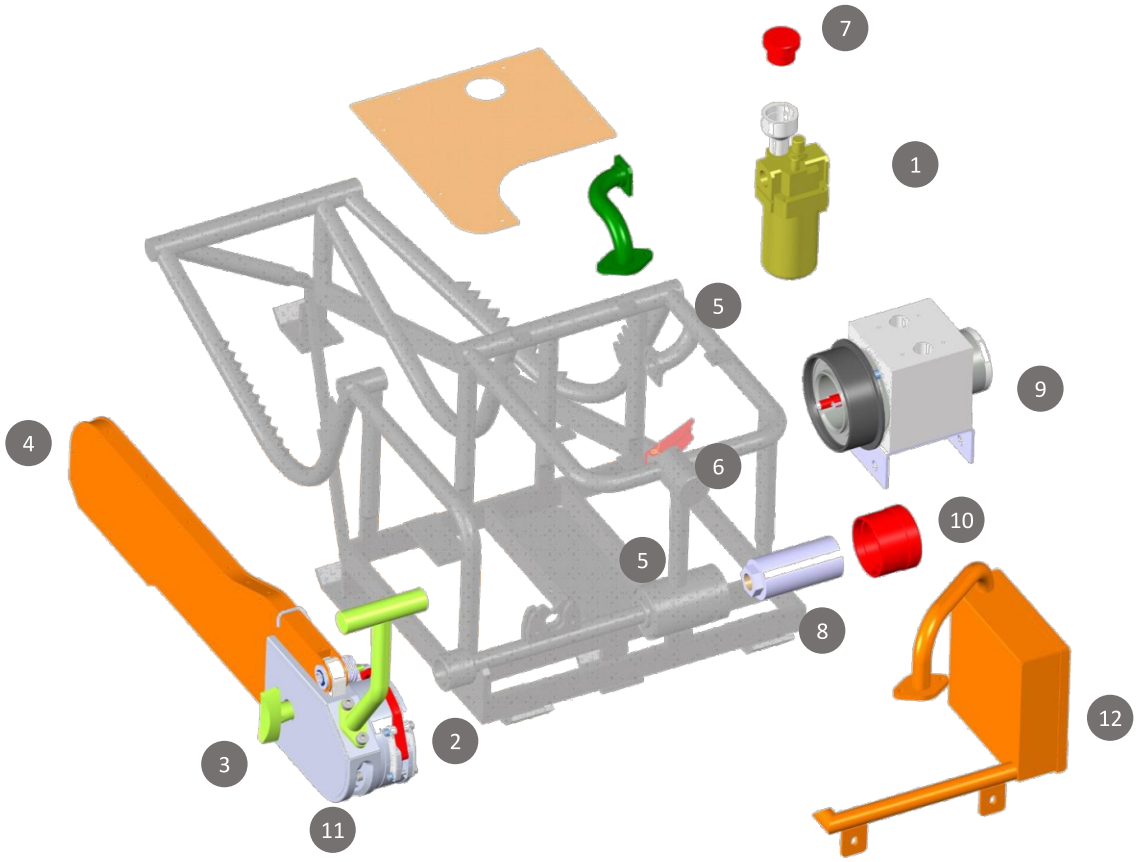
Magnevane patented technology consists in using high-power magnets in the core and vanes of a sliding vane motor, creating a repelling effect among them, that pushes and seals the vanes against the housing of the motor, thus achieving much better compression rates.

The higher compression rates result in:

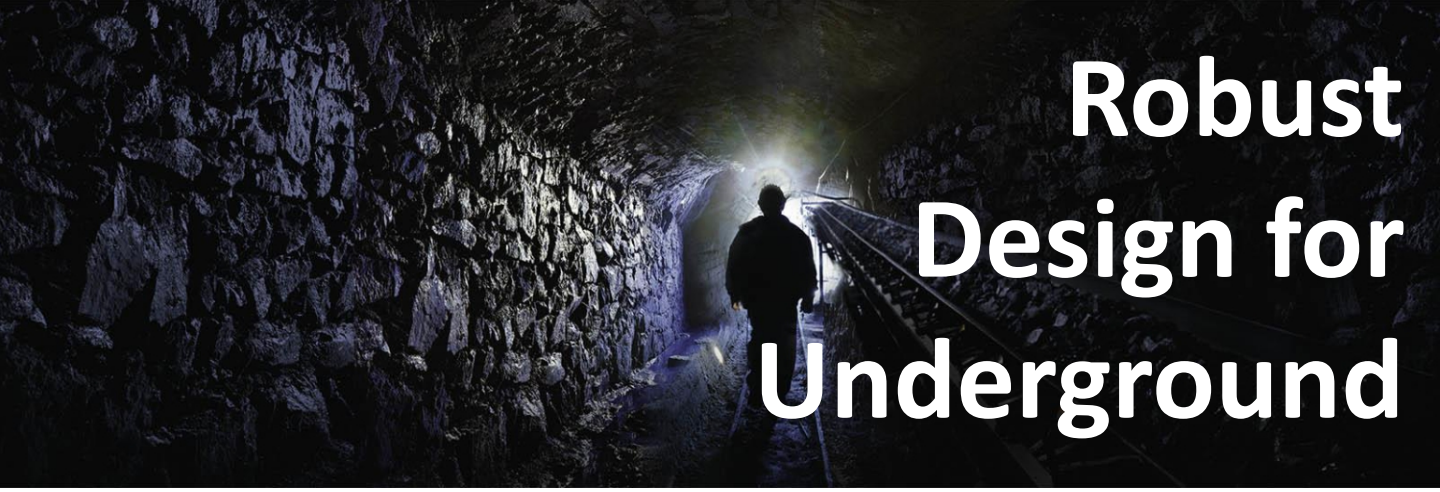
- Much improved starting torque
- Much higher stall torque
- Better power/torque throughout all speeds of operation
- More efficiency (40% saving on energy)
- Extended life cycle
- Near perfect reliability
- Capacity to work at much lower pressure than the current technologies
- Better size to power and weight to power ratio



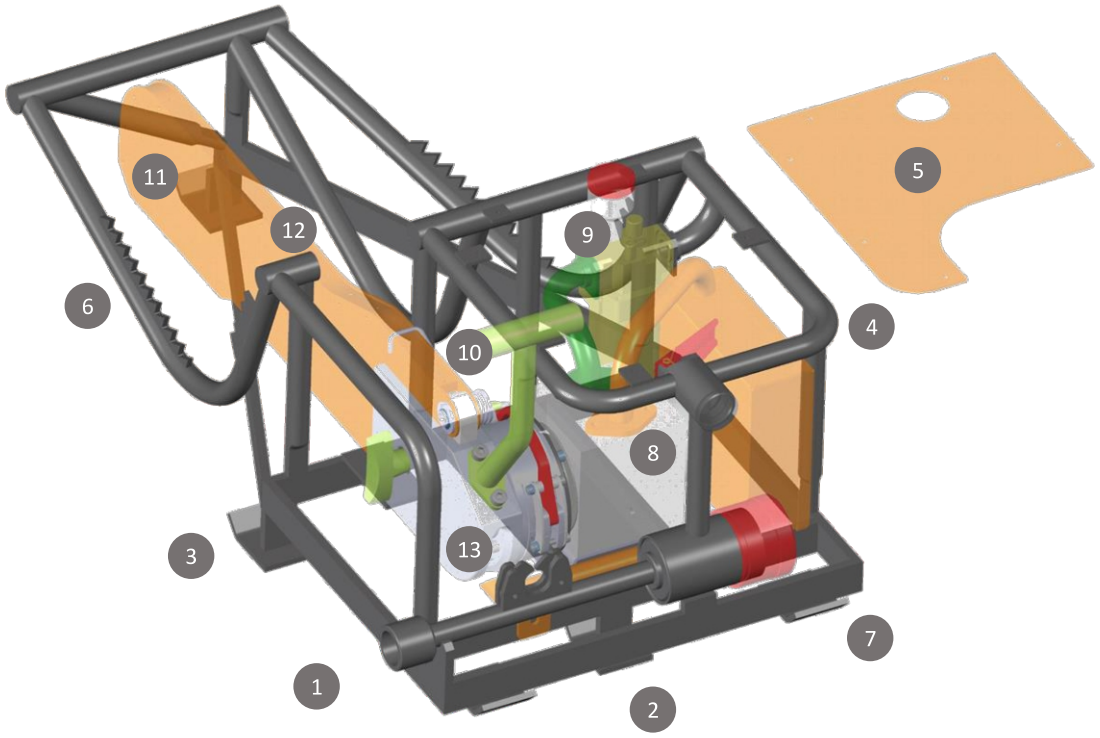
Innovative Technology



1. Inline Lubricator ½" complete with Quick-Fix connections for easier maintenance.
2. Magnevane patented Quick Disconnect system to allow for rapid chain change – zero tools required.
3. Tension handle for position blade and zero tool quick release auto chain tensioner.
4. Chainsaw Blade Guide complete with automatic system 45 cm / 18" cutting length
5. Main trigger body has fixed inlet and outlet rigid piping for better **RELIABILITY**.
6. Spring lever inline trigger system with ¾" plunger
7. Removable filler cap to allow for quick oil filling application
8. Removable and washable steel braided ½" filter to ensure correct protection of equipment downstream
9. Magnevane patented rotor and motor technology: 7.5 HP @ 8.21 Nm consuming 28 CFM per HP
10. Aluminium removable cap for on the run change of inlet filter
11. Slotted Port on Guide bar holder to allow for silenced exhaust air to clear the saw dust
12. Magnevane innovative cone wall of offset plates silencer requires zero maintenance



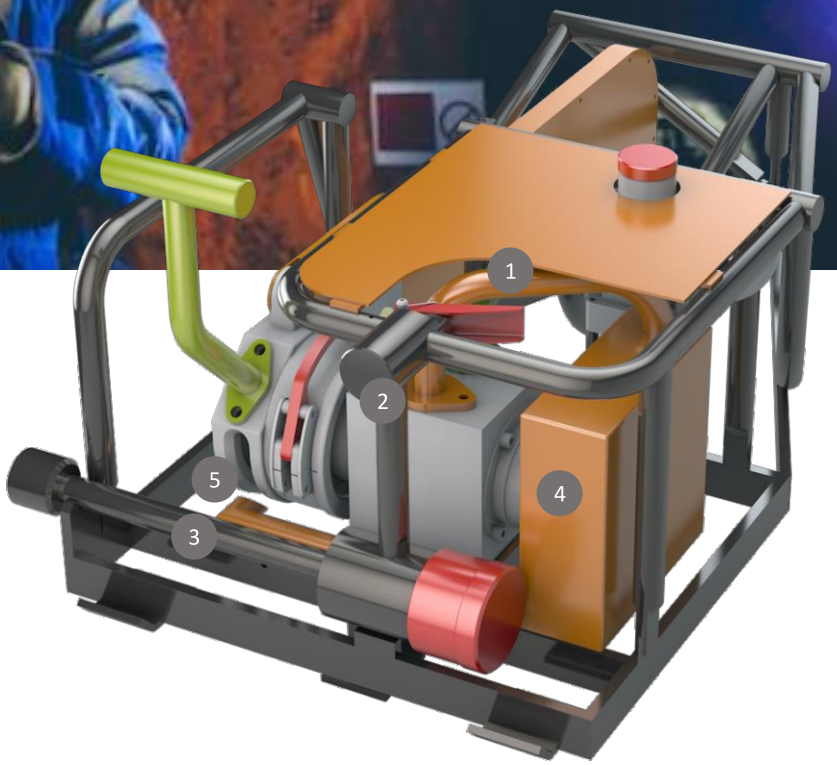
Robust Design for Underground



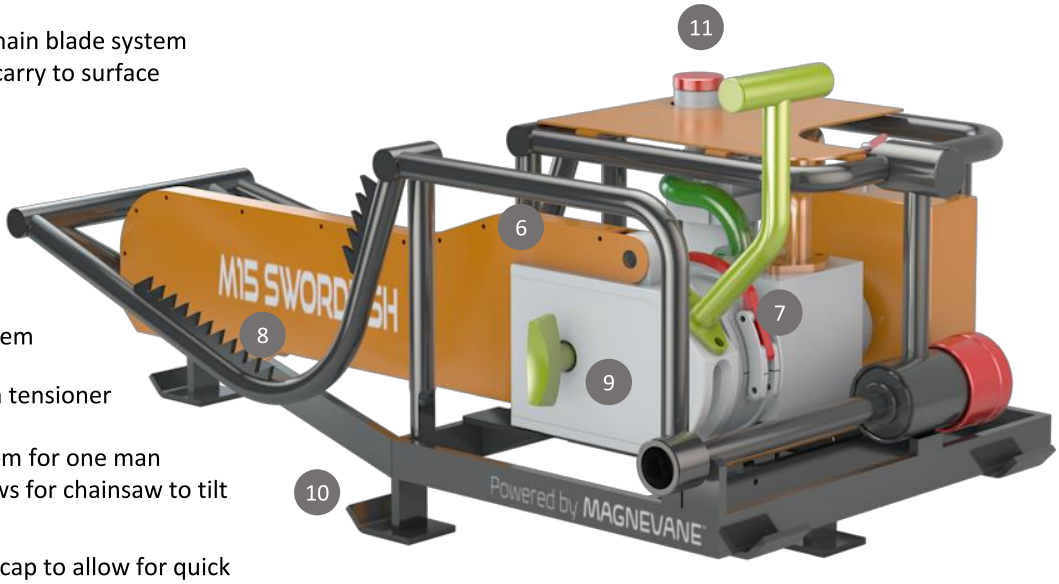
1. 1” Female BSP threaded inlet pipe fixture
2. Lower sub base assembly frame mild steel 8mm powder coating epoxy painted
3. Dual centre skid system to allow complete frame to tilt when log is preloaded ensures a 90 degree cut every time
4. Steel plated silencer box with polyurethane resin to resist high vibration
5. Aluminium 2 mm guard plate with access hole for oil refill
6. Lower serrated teeth slanted to create an anti-slippage of the log when cutting
7. 8mm mild steel rear drag skids
8. Aluminium removable cap for ease of trigger maintenance – fitted with O-ring for maximum seal
9. Inlet and Lubricator fast replacement system for easier maintenance
10. T-Cross bar handle – complete with two hole mounting flange for quick mounting interchangeability
11. 8 mm mild steel front skid
12. Lightweight Aluminium Powder Coated Chainsaw Blade Guard for Finger Protection c/w Standard or Tungsten Blade – 66 teeth 9,32 mm | 3/8 “- 1,6 mm guide tooth
13. Seven tooth drive sprocket

Safety Focused Design

Our experience in underground mining has given us important insight into inherent risks, work habits and best practices.
Our entire design has a human-centered approach where every detail counts for operator safety.

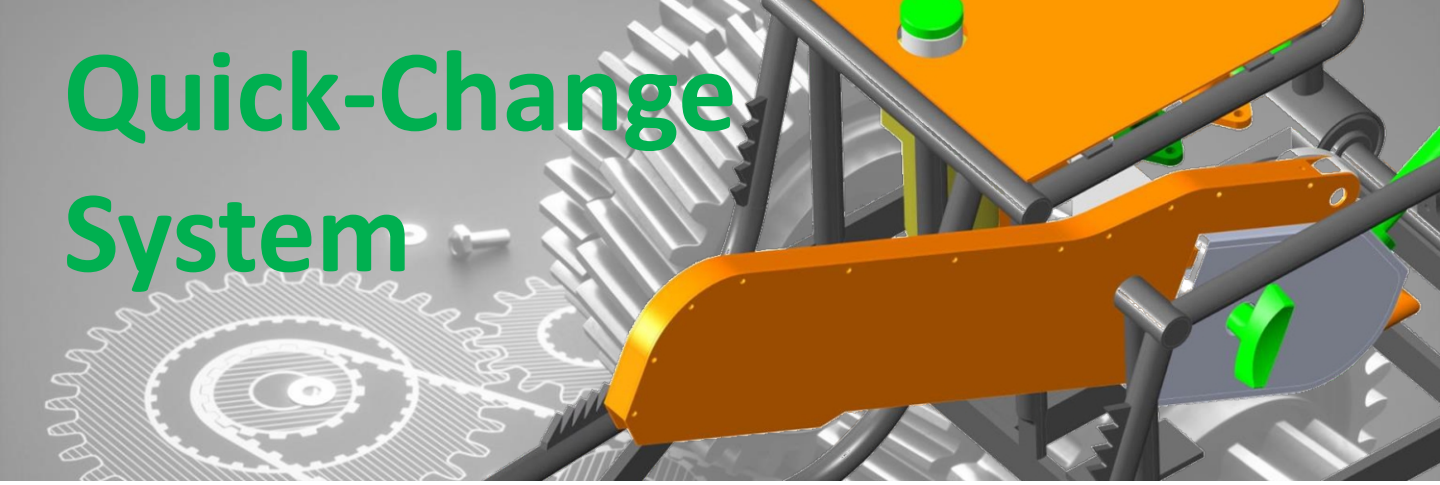


1. Folded plate with lip and trigger level is positioned so no accidental chainsaw operation occurs.
2. Main trigger body has fixed inlet and outlet rigid piping for better **SAFETY**.
3. Quick-click holding jaw to allow for one man operation blade grip when inserting log
4. Exhaust baffle box 79 dB noise at 1,5 m behind operator
5. Exhaust to keep saw dust clear of operator
6. Spring loaded guard for operator protection
7. Quick-Change chain blade system → Only 4 Kg to carry to surface



8. Anti Log Slip System
9. Two action-chain tensioner
10. Three Skid System for one man operation - allows for chainsaw to tilt when cutting
11. Removable filler cap to allow for quick oil filling application

Quick-Change System

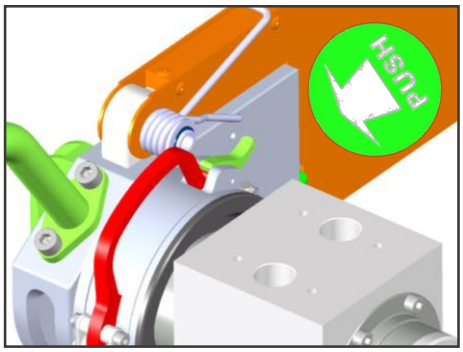


Magnevane's M15 Swordfish Chainsaw introduces a revolutionary blade change system that requires no tools for the job. The disconnecting system allows for rapid disassembling of the blade, maintaining the main frame of the chainsaw underground.
This feature avoids unnecessary equipment movement, significantly reducing maintenance downtime. According to our experience, a blade substitution may take only one minute with this system.

NO TOOLS REQUIRED

The detachable blade system weighs only 5 Kg and it's the only part that needs to go to the surface for exchange. The chainsaw frame and engine will always remain underground.

1



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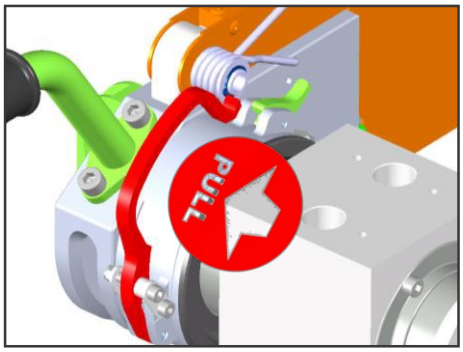

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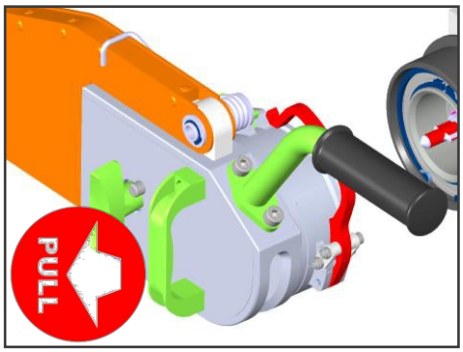
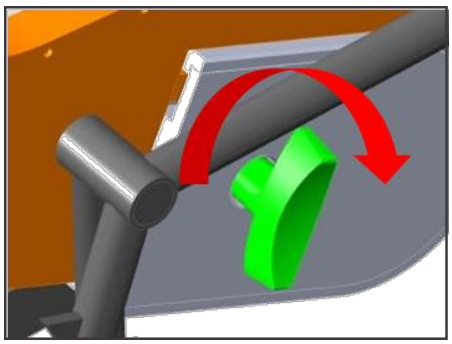


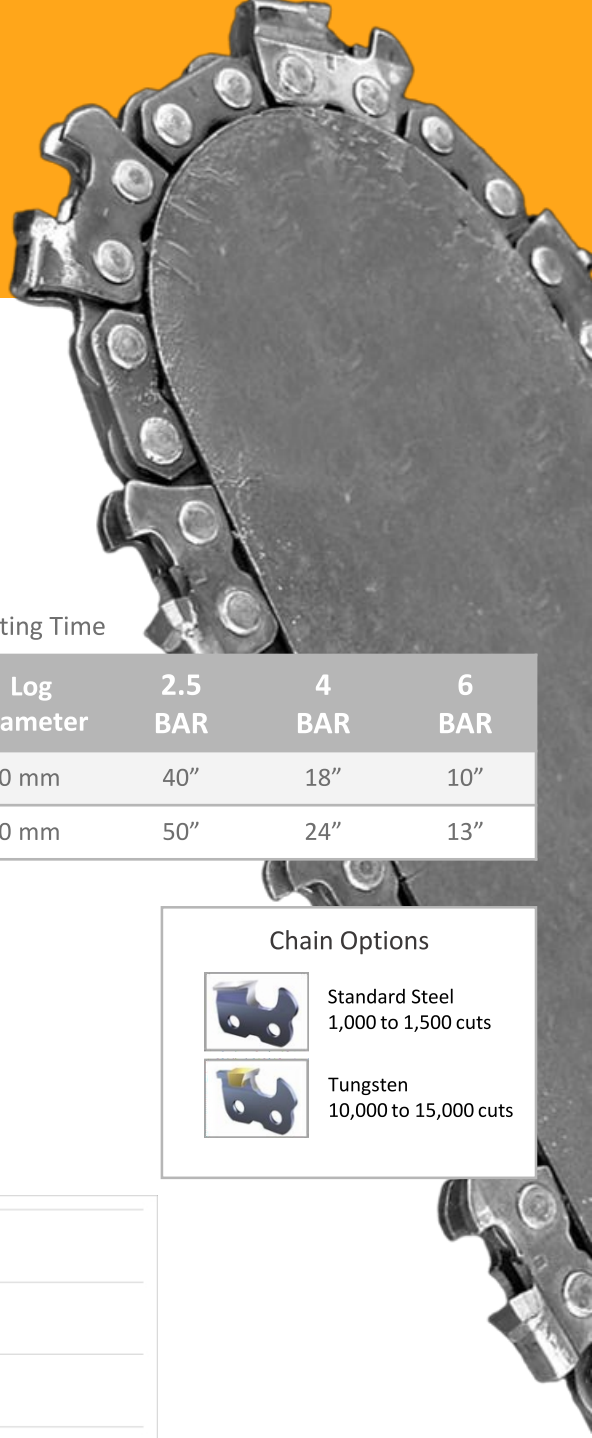


Auto-Tensioner

The Auto-Tensioner System allows the operator to tension the chainsaw blade with two simple actions which require zero tools.

NO TOOLS REQUIRED

Leading Performance



Technical Specifications	
Chain Bar Length	450 mm
Number of Cutting Teeth	33
Size of Chain	3/8 “ 9.32 mm
Motor Power Output	5.5 kW (7.5 HP)
Air Inlet Size	1”
Detachable Blade Weight	5 Kg
Main Frame Body Weight	<18 Kg
Total Weight	<23 Kg
Dimensions (L x W x H) mm:	
Frame and Motor	800 x 440 x 285
Detachable Blade	695 x 115 x 310
Lubricator Capacity	24 hours
Max Tiber Diam	300 mm
Noise Level (Average @6 BAR)	75 dB @1.5m
Noise Level (Maximum @6 BAR)	83 dB @1.5m

Cutting Time

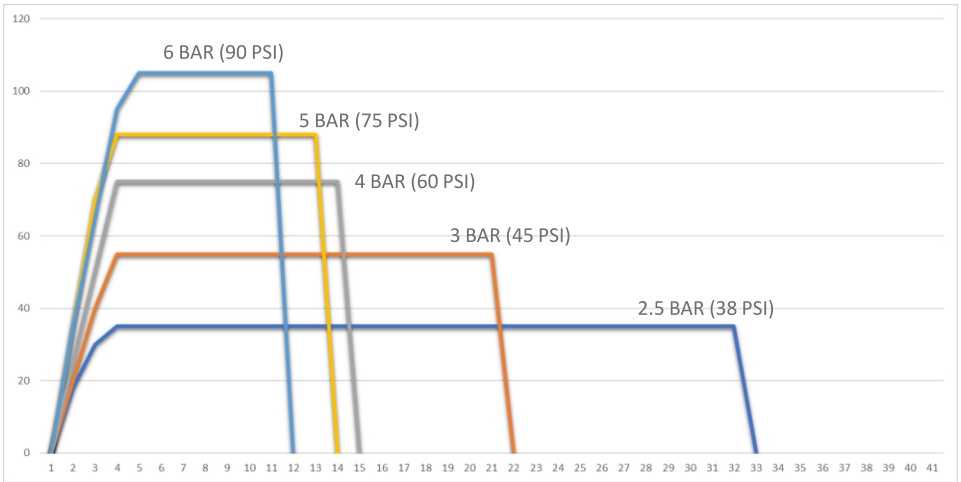
Log Diameter	2.5 BAR	4 BAR	6 BAR
230 mm	40”	18”	10”
300 mm	50”	24”	13”

Chain Options

Standard Steel
1,000 to 1,500 cuts

Tungsten
10,000 to 15,000 cuts

CUT RATE FOR 230mm LOG



BLADE AND CHAIN DISCONNECTION TIME REQUIRED

1 min

OPERATIONAL AT AS LOW AS

2.5 BAR

AVERAGE CUTTING SPEED 230MM LOG @6 BAR

11”

CUTTING AIR CONSUMPTION 230MM LOG @6 BAR

20 CF

Simply the Best

Better productivity

A Magnevane chainsaw, due to its much higher torque, has a much improved speed cut.
In a comparative test done in 2016, Magnevane Chainsaw was cutting a log in 8 seconds, while the two other brands in the market were cutting the same log at 42 and 52 seconds, respectively.
A Magnevane motor can work as low as 2.5 BAR of pressure, which not only gives reliability to the chainsaw but also results in better distribution of the air pressure to the other productive equipment like the rock drills, improving the yields at the face of the mine.

Low consumption

In the above mentioned test, Magnevane Chainsaw was achieving a 90% saving on power, on each cut. This is due to the lower CFM per HP required but, also, because it cuts in much less time.

Portability

Magnevane Chainsaw weighs 23 Kg, which is the lowest in the market.
It also has a disconnector system, that allows a manual disconnection of the complete blade arm in under 1 minute, thus only requiring to carry the blade unit to the surface for better maintenance purposes.

Lower downtimes

Magnevane motors have a much improved lifetime, that can last many years.
The consumables that wear naturally in short cycles (blade, etc.) can be replaced in matter of minutes in the site of use of the chainsaw, with the disconnector feature.
Because it can work at ultra low pressure (<3 BAR) it operates even when there are pressure drops, as the Magnevane technology allows for instant restart every time.

We know what you need to get your job done right

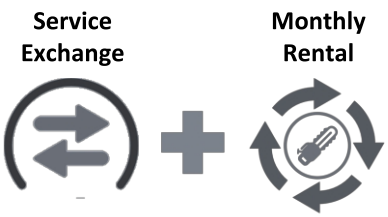
Magnevane Rental

Magnevane's confidence on the product, aligned with the need of the mines to reduce their production costs and/or increase productivity, has led us to address the market on a rental model.

With this model, the client will pay an upfront payment as a service exchange fee, handing us the "old" chainsaw, getting a new Swordfish superior chainsaw.
Magnevane will charge a monthly rental fee on a three year contract, that can be renewed.

The equipment will remain property of Magnevane and all service will be included on the rental fee, with the client bearing the cost of faulty use.
The client will have the option to have a all-in fee, including faulty damages, for an increased monthly fee.

Magnevane will have a pool of replacement chainsaws and parts at the client premises, to guarantee immediate replacement of any faulty, damaged or in need of maintenance unit. The size of the pool will depend on the number of chainsaws operating, with a Service Level Agreement that will guarantee the client on immediate availability of a replacement unit.
Magnevane will also guarantee the technical assistance agreed by the parties on the rental contract.



Magnevane Rental

Reduce your annual cost per chainsaw

- ✓ **Predictable cost per chainsaw**
- ✓ **Considerable power savings**
  - A study done by Deloitte has shown the possibility of 90% saving on the energy consumption of the chainsaws;
  - The client will be able to claim 12L tax benefits as well as the offset of carbon credits;
- ✓ **Downtimes on production will be drastically reduced**
- ✓ **Increased productivity**
  - Lower cutting times;
  - Less pressure used by the Chainsaw will result in higher pressure available for rock drill and other high-production items in operation;
- ✓ **No cost of replacement units and spare parts**

During a trial with a large South African miner, Magnevane was able to increase the performance of a pneumatic chainsaw by over 600% without increasing the equipment's air consumption, by simply replacing its air motor with Magnevane's upgraded version.

CREAMER MEDIA'S MINING WEEKLY

Pneumatic tech significantly improves equipment performance

26TH AUGUST 2016

BY: ROBYN WILKINSON
FEATURES REPORTER
EDITED BY: TRACY HANCOCK
CREAMER MEDIA CONTRIBUTING EDITOR

South African start-up Magnevane, assisted by consulting firm Deloitte, is introducing a design that significantly improves the performance of pneumatic engines by using high-powered magnets in air motor applications.
Magnevane is currently running four pilots at large South African companies and is pursuing opportunities in Canada, Europe and the US.

The company's technology can be used to retrofit existing equipment, such as drills, hoists, saws, gunnite machines, mixers, pumps and grinders, essentially upgrading them and, thereby, greatly improving torque and power. During a trial with a large South African miner, Magnevane was, for example, able to increase the performance of a pneumatic chainsaw by over 600% without increasing the equipment's air consumption, by simply replacing its air motor with Magnevane's upgraded version.

Deloitte consultant Gareth Rees believes that this significant increase in performance makes it possible to improve productivity across many industries where pneumatic motors are used, including the mining, pulp and paper, transport, manufacturing and oil and gas sectors.

"Deloitte has long serviced these sectors and has increasingly seen the need to seek out low-risk, high-impact innovations on behalf of our clients and assist in reducing the friction impeding the implementation of such innovations. This has led the company to develop an innovation division that looks to rapidly commercialize high-potential new ventures," he explains.
"For half a decade, heavy industry has countered this down cycle with relentless cost cutting that often goes past the fat and deep into the muscle of a business. This has, in many cases, resulted in a dearth of capacity to do much beyond keeping the lights on, which has seriously impacted the introduction of innovation. As an imminent turning of the global commodities cycle is unlikely, Deloitte aims to introduce innovation that will increase productivity while also assisting in the development of cost-cutting strategies," says Rees.

Therefore, over the past six months, Magnevane has implemented its strategy, which involves running pilot projects at large blue chip industrial companies to demonstrate in real time the performance claims of its technology, before seeking to secure offtake agreements.
Rees highlights that the results of these trials have been extremely impressive, achieving triple-digit increases to torque and notable growth in power output and efficiency.
For instance, Magnevane's trials have shown that its technology can operate at a level comparable to its tested incumbents' but at as low as half the pressure, while more than doubling maintenance intervals.
Rees says large high-pressure pneumatic networks lose significant air pressure through concealed and inaccessible leaks, so the lower the pressure in these networks, the lower the loss to leaks.
He explains that, if all equipment on a pneumatic line could be replaced with a technology such as that of Magnevane's, the electricity savings generated by keeping large air compressors off load would be significant. As an example, Rees cites thata large South African miner can spend over R300-million on electricity each year just to run the air compressors for its pneumatic networks, so reducing this pressure can be a big cost saver.

"Depending on the nature of the problem, Magnevane can create either high-efficiency or high-performance engines, or combinations of both.
Magnevane has developed technology that has the potential to take on global pneumatics giants".

- Gareth Rees, Deloitte Consultant

*To read the full article go to www.miningweekly.com

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