



DELIVERING PRODUCTIVITY THROUGH INCREASED MACHINE PERFORMANCE



PROTECTION
SOLUTIONS

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Muirhead® protection solutions are a pivotal force in mine managers reaching production targets.

Muirhead® protection solutions were the foundation products for RCT, 45 years ago. In the beginning these devices were designed through close collaboration with the end-user to protect machines from operator abuse and ensure operator safety. However, it soon became apparent that the benefits gained from utilising these solutions extended to improving machine availability and operation; which in turn substantially increased machine production and lifespan. This revelation drove RCT to refine these solutions, and as a result they are now a pivotal force in mine managers reaching production targets.

All Muirhead® Protection solutions are suitable for surface and underground applications.

IDLE TIMER



The Idle Timer was one of the first Muirhead® products developed in response to customers requiring solutions to ensure machines were able to cool down before they were shutdown to prevent engine and turbo damage.

Having the Idle Timer in place allows shutdown to be managed through a configurable setting; eliminating damage and significantly reducing costly unplanned downtime which results in increased production. Immediate gains in machine availability and production hours were experienced across fleets.

Idle Timers are easy to install and maintain and require no ongoing maintenance. The benefits of the Idle Timer far outweigh the small cost involved in introducing the product.

One client reported the elimination of turbo damage to its fleet of trucks following the installation of Idle Timers; saving them thousand of dollars in repairs.

There are now a large range of idle timers to suit all machines and applications, these include:

- Idle Timer kit (Part No. 11452)
- Excess Idle Timer controller (Part No. 12362)
- Idle Timer with Park Brake Interlock controller (Part No. 12848)
- Idle Timer with Start Inhibit controller (Part No. 12535)
- Idle Timer to suit Energise to Stop Engines controller (Part No. 12534)

These can be purchased in a kit or as a controller only.

***Fuel saving device**

SPEED LIMITERS



The Muirhead® Speed Limiter has been a part of RCT's Muirhead® range for 20 years, where its only requirement was to control the speed of machines to prevent accidents. However, the benefits extended to: greater fuel economy, reduced unplanned downtime, and extended life of all major machine components.

This small device is delivering big results in terms of productivity. In one case the Muirhead® Speed Limiter extended machine life by a further 2000 hours and reduced fuel usage by 40 per cent.

This device can be further enhanced with the use of a Zone Controller which will enable different speed settings for different zones on site to ensure a machine is travelling at the optimum speed at all times to further improve productivity.

The Muirhead® Speed Limiter is not restricted to just travelling speed, but can also limit engine speed.

The Muirhead® Engine Overspeed System is designed to prevent major component damage and reduce engine life. The solution will monitor and prevent overspeed by limiting or restricting engine RPM to below or at OEM specified levels.

The Overspeed Systems are universal in design to allow for installation across all machine types and brands.

The systems range from:

- Electronic Throttle Speed Limiter (Part No. 7290)
- Mechanical Throttle Speed Limiter (Part No. 12607)

These can be purchased in kits or as a controller only.

***Fuel saving device**



*a pivotal force in mine managers
reaching production targets.*

PARK BRAKE INTERLOCK



Entering and exiting large mining machines can be precarious due to numerous reasons beyond control, so RCT has come up with a solution to mitigate a risk it can control with the Park Brake Interlock.

This warning system reduces the risk of an accident resulting from a machine rolling when the park brake not been applied correctly. Improving machine use helps to drive productivity gains and extends machine life.

Introducing the Park Brake Interlock has proven to improve site's operating habits which, in turn has reduced machine damage.

Systems available:

- Door Open Park Brake Warning (Part No. 11377)
- Park Brake Interlock (Part No. 12848)
- Seat Belt and Door Open Warning

All systems are available in kits or as a controller only.

FATIGUE MONITORING



Operator fatigue has been identified as a major contributor of machine damage and reduced productivity. To address this issue, RCT has developed a range of easy-to-use Fatigue Monitoring systems to help combat the problem without disrupting production or increasing the risk of accidents.

The systems come in two options; Reflex and Active to cater to different requirements. The Reflex Warning System monitors the time it takes for the operator to reset the warning once it goes off. If the system detects a slower reaction time, the warning will ensue more frequently.

The Active Fatigue Warning requires the operator to react when prompted, however this warning can be programmed to operate at times fatigue is most prevalent. For example, one site found that operators working between the hours of 10pm-3am were most prone to fatigue. Upon implementation of the system, the user noticed a considerable decrease in operator fatigue and accidents.

RCT can collaborate with customers to enhance their chosen system. The Fatigue Monitoring systems have been adopted into a wide variety of applications and are currently used extensively across Asia and Africa.

Systems available:

- Reflex Fatigue Warning (Part No. 9055)
- Active Fatigue Warning (Part No. 3837)

These can be purchased in kits or as controllers only.

Benefits gained from utilising these solutions extended to improving machine availability and operation...which in turn substantially increased machine production and lifespan.

INCLINE CONTROLLERS



Machine roll overs on site are all too prevalent and results in costly and significant disruptions that interfere with productivity on site. RCT's Incline Controllers assist operators in combating the issue; empowering them with the information on their operating conditions and machine position, allowing them to make better decisions.

Although Incline Controllers can be equipped to any mobile machine they are particularly sought after for use on bulldozers, which often work on steep incline and operate at critical angles.

These systems include:

- 35 Degree Incline controller (Part No. 1800)
- 60 Degree Incline controller (Part No. 4090)
- Fully Programmable 10 to 45 Degree Incline Controller (Part No. 6119)

Systems suit all machine types and can be configured for alarm or control.

FUEL LOCKOUTS



Safeguard operators during refuelling to prevent incidents such as driving off with the fuel nozzle still attached by ensuring the machine remains locked out, in a safe state for the duration of the daily task.

RCT's Fuel Lockouts are suitable across all machine types and brands and has proven to improve machine availability and operating practices.

Clients already utilising the Fuel Lockouts have eliminated damage to refueling bays. This has saved companies in both repairs and downtime costs associated with operators driving off with the nozzle attached.

ENGINE PROTECTION



Engine damage is costly and disrupts mine production for extended periods of time. To combat this and ensure long-term machine availability to maintain productivity, RCT designed the Muirhead® Engine Protection System (EPS) for heavy duty machines.

The Muirhead® EPS prevents engine damage if a fault was to arise. It has proven to be an industry leading product and as a result it is one of the most popular engine protection solutions available in the mining industry today.

This solution is programmable to three levels of protection in addition to being able to lockout operation in order to prevent catastrophic engine failure.

The kits can be configured to suit all machine types and brands; regardless of the size of machines. Muirhead® EPS should be included on all mining machines to prolong engine life increase productivity levels.

Systems available:

- Six and Four Function Water and Air Cooled Kits (Part No. 3565 and Part No. 3747)

These are available in kits or as controllers only.

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Systems available:

- Mechanical Live Fuel Lockouts (Part No. 5338)
- Electronic Live Fuel Lockouts (Part No. 8972)
- Fuel Cap Lockouts (Part No. 7811)

These are available in kits.

***Fuel saving device**

TRAY LOCKOUTS



A haul truck is the critical link in the surface mining process in determining if production tons are met. Being able to prevent avoidable accidents and damage to these machines can ensure productivity targets are continually met.

Damage to a haul truck's tray is the most common occurrence, particularly with oversized or modified trays. To prevent this damage, RCT has designed Tray Lockout solutions to alert the operator or inhibit the tray from rising in a situation that could result in damage. These devices are now widely used to accommodate the increase in custom trays being installed on haul trucks to assist in increasing production rates.

Tray Lockouts are simple to install and maintain and configurable; delivering peace of mind to mining managers.

Systems available:

- Raise Tray Warning (Part No. 12537)
- Raise Tray Inhibit (Part No. 12595)
- Tray Angle Kickout (Part No. 6274)

These are available in kits and as controller only.

POWER MODE BYPASS



Managing Haul Truck fuel consumption efficiently is an easy and effective way to help streamline operations on site.

The Muirhead® Power Mode Bypass ensures the "power mode" function on a Haul Truck is used correctly, every time. It's the easiest way to guarantee the longevity of the trucks and facilitate high productivity – which is what all mine managers strive for.

Mining operations across the globe are facing rising costs due to fuel price hikes and maintenance overheads and the Muirhead® Power Mode Bypass is helping overcome this by reducing these costs and assisting in the viability of an operation.

The innovative system can be installed on Komatsu 785-5 and 785-7 Haul Trucks with custom kits available for other haul truck models and brands where a "power mode" selection is available.

THROTTLE LIMITER



Safeguarding machines operating in extreme weather conditions is critical as an engine's RPM is raised too fast when a machine is started in cold conditions. This causes excessive stress on the machine as the oils and lubricants don't have enough time to spread throughout the engine.

To prevent this from occurring, RCT has developed the Throttle Limiter to restrict the RPM for a pre-set amount of time, or when the engine temperature reaches an acceptable level. The system prevents the engine from experiencing unnecessary stress on cold starts to extend machine life and increase productivity.

Kits are programmable to suit all operating conditions, are simple to install and easy to maintain.

Systems available:

- Electronic Throttle Limiting (Part No. 10975)

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The controller is designed to automatically select either "power mode" or "economy mode" via an interface to the machine's switches. When the Haul Truck is carrying a load, "power mode" is engaged. And, when it is empty, it automatically transitions to "economy mode" to reduce overall fuel and maintenance costs.

Systems available:

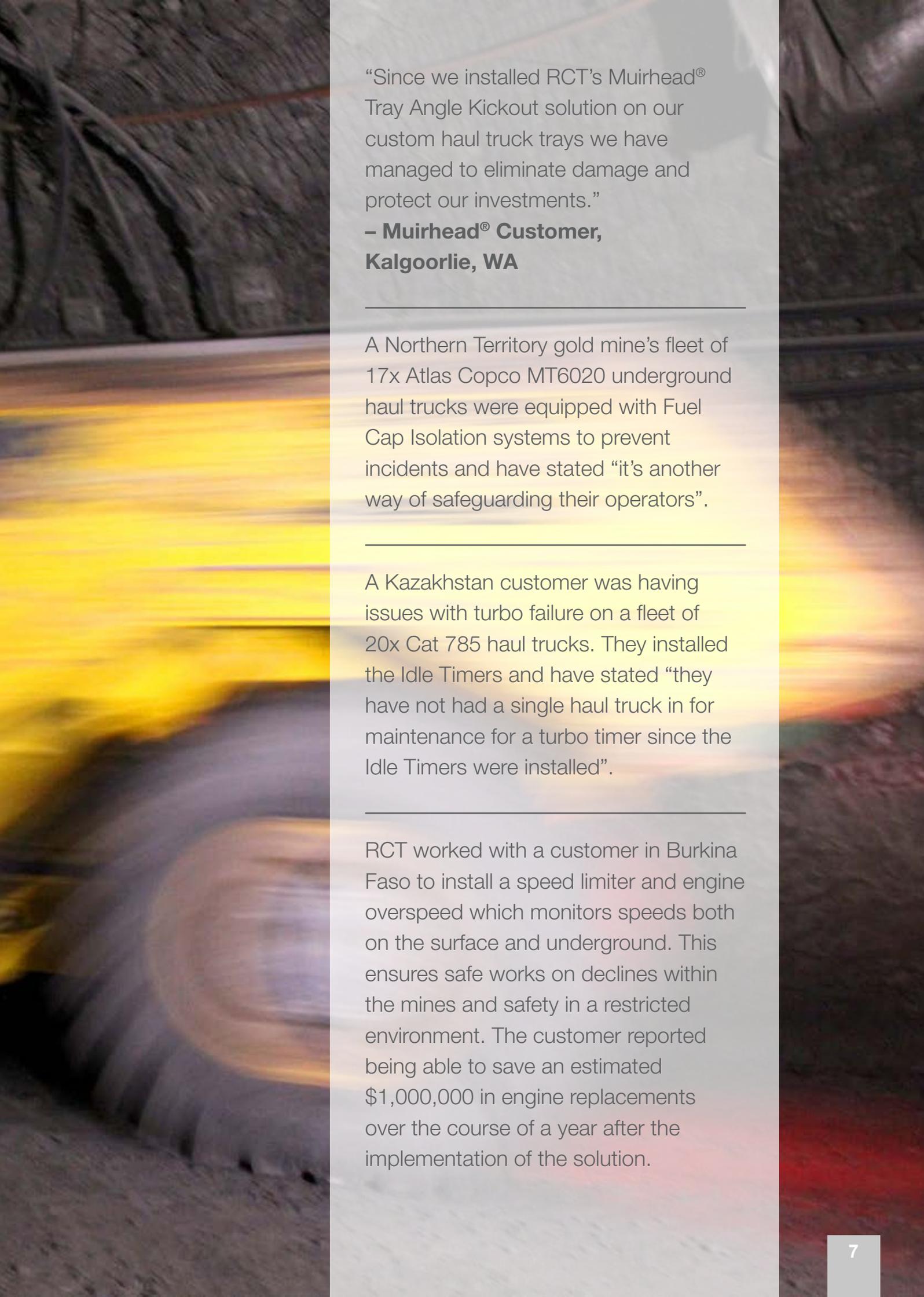
- Komatsu 785-5 and 785-7 Power Mode Bypass (Part No. 11337)

Note: Other Haul Truck models and brands are available upon request.

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“Since we installed RCT’s Muirhead® Tray Angle Kickout solution on our custom haul truck trays we have managed to eliminate damage and protect our investments.”

**– Muirhead® Customer,
Kalgoorlie, WA**

A Northern Territory gold mine’s fleet of 17x Atlas Copco MT6020 underground haul trucks were equipped with Fuel Cap Isolation systems to prevent incidents and have stated “it’s another way of safeguarding their operators”.

A Kazakhstan customer was having issues with turbo failure on a fleet of 20x Cat 785 haul trucks. They installed the Idle Timers and have stated “they have not had a single haul truck in for maintenance for a turbo timer since the Idle Timers were installed”.

RCT worked with a customer in Burkina Faso to install a speed limiter and engine overspeed which monitors speeds both on the surface and underground. This ensures safe works on declines within the mines and safety in a restricted environment. The customer reported being able to save an estimated \$1,000,000 in engine replacements over the course of a year after the implementation of the solution.



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