



## 13 STRATEGIES TO REDUCE THE OPERATING COST OF YOUR G.E.T.

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*Ground engaging tools (G.E.T)*

Faced with the increasingly difficult task of reducing the sale price of their products or services, all companies, regardless of their industry, have only one strategy to remain competitive: reducing costs. This holds true in the mining market.

Every penny saved on operating cost, every second reduced in production cycles and every percentage point reduced in equipment downtime represents a lot at the end of a year in terms of productivity and cost per ton.

Historically, the largest mining expenditures are fuel and tires, with ground engaging tools (G.E.T.: tooth, adapter, lip shroud, pin, etc.) placing only third. But it's important to remember that when high quality G.E.T. is used, fuel use and tire wear are reduced. On the other hand, a lower bucket penetration results in a decrease in performance, which promotes higher fuel consumption and increased tire wear.

To improve your overall profitability and your ability to compete, we provide 13 strategies to optimize G.E.T. management.

**1. Don't confuse price with cost**

As the saying goes, “you get what you pay for”. While reducing upfront costs can seem appealing when purchasing G.E.T., mining operations pay the price with shortened service life and constant maintenance. Low quality products increase the risk of accidents and lead to higher maintenance costs for digging, loading or crushing equipment. On excavators and loaders, using pins beyond their service life can result in costly damage. Always calculate the long-term costs of your business decisions to ensure you can stay competitive.

**2. Form a dedicated team for G.E.T. maintenance and control**

The size of this team depends on the size of the mine equipment fleet. Oftentimes, maintenance staff will skip on allocating human resources to consumables in an attempt to reduce headcount costs. However, we suggest taking the analysis one step further, and comparing the cost of this dedicated team with the total costs of corrective equipment maintenance. Production stoppage due to broken equipment should also be factored in. For example, a low-quality bucket tooth could fall inside a crusher and cause it to fail.

**3. Measure G.E.T. performance**

Collecting production data is not enough. The performance measurements should generate relevant information to support decision-making. Oftentimes, the metric chosen to assess G.E.T. performance



*Hensley Bucket*

may not be the most appropriate. When monitoring G.E.T., it is recommended to look at the cost per ton.

**4. Reverse the teeth to maintain an even profile**

Depending on your application and on the type of material, teeth wear can be irregular, which will shorten their useful life. By simply monitoring and reversing the teeth at the correct time, you optimize their steel consumption. Maximizing the useful life of your teeth will greatly reduce your operating costs.

**5. Regularly rotate teeth to extend wear life**

As mentioned previously, the operational characteristics of your mining equipment can result in uneven wear on different teeth of the same bucket. If teeth of different sizes operate simultaneously on a bucket, larger teeth can be overloaded and break. The practice of rotating teeth is nothing more than occasionally

changing their location on a bucket to ensure the size and position is uniform. This will improve the leading edge of the bucket, promote a higher fill rate and reduce teeth breakage.

#### **6. Re-use pins**

Some manufacturers, such as Hensley Industries, provide re-usable pins. This promotes substantial savings, as some pins can outlast up to seven sets of teeth, depending on the operating conditions of the mine. When reusing teeth, it's important that the maintenance team monitors and identifies the number of times the pins were used and the exact moment they should be discarded.

#### **7. Follow the manufacturer's welding procedures**

Most mines will have experienced and skilled welders on their staff. But experience is not enough when working with constantly evolving products. Following the manufacturer's welding procedures and recommendations is essential. The quality of the weld can be impacted by the amount of preheat,



*Hensley bucket*

the choice of welding filler material, or the type of welding bead. Neglecting the manufacturer's instructions can result in premature cracking and costly repairs.

#### **8. Visit the scrap yard**

Avoid immediately discarding used G.E.T. Before doing so, place it in a location for further analysis. This analysis can answer several questions like: Am I wasting material? Could I re-use this pin more often, reducing my cost? Is the G.E.T. demonstrating an abnormal or non-uniform wear behavior? Is the mine blasting the material properly before excavating it? The answers to these important questions can lead to improvements in mine resource management and cost reduction.

#### **9. Have the Equipment Operator visually inspect the bucket**

No one knows the equipment better than the operator who uses it between 6 and 8 hours a day. With a 5-minute visual inspection of the bucket, the operator can prevent equipment damage by identify breakage or cracking and prevent any part from falling into the crusher. This visual inspection can occur at the beginning of each shift or any time that does not interrupt production.

#### **10. Train and monitor the team involved with G.E.T. maintenance**

Activities such as installation, change-outs, inspection, welding, and maintenance require constant training and monitoring, especially when taking the high turnover of mine professionals into account. This will promote higher levels of safety and productivity.

### 11. Prioritize preventive maintenance

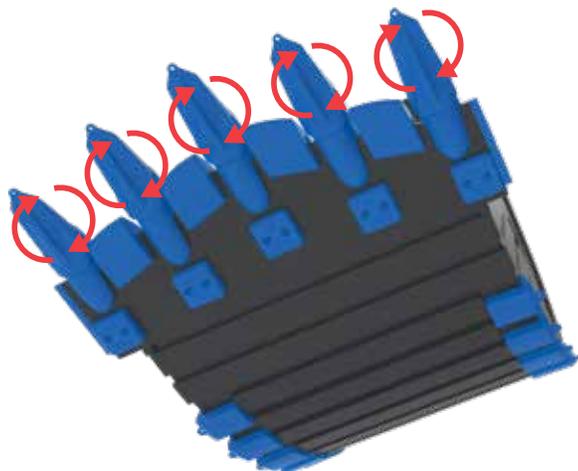
In a mining environment, unplanned equipment downtime should be avoided at all costs. With a preventive maintenance policy, regular maintenance interventions are undertaken to avoid unexpected break-downs and their implications: higher costs, and a lot of headaches. The old saying “an ounce of prevention is worth a pound of cure” aligns with this G.E.T. maintenance strategy.

### 12. Protect your bucket

In mines with severe digging conditions - abrasiveness, impact, etc. - the service life of wear material is negatively impacted. This suggests that the bucket should have extra protections to achieve its expected wear life. But the challenge is to balance wear protection and bucket weight. If the bucket becomes too heavy, the weight capacity will be reduced. The structural integrity of the equipment can also be affected if an overweight bucket is used to lift heavy material. We usually recommend using high-weldability and low weight materials, such as bimetallic or Chocky Bars. These high hardness materials [approximately 700 Brinell] provide protection in extremely abrasive applications. Wear plates can also be used, and further reinforced with tungsten carbide.

### 13. Use templates during inspections

Each component of a bucket (lip, adapters, teeth, lip shrouds, etc.) has a different hardness index. The contact and movement between different components cause wear and deformation over time. To prevent accelerated wear, it's important to monitor all components while performing maintenance. However, a visual assessment is not precise enough. For an accurate inspection, templates should be used to measure the amount of wear or deformation and to help determine if part is still within specification.



*Teeth rotation*

Each mine operation is unique. The challenges you face will vary with the size of your maintenance team, the minerals being extracted, and the resources and professional expertise at your disposal. However, given the strategic impact of G.E.T. on a mine's operating costs, we believe that following these recommendations can yield significant benefits for companies operating in the mineral extraction market.

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