MINING TYRE SOLUTIONS

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Technical Bulletin

GETTING SIMPLE THINGS WRONG

ABOUT

EARTHMOVER TYRE LIFE RECORDING & ANALYSIS

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EM TYRE LIFE RECORDING & ANALYSIS – GETTING SIMPLE THINGS WRONG

In regard to EM tyre management, if a mine gets the basic elements wrong – e.g. inappropriate tyre life recording or analysis methodology – it is likely to lead to one or other of the following costly outcomes:

- skewed management mindset – reduced operational productivity,
- wrong purchasing decisions – increased direct tyre costs.

Tyre life recording – hours or distance?

The true measure of haul truck tyre life is distance, not time. On most mine sites hours have been used historically because it is the measure used for all other components of the truck (engine, chassis, suspension, body, etc.) and it is the easiest means of measuring.

But there are significant, inherent problems in using hours as a measure of tyre life. Firstly, which hours are being measured – engine, production or rolling hours? (to name just three). There can be up to 20% difference among these due to truck idling time and other factors.

Distance is the proper measure of haul truck tyre life – kilometers or miles. Distance is directly related to the number of times a tyre rotates during its life – exposing each section of its casing to static and dynamic load, and each section of its tread to road wear and hazards.

The following example shows how an anomaly – and unwelcome consequences – can result from recording tyre life in hours rather than distance.

> Original condition: *Assume that a haul truck fleet on a mine site is achieving an average tyre life of 100,000 km at an average fleet speed of 10 km/h. Average tyre life, measured in hours, would therefore be 10,000 hr.*
>
> New condition*: If haul cycle distances were to increase causing average fleet speed to rise to 12 km/h*[1] *then tyre life of 100,000 km would now, if measured in hours, be 8,330 hr – an apparent reduction of 17% even though there has been no reduction in tyre life recorded in the correct measure – distance.*
>
> Consequence: *In this case, if site tyre life is measured solely in hours, mine management would typically conclude that life has dropped because of a problem with either the tyres or the operating conditions – most probably leading to inappropriate and costly rectification attempts.*

Tyres on other EM equipment apart from trucks (e.g. loaders, dozers, graders, etc.) should be measured in hours because, due to the nature of their work duties, distance recording is not appropriate.

[1] An increase in average haulage distance typically results in an increase in haul truck average fleet speed because the trucks now spend a greater proportion of their operating time travelling between loading and tipping points and a smaller proportion of time stationary at these points.

Tyre life analysis – fitment or scrap period?

There are two methodologies for analysing EM tyre life. One is scrap-period based and the other fitment-period based. Both are valid, but each has a specific purpose; if methodologies are crossed then spurious results are likely.

If the requirement is to determine the tyre life trend in a particular application, e.g. 220t haul truck fleet, then Scrap-period based analysis is appropriate, typically on a 12-month moving average (12mma) basis. Using this method, the average life of all tyres scrapped over the previous 12 months is calculated and graphed monthly. The resulting plot clearly shows the tyre life trend (increasing, constant or decreasing) and 12mma life on a monthly basis.

If the requirement is to compare tyre life by manufacturer or specification in a particular application (e.g. as a basis for tyre purchasing decisions), then Fitment-period based analysis is the proper methodology. The fitment period would typically be six or 12-monthly depending on site consumption on each specification of tyre being compared (the greater the quantity of tyres in each fitment batch, the more statistically reliable the results).

Summarizing, the rules for tyre life analysis methodology are as follows:

To determine:

1. Tyre life *Trend* (all brands and specifications, used in one application, grouped together):
    - Use *12mma* (scrap-period) analysis

To determine:

2. Tyre life by *Brand or specification*:
    - Use *Batch* (fitment-period) analysis

Note: While 12mma analysis may provide relatively accurate indicative brand or specification tyre life if the supply of all brands or specifications remains consistent over time, it will give false results (in some cases dangerously incorrect) if the supply of any brand or specification is inconsistent, interrupted or terminated.

Conclusion

You can't manage what you can't measure. However, incorrect measurement – due to the use of inappropriate measurement units or analysis – may lead to decisions and actions that are as costly as no tyre management at all.

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