

FINDING Added Value

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considers how calculating TCO can help identify added value
as well as hidden costs.



Cement plants are increasingly looking at Total Cost of Ownership (TCO) when they make purchasing decisions. This is a useful tool that accounts for both the initial and ongoing costs of a product or service, as well as any indirect costs that should be considered.

It could be compared to figuring out the total cost of a US\$2000 suit: wear it once for a wedding and it is an expensive suit; wear it every week for four years and the cost per wear is just under US\$10 – not bad. Add dry cleaning and the TCO goes up. What about the cost of getting to and from the dry cleaners? These are the kinds of indirect costs that should be considered in order to really understand the lifetime cost of a product.

TCO can be a great way of identifying hidden costs. If a product comes cheap but the wear parts are expensive, for example, or energy consumption starts out reasonably stable but quickly increases, running the TCO sums helps to steer customers away from what could turn out to be a costly decision.

TCO can also help discover added value, which is what this article will discuss. First, a quick word about data.

Data: the keystone of calculating TCO

Having a robust system in place to collect and analyse data is a great benefit to calculating TCO. Imagine, for example, putting out a tender for new filter bags when five years of operational data are on hand: 43 800 rows (1 row = 1 hr) of parameters like Kiln Production Rate, Filter Pressure Drop Flange to Flange, Filter Fan Power, Filter Fan Speed, Kiln ID Fan Power, Raw Mill Status, Dust Emissions, Pressure Drop by compartment, and Temperature. That is 394 200 data points to help improve understanding of the challenges – and the positives – in the process that will have an impact on the TCO of a new type of filter bags. Vendors can then use this information to estimate the level of performance that can be expected from the filter bags and the likely impact on the process. The more information they have, the more accurate their forecast.

'Hidden' value

There is a saying: 'Buy cheap, buy twice'. While it is certainly not always true that a more expensive product offers better long-term value, initial purchase price should not be the deciding factor when it comes to making decisions about cement plant equipment. Sometimes a bigger upfront cost can be justified by savings in energy consumption, maintenance and equipment life, among other things.

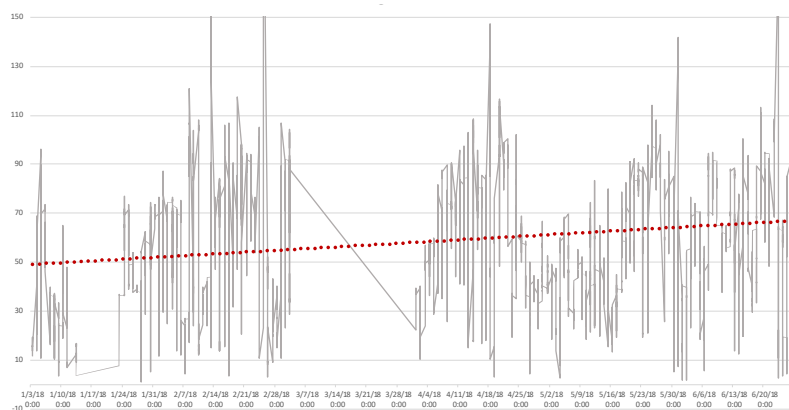


Figure 1. Cement plant #1 - AFR kg/clinker ton.



Figure 2. Cement plant #2 – BH Inlet pressure (mbar).

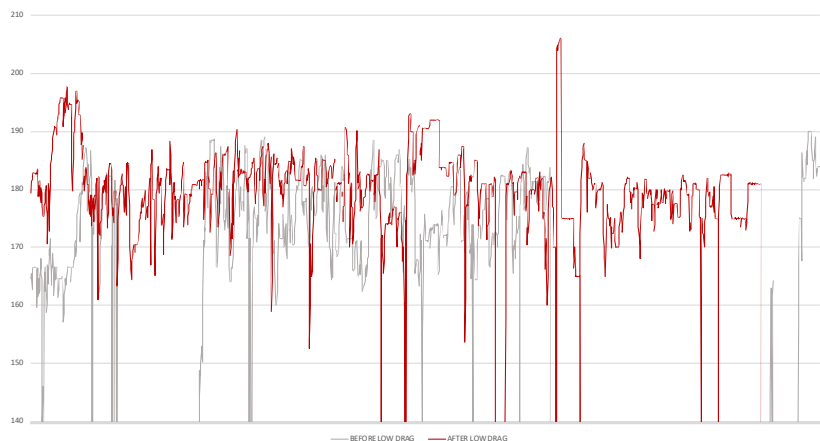


Figure 3. Cement plant #1 – Kiln feed t/hr.

Gore's LOW DRAG™ filter bags are not the cheapest on the market. In fact, they are at the higher end of the price range. However, because of the special membrane technology that faces the PTFE filter bags, they significantly reduce filter drag, which creates operational benefits including lower differential pressure (DP), longer bag life, increased capacity and reduced fan energy consumption. Any one of these benefits will reduce baghouse operating costs and thus generate a lower TCO. Furthermore, because there is flexibility

in how plants make use of these benefits, there is the potential for customers to find 'hidden' value – as the following three examples show.

Case studies

Cement plant #1

- Kiln Application
- 2856 filter bags
- 478 475 m³/hr

This customer opted for the LOW DRAG filter bags because of the lower DP benefit. However, when the plant was in peak season, it naturally wanted to ramp up production in line with demand. Thanks to the flexibility of the new filter bags, the plant was able to increase clinker production by 5.1% without seeing a hit on filtration performance as a result of the 20% increase in baghouse inlet static pressure. Later, when demand fell, the plant realised other benefits, including:

- 10.83% of power savings at the baghouse main fan, compared with the same kiln feed rate with previous bags.
- 16 mbar, the lowest DP recorded after 1 year of operation.
- 87.71 kg/t, the highest rate of alternative fuels used per ton of clinker.

In both situations, the value gained was not the proposition that initially encouraged the customer to purchase the bags – it was an associate benefit.

Cement plant #2

- Kiln Application
- 2688 filter bags
- 741 100 m³/hr

This customer was also interested in the LOW DRAG bags for the lower DP. Once again, however, productivity soon took priority over low DP and the plant increased kiln production by



Figure 4. Calculating TCO can reveal both added value and hidden costs.

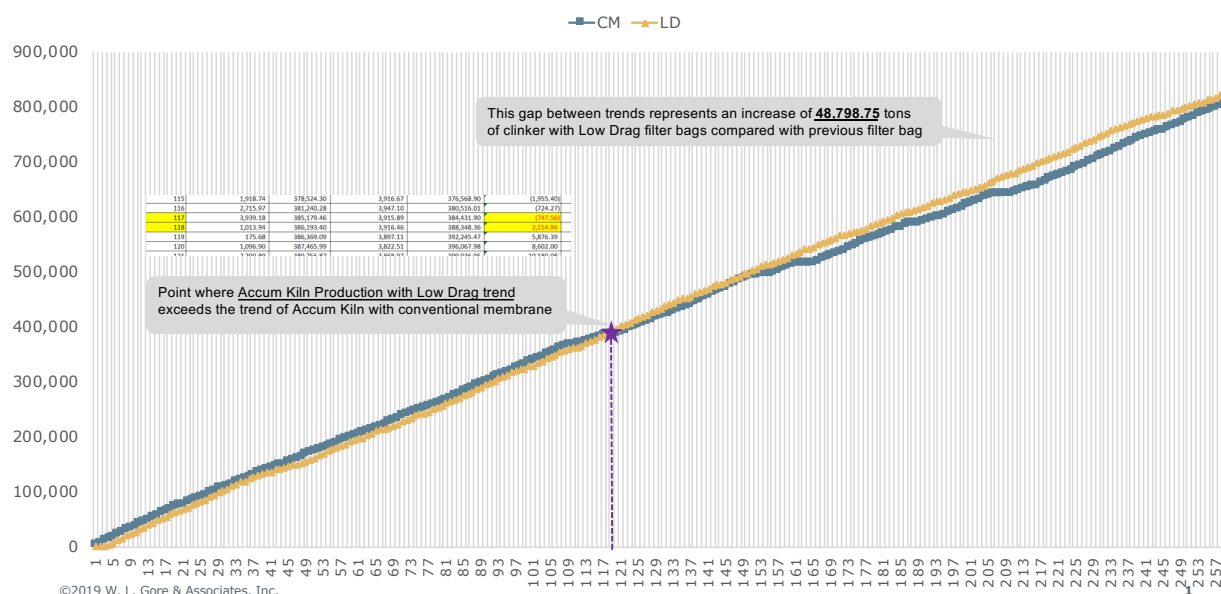


Figure 5. Kiln production tpd.

~6%. The filter bags were perfectly able to cope with the increase in throughput, associated higher temperatures and higher fan energy consumption. Looking at the TCO impact of changing the operating parameters, the plant could see that the new filter bags would be able to facilitate this increase in productivity without sacrificing performance or bag life. The value of increased productivity was not one that the plant had initially considered making use of, but it certainly made an impact on the TCO.

Cement plant #3

- ▶ Cement Mill Application
- ▶ 1280 filter bags
- ▶ 600 000 m³/hr

Having opted for LOW DRAG filter bags for this cement mill baghouse to increase stability and reduce the number of forced shutdowns, the 'hidden' value in this project was the increase in production gained as a result of that stability.

Six years before they installed the new filter bags here, this cement mill was retrofitted to increase production from 88 tph to 98 tph. The modification consisted of removing some of the internal blades of the elements that worked as flow conductors. It was not possible to change cleaning parameters. The baghouse was working at the limits of its capacity. The customer instead switched from a

different type of GORE® filter bags to the LOW DRAG bags for the promised decrease in DP.

Unlike the kiln, which has just one job, the four cement mills at this plant can produce three different products: cpc30, cpc40 and mortar. Naturally, this means that the cement mills work under variable parameters; they are not producing the three products at the same rate. The most important benefit for Process Engineers at this plant is maintaining a stable process, which was achieved. Furthermore, despite the limits of the baghouse, after 9 months of operations with the new filter bags, analysis shows that the plant has increased production by 3.06% compared to the record of the previous GORE membrane filter bag. Production has risen from 98 tph to 101 tph.

Bags with benefits

The three cement plants mentioned previously all chose the LOW DRAG filter bags because of the lower DP they could achieve. However, the unexpected gains from increasing productivity in the kiln and cement mill may have contributed more to lowering the TCO than the lower DP. The new bags did not just remove a cost – they added value to the process. Their flexible nature allows the plant to choose the benefit that best suits their shifting priorities, enabling the baghouse to be a facilitator of productivity rather than a limitation on production. ■