AUMUND announces new bucket elevator performance record

Bucket elevators play a standard equipment role in bulk material conveying technology wherever vertical conveying is involved. The conveying specialist Aumund has been active in this segment for decades, supplying reliable, high-performance bucket elevators that have gained a good reputation worldwide. To date, however, the experts from Rheinberg have been limited by certain constraints. Although the belt bucket elevators were characterised by high capacities (up to 2000 m³/h) and by conveying heights of up to 200 m, they were largely limited to pulverulent, fine-grained bulk materials. In contrast, Aumund chain bucket elevators with central chain were suited to coarse-grained bulk materials but were pushing their boundaries at a conveying height of around 70 m and capacities of up to 2500 tph.

Owing to these limitations, not all of the belt’s or chain’s advantages were being fully exploited. Aumund’s development department has now developed a coarse-grain belt bucket elevator (AUMUND Type BWG-GK) that conveys grain sizes of up to 60 mm, as well as a high-capacity chain bucket elevator (AUMUND Type BW-T) that conveys up to 90 m in height and manages mass flows of up to 4000 tph. The developers paid particular attention to these capacities being reliably available in normal operation, in addition to when a malfunction occurs during daily operation.

The coarse grain belt bucket elevator

The main task when developing a belt bucket elevator for coarse material is protecting the belt from damage caused by the conveyed material. Reiner Furthmann, Chief of Development, and his team therefore followed a completely new path: the narrow, overlapping bucket configuration permits the belt to disappear entirely behind the buckets. It is thereby protected and no coarse material can become jammed between the backs of the buckets and the belt. The outer belt edges are protected against damages.

Another positive effect is the relief of the strain on the bucket lead edges and the clamping bolts. However, more importantly, a gentle emptying procedure is possible in crawling gear even in the case of an emergency stop or backfill of the bucket foot. Thanks to its design, no material can be thrown behind the backs of the buckets (Figure 1).

The coarse material belt bucket elevator has already passed its “baptism of fire”. After pre-examinations and DEM analyses, the new product was thoroughly tested under realistic conditions.

The high-capacity chain bucket elevator

The bucket elevator with central chain will also remain an important variant for reliable vertical conveying of problematic bulk materials in the future. The new coarse-grain belt bucket elevator will be a competitive product for some applications. However, the chain bucket elevator always displays its advantages when harsh operating conditions, high temperatures, overflow or buildup (in the case of sticky bulk materials) are encountered. Where high capacities are used, Aumund introduced the double strand bucket elevator years ago (AUMUND Type BW-D). In cases where this larger sister of the chain bucket elevator did not suffice, Aumund now offers the high-capacity chain bucket elevator with a triple bucket configuration. Hence the model designation AUMUND Type BW-T, in which the ‘T’ stands for ’Triple’.

Figure 1. No material gets trapped behind the buckets even after an emergency stop with filled buckets.

Figure 2. BW-T head with drive shaft and three bucket strands.
Three bucket strands run via a common drive shaft supported by four vertical bearings (Figure 2). In contrast, the tension axles are supported separately so that they are able to balance different chain lengths independently of each other.

The high-capacity chain bucket elevator is distinguished by a very compact method of construction (Figure 3). Compared with three individual bucket elevators, the component diversity is greatly reduced. The constructional components are configured in such a way that the highest possible degree of accessibility, in addition to user and service-friendliness, is guaranteed. For this reason, not only the bucket elevator foot and bucket elevator head, but also the field assembly casing were newly conceived.

A further significant element of the realisation of the new bucket elevator was the availability of a chain which, with a breaking load of 2450 kN, also masters lift heights of up to 90 m.

Finally, the bulk material flow had to be adapted and a suitable bulk material flow divider needed to be developed. Realised in cooperation with the Technical University of Magdeburg, this development ensures even filling of the three bucket strands. It functions purely gravimetrically and therefore manages without mechanical working parts, keeping it largely maintenance-free.