Less operational problems with the 'Olds Elevator'

Bucket elevators are used extensively to elevate bulk materials in the feed industry. However, they can also experience a wide range of maintenance and operational problems and generate plant hazards, such as dust emissions and dust explosions.
A new type of elevator, called the 'Olds Elevator', has been developed recently to overcome many of these problems.

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Damages that occur in a conventional bucket elevator

Bulk materials handling plants and processes quite often require the elevation (lifting) of bulk materials to other parts of the plant or process. Numerous technologies and equipment are currently available for this purpose.However,the current systems can have a range problems and limitations. A few examples are listed below:

a) The pneumatic conveyor or air lifter has relatively high operating costs (e.g. blower, compressor), product velocities and wear rates (especially for dilute-phase conveying).

b) The conventional screw conveyor has relatively high operating speeds (due to slippage between the screw flight and particles, and also due to the back-flow of material through the screw flight and casing clearance); increased particle attrition; undesirable casing/screw contact.

c) The bucket elevator is by far the most popular method used in industry. However, it has relatively high capital and maintenance costs; mistracking of belt/chain; damage to belt/chain, buckets and casing (see photo on this page).

The additional problem or hazard with conventional elevation technology (especially bucket elevators) is the increased risk of a dust explosion due to:

- Sparking, caused by mechanical damage or impact (e.g. tramp metal, broken bucket, misalignment of belt/chain/screws);
- Ignition, caused by overheating bearings/pulleys;
- Frictional heating, caused by buckets shearing against product that has built up at the bottom of the bucket elevator casing.

This is exacerbated by the dust generation mechanisms and dust clouds that can be prevalent inside such conventional elevators. Some typical sources of dust generation include particle-particle and particle-wall impacts, particle attrition, turbulence and induced/entrained air flows. Another concern is the propagation of a dust explosion or deflagration through the elevator to other parts of the plant, in which case some method of explosion control is required (e.g. venting; explosion detection/suppression; product "isolation" barriers).

Olds overcomes many problems

A new type of elevator, called the Olds Elevator, has been developed recently to overcome many of the above problems. The new elevator has only one moving part in contact with the bulk material, a tubular casing with attached in-feed scoops that rotates around a static screw. Generous clearance is provided between the static screw and casing *(Figure 1)*. This clearance is an important design feature that prevents damage to the bulk material, casing wear and metal-on-metal contact. The elevator is self-feeding at a controlled rate as it rotates. Bulk material in the feed hopper typically covers the in-feed scoops. Friction against the inner wall of the casing rotates the material and causes product resting on the screw flight to be driven gently up the inclined face of the screw.

The full-bore flow of material avoids back-flow or "leakage" of material through the annular clearance,