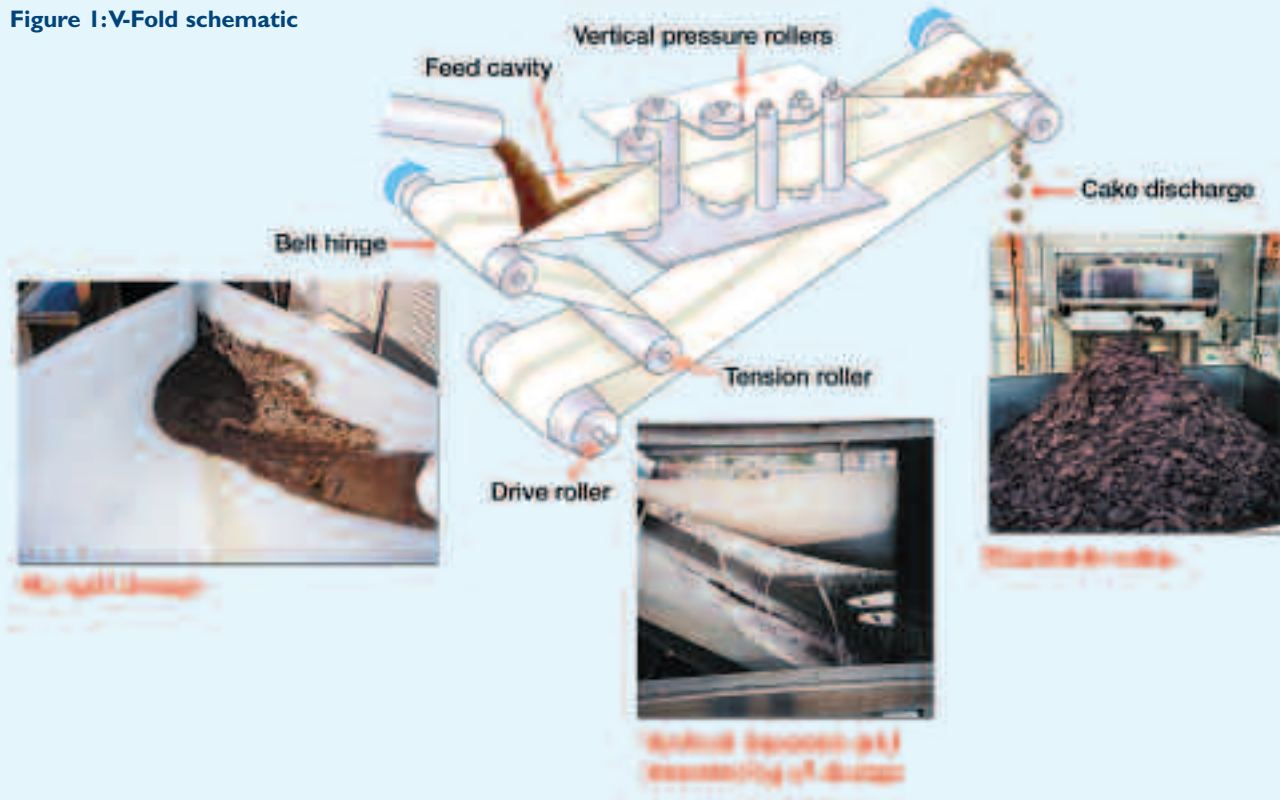


The V-Fold belt filter press

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Figure 1: V-Fold schematic



Waste disposal has become an expensive component within the leather making industry. The V-Fold filter was developed in Australia to dewater slurries and sludges generated during wastewater treatment so they can be removed at lower cost, and in some cases used in compost. Its simple design and forgiving nature means little operator input is needed, even when the slurry composition varies.

The technology is based on conventional “two-belt filter press” technology, but uses a single belt that avoids many of the problems associated with this method of dewatering. The belt is made from conventional filter fabric with a reinforced centre-line that allows it to fold longitudinally and form a V-shaped cavity that can hold feed slurry without fear of spillage as shown in Figure 1.

Waste slurries to be dewatered are usually a mixture of water and particulate solids ranging in size from sub-micron to several millimetres. They need to be “conditioned” by adding a small amount of a polyelectrolyte so the solid particles clump together as flocs.

Initial dewatering is by gravity drainage of “free water” in the V-shaped feed cavity. As the belt moves forward, the V-shape closes to trap flocs of sludge in the fully folded belt. Belt tension and shear cause more water to be released as the belt passes

around a series of vertical rollers in this pressure zone. The belt opens to discharge a filter cake that still contains some moisture, but is now “spade-able” and much less in weight than the feed slurry. ➤



Figure 2: V-Fold filter being used on settled chrome precipitate at a tannery processing 15,000 cattle hides per week to the wet blue state, Queensland, Australia. Typical filter cake production rate is 200 kg/hour at 20% dry solids for disposal.



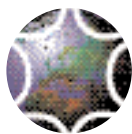


Figure 3: V-Fold filters used to dewater thickened biological sludge at a tannery in Queensland, Australia. The filter cake is composted on site with sawdust.

The combination of vertical and horizontal rollers makes the filter belt self-tracking. It is simply washed clean by water sprays to ensure continuous operation. Recycled water is used for belt wash in some applications, but many operators use mains water because the flow rates are small.

An ultrasonic level detector can be fitted over the feed cavity to measure the sludge height and control the slurry feed rate. If dewatering is slow, the height rises, and a signal slows down the feed. Alternatively, if the level drops below a set point the feed pump will speed up to ensure optimum performance. This feature helps make the equipment even more forgiving of variable feed slurry quality.

Applications in the leather sector

The first of these sludge presses were sold in Australia in 2000, and the first into a tannery application in early 2001. There are now eight operating in Australian tanneries ranging in size from 15,000 cattle hides per week down to 5,000 kangaroo hides per week.



Figure 4: Filter cake at kangaroo hide tanner Adelaide Processors, Adelaide, Australia.

Advantages of the V-Fold system

Chamber presses need labour to empty the press, and filter cloths can quickly blind. Centrifuges need high power input, and long-term maintenance costs can be high. Conventional two-belt filters need consistent, well-flocculated feed slurry or sludge can be squeezed out the side of the belts. They can also have belt-tracking problems.

The folding belt avoids these problems. It is simple to operate, the footprint small and power demands low. It has a “forgiving” nature, and is easy to maintain compared with other dewatering devices. 🌟