

Unwrapping alternative fuels

The cement industry is constantly moving towards more sustainable and environmentally friendly operations. Green energy, circular economy and a low carbon footprint are becoming household terms. These fine ideas need to be taken seriously and they also need to be implemented in such a way that is good for business. In this article, Cross Wrap reveals the possibilities of alternative fuel (AF) wrapping, its benefits for processes, and how it can help achieve sustainability and operational efficiency in cement manufacturing.

■ by **Panu Kantosalo**, Cross Wrap Ltd, Finland

Cross Wrap Oy has gained over 26 years of experience in manufacturing automatic bale wrappers and bale openers for different industries. The waste-to-energy (WTE) business is the biggest customer sector for Cross Wrap, including materials recovery facilities (MRFs), waste-fuel manufacturers and traders, WTE plants and cement kilns. The majority of the 500 delivered Cross Wrap machines are used in the WTE industry.

The Cross Wrap method offers gentle and effective bale movement during the wrapping cycle. This keeps the bale structure unstressed during wrapping and helps to maintain clean operations. The Cross Wrap method keeps the machinery layouts, bale tracks and conveying lines simple and adaptable, and also flexible for different needs.

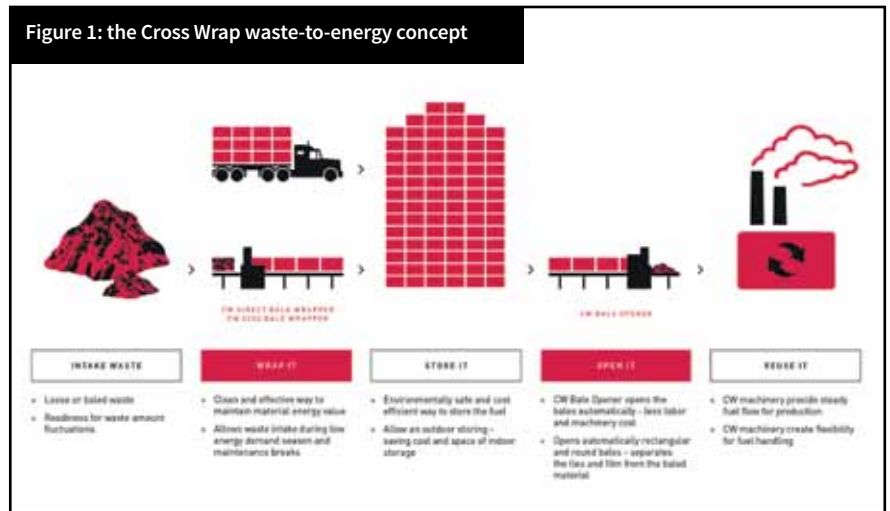
Getting more from AFs

Bale wrapping helps to maintain the alternative fuel (AF) calorific value. The airtight wrapped package does not allow the baled material to be composted with air. This keeps the fuel's calorific value as high as it was when baled. The plastic wrap keeps any moisture away from the baled fuel material, which could be refuse-derived fuel (RDF) or solid recovered fuel (SRF). It also prevents combustion when transporting or storing.

These benefits keep the stored fuel in good condition. This is an important feature as the process efficiency and product quality are dependable on the quality of the raw materials and fuels used in the process.

The AF wrapping and the baled AF lifecycle have been conceptualised by Cross Wrap. This Cross Wrap WTE concept (see Figure 1) is developed to simplify and generate operational benefits for AF users and manufacturers.

Figure 1: the Cross Wrap waste-to-energy concept



The Cross Wrap WTE concept focusses on maintaining good material and operational quality throughout fuel wrapping, transport and storage operations. As the fuel bales are wrapped the material quality maintains unchanged. This concept also reveals other beneficial factors deriving from the wrapping.

One of the biggest benefits of wrapping is that the baled and wrapped material can be easily transported and stored. The cubical bale form is the most efficient logistical shape to be transported and the balers that produce cubical bales are the most common industrial balers around the world.

In addition, the bale densities and weights are maximised when using industrial channel- or two-ram balers. By cross-wrapping, the bale structure and content are secured, and the bale handling is safer and cleaner.

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the fuel material. These storage benefits apply to all positions on the fuel material's logistical journey, such as in harbours, manufacturer's sites, cement mill areas or transport company grounds.

Solutions for wrapping and opening

Cross Wrap's bale wrappers represent the company's long line of industrial wrapping machines. Cross Wrap machines use the



Figure 2: CW 2200 Bale Wrapper



Figure 3: The CW Bale Opener is a fully automatic machine that opens and removes the bale wrap and ties from the baled material

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latest automation programmes and the most sophisticated user interfaces that are easy to use and to learn. The machines offer an efficiency boost with high automation, accurate programmability and with tailored wrapping programs to suit each customer’s needs.

There are two Cross Wrap bale wrapper models that both use the same wrapping method. The most used Cross Wrap bale wrapper is the CW 2200 (see Figure 2), which can be paired with any baler. Another wrapper model is called the CW Direct wrapper, which wraps the bale directly from the two-ram-balers chamber. This direct wrapping method only needs the wrapping film to wrap the bale and no additional bale ties are needed. This method makes it possible to only use wrapping to seal the bale with no need for bale tying. The bale wrapper

customers are most commonly MRFs and AF producers.

To handle the wrapped bales at their end location, Cross Wrap has engineered a CW Bale opening machine (see Figure 3). This machine automatically opens the bales and removes the wrapping film together with possible bale ties away from the bale. These CW Bale Opener machines are used by WTE plants and cement kilns. The CW Bale Opener machine offers high automation and optimal fuel flow for processes and helps to keep the material quality high.

Fully recyclable packaging materials

Cross Wrap bale wrapping uses fully-recyclable PE-film, which can be easily recycled when the Cross Wrap Bale Opener machine is used to open the wrapped

bales. As the machine opens and removes the wrap from the bale content, it enables the operation to have high-quality AF flow and to easily recycle the used wrap.

The CW Direct Bale Wrapper has also gained a lot of interest among AF producers as it enables the creation of high-quality wrapped bales without the need for traditional metal wire bale tying. These cross-wrapped bales are easy to handle, and the used PE-film is the only packaging material that is left behind after opening. This helps to use the wrapping film as an energy source or to recycle it properly, without any metal removing.

LafargeHolcim reference

LafargeHolcim’s Villaluenga cement plant in Spain updated its AF (WTE) infeed system by purchasing a fully-automatic Cross Wrap BO 3600 Bale Opener machine, which was installed in April 2019. The investment contacts and prework were conducted by LafargeHolcim subsidiary Geocycle, which is responsible for all LafargeHolcim waste management activities.

By shifting to the Cross Wrap Bale Opener the customer automated its AF feed, where baled and wrapped SRF is used as an AF in the cement manufacturing

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process. The CW Bale Opener opens the bales automatically and then separates the wrapping film and bale wires. The removal of large packaging material fragments from the material stream, improving the material feeding process and maintaining a higher-quality fuel stream.

The cement kiln AF feed system is dependent on steady fuel handling. CW Bale Opener removes the wrapping film from the bale content and moves the baled material forward in the process. With the help of the CW Bale Opener, no bale tying material will end up among the fuel.

Flexibility to the process

One of the greatest benefits of the CW Bale Opener is its versatility and ability to open both square and round bales. It was the perfect choice for LafargeHolcim as the company receives all types and shapes of AF bales and can store them wrapped on its premises and use them on demand according to process needs.

As the CW Bale Opener operates automatically, the loader only needs to



Figure 5: LafargeHolcim Spain invested in an automatic Cross Wrap Bale Opener to improve its waste fuel infeed operation capacity and process automation

place the bales on the feeding conveyor and the machine does the rest. The bale opening cycle speed is automatically adjusted according to the fuel infeed line speed or the bale loading speed, if the material is continuing to a bunker.

The option to choose the feeding conveyor's length helps to set a comfortable and safe pace for bale loading. A longer feeding conveyor helps to buffer the feeding, slows loading speed and helps the operator to work unhurried, which increases safety and operational precision.

Enhancing operations

There are many references that demonstrate the benefits of Cross Wrap bale wrapping and bale opening. Recently the company's automatic CW Bale Opener has become the choice for many cement kilns and WTE plants. Cross Wrap wants to offer solutions that not only become

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industry standards but will also become game-changers in the way they provide more operational efficiency and a competitive advantage to its users. ■



Figure 4: Wrapped RDF bales can be safely stored outside without odours, leakages or fire risk