



All Wrapped Up

Panu Kantosalo, Cross Wrap, explores bale wrapping and bale opening for cement kilns.

The optimisation of waste fuel flow and handling can be done safely and with high capacity by using cross-wrapped bales and bale openers at the kiln feeding end. This solution helps the overall operation to be flexible and productive, while remaining compact and robust.

The cement industry is constantly increasing the amount of waste-based fuels to be used as a main energy heat source. In order to do this, many companies have incorporated into their kilns technologies that can use refuse-derived fuel

(RDF) or solid recovered fuels (SRF), to be fed partially to the burning process. This operation can give these companies a more carbon-friendly footprint and promotes more sustainable operation.

RDFs and SRFs are commonly used in two different ways. Some cement kilns receive and use the fuel as a loose material, but this is only cost effective when the fuel source is very close by – preferably on the same plant. Other cement kilns receive the material in baled and wrapped form from different operators. This method is also logistically cost effective, keeping the fuel dry and in stable form, even if it needs to be stored outside.

Due to the impacts of environmental restrictions, corporate responsibility, and greener corporate image, many cement

producers have been renewing their production lines to adapt to the use of waste-based fuels. The changes and upgrades needed are technical, but the outcomes can be positive.

Cement kilns run high automation level processes that are monitored and adjusted flexibly to the need of the current production level. This is one reason why the use of baled and wrapped fuel is a good option for kilns. This way, the material can be safely stocked onsite in large amounts. Wrapped bales also maintain the fuel's calorific value at a high level, while storing and keep the plant litter free and fire safe.

Keeping the fuel flow and quality high

The optimisation of waste fuel flow is one part of the cement manufacturing process. The flow needs to be constant and the fuel material needs to be high grade to give the best possible output and final product quality. Both the wrap and the tying material must be removed from the RDF or SRF bales in order



Figure 1. Cement plants need a steady flow of fuel material that is usually transported with conveyors.



Figure 2. Cross Wrap Bale Opener combines fully automatic, high capacity bale opening with wrapping material removal, together with a robust structure that lasts even in the most demanding surroundings.

to keep the fuel material loading and feeding system operational. The metal tying wires can be a problem, if they enter the fuel feed at a point where they can create blockages and machinery breaks. Luckily, there are machines available that can help to conquer this problem.

For example, the Cross Wrap bale opener is engineered to open the bale and remove the bale wrap and ties automatically. The machine has evolved throughout the years and it has been a proven solution for many waste-to-energy sites globally. Operational benefits arise from a high automation level, flexible operation, and ease of maintenance and kick off. These benefits help to streamline and optimise production, while wrapped material ensures the high calorific value of the fuel itself.

Cross Wrap's current cement industry customers have been using the bale opener for a long period of time, so the machine's structural and mechanical features have been tested. Some of the features have now been updated to work similarly to a bale dewiring machine, which has been a revolution among the plastic and paper recycling industries.

Constant evolution and technical upgrades can be backed up with in-house service and upkeep.

Automation offers more safety and capacity

Automatic bale opening machines also have a direct impact on production feeding line safety and capacity. When a bale opener is equipped with a feeding conveyor, it can be loaded flexibly and with no rush. The machine opens the bales automatically and it can vary its speed regarding the feeding line's changing input speed. Machine automation, remote control, and a feeding conveyor loading time buffer give the loader more time and possibilities to operate the loading area with no rush. This is safe and stress free. Also, there is no need to jump in and out of the loader, meaning the work itself is worker-friendly and clean.

The automatic operation helps to boost the feeding line capacity when needed, and the gentle bale opening operation keeps littering and dust levels at a minimum. Cross Wrap bale openers remove the bale wrap and ties from the bale by cutting them open and spooling the wrapping material to one side, from which position it is easy to pick up and send it to further handling. By using a direct wrapped bale, further packing material handling is made even more simple. This is because the unique tie-free wrapping operation of Cross Wrap's direct wrappers mean that there are not multiple packaging materials. The plastic wrap is made of 100% recyclable material, so it can be reused, and it keeps the RDF and SRF

material safely packaged, even in the toughest storing and transportation conditions.

Tightening regulations

The critical environmental aspects and global efforts to minimise the usage of fossil fuels will also impact the cement industry. Waste-based fuel usage may increase through time, and tightening material transport, handling, and storing regulations will create changes in the operations that are nowadays commonly used. For example, in Austria, in 2019, legislation is tightening around the storage of waste and recycled material, so that, in the future, the materials cannot be stored outdoors without wrapping.

Lowering the carbon footprint is a global priority and a way to move towards more



Figure 3. Cross Wrapping the RDF and SRF material offers a clean and cost-effective method for transporting and storing the waste fuels.

environmentally-sustainable production. This creates the need to incorporate alternative fuels and more capable transportation and storing methods. So far, the most economical way to transport waste-based fuels has been in baled form. In this method, the waste fuel material characteristics require a protective wrap.

Another way in which this wrapping can be beneficial to the industry is its buffer storing capability. The wrapped fuel is stable and it can be stored outdoors without the risk of combustion, unwanted littering, or the escape of odours and other greenhouse gases. The law changes in Austria were deployed just to keep the waste material odours and gasses under control. This may well be a direction that other countries need to follow.

In the future, it is likely that more resources will be derived and manufactured from waste material – which will have large-scale impacts on all industries. And because humankind has not yet discovered Star Trek's "beam me up, Scotty" teleporting method for material transportation, it is important to use the best practices available. Therefore, baling, wrapping, and automatic opening solutions are a good way to handle waste materials in an environmentally friendly way.

The time is now

Many cement kilns run at high capacity. This means that modernisation and automation investments need to be planned carefully. The whole plant is as good as its weakest point, so most of the machinery investments undergo tight evaluation and screening. For this reason, industry proven solutions that have been incorporated to a similar operation elsewhere are economically the safest way to modernise a cement production line.

When sales personnel and engineers come together with a buyer's staff, it is possible to find the most suitable system to incorporate to an existing production line. For Cross Wrap, the modular structure of its machinery keeps layouts compact, simple, and easy to setup during normal maintenance shutdown.

From the manufacturer's point of view, the best time to start planning for a waste fuel system introduction is now. The technology is already here and its interest has been constantly growing in the industry. The strongest and the pioneers will choose the greener way of doing things. Others need to adapt to the same methods in the long run. So why delay the process, when you can be one of the industry pioneers? ■

About the author

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